THE ACQUISITION AND USE OF KNOWLEDGE ABOUT THE STORY SCHEMA

By

ROSEMARY ELAINE YOUNG, B.A., M.A.

A Thesis

Submitted to the School of Graduate Studies

in Partial Fulfilment of the Requirements

for the Degree

Doctor of Philosophy

McMaster University

THE ACQUISITION AND USE OF KNOWLEDGE ABOUT THE STORY SCHEMA

DOCTOR OF PHILOSOPHY (1983)
(Psychology)

McMASTER UNIVERSITY
Hamilton, Ontario

TITLE: The Acquisition and Use of Knowledge about the Story Schema

AUTHOR: Rosemary Elaine Young, B.A. (McMaster University)
M.A. (University of Toronto)

SUPERVISOR: Professor Ian M. Begg

NUMBER OF PAGES: xiii, 190

ABSTRACT

The general purpose of this thesis was to examine the process of acquiring knowledge about the story schema and the ability to use that knowledge to understand and remember stories. At a more specific level, the thesis examined the effects of experience with stories in the preschool years on the acquisition and use of knowledge about the structure of stories.

Experiments 1 and 2 assessed the hypothesis that there are social class differences in 4- and 6-year-old children's knowledge of the story schema, and in their ability to comprehend and recall stories. When middle-class children describe and recall picture stories, they emphasize the aspects of the pictures that are central to the gist of the story. Lower-class children emphasize inessential details, include many spurious statements, and seldom note relationships between pictures. In a rearrangement task, only the middle-class children schematize scrambled stories into a sequence that is strongly related to the original story.

Experiment 3 investigated the effect of an intervention program on 4-year-old lower-class children's knowledge of the story schema and ability to understand and remember stories. There were no differences between children in the experimental group and two control groups prior to treatment. After 26 traditional picture stories were read to them, children in the experimental group describe, recall and rearrange

stories like their middle-class age-peers in Experiment 1. Children in the control groups show no such improvement.

The theoretical implications of identifying a method of empirically investigating the process of acquiring knowledge about the story schema are discussed. The educational implications that the class difference and the effective intervention program may have for lower-class children's achievement in the story-laden primary grades are considered.

Acknowledgements

The research reported in this thesis could not have been completed if others had not been generous with their knowledge and their time. The original thesis proposal was completed under the supervision of the late Professor Glenn Macdonald at the University of Toronto. The final design of the first two experiments is the product of many fruitful hours of discussion with Professor Macdonald. The actual completion of the first two experiments, however, as well as the design and execution of the third experiment would not have been possible without the supervision of Professor Ian Begg. Ian has the rare talent of effectively combining the roles of the appropriately harsh critic, the supportive supervisor and the friend. I personally, as well as the thesis, have benefitted greatly from my interactions with him throughout my tenure as a student at McMaster. The other members of my thesis committee, Dr. Linda Siegel and Dr. Richard Bourhis, deserve thanks for their comments on my progress reports and my thesis.

Maureen Segato was a most receptive listener for all the children. She displayed the same enthusiasm when hearing about a story with a frog in it on the four-hundredth occasion as she did on the first. Maureen also transcribed and coded protocols for reliability purposes. The many hours she spent on the often snowy roads between Hamilton and Toronto, and her skill at catching and holding frogs that were hopping to the principal's office also must be acknowledged.

Finally, her friendship and constant encouragement of my academic endeavours have been important, especially during the past three years.

Donald Rutledge, the Associate Director of the Board of Education for the City of Toronto, played a major role in obtaining permission for me to conduct the research in the participant schools in Toronto. He also read my thesis proposal and progress reports, offered insightful comments on them, and displayed his enthusiasm about the potential theoretical and education implications of the research.

The children who were involved in the studies reported in this thesis and their parents are thanked for their participation. The cooperation and assistance of the supervisors, principals and teaching staff at all the schools involved in the study also is gratefully acknowledged. Special thanks are due to Donald Urquhart, the principal, and to Rosemary Morton, the teacher, who willingly agreed to tolerate the months of disruption that were an inevitable part of the intervention study reported in this thesis.

I am grateful to my friends, Bev Bardy, Gordon Hayman, Janet Olds, Helen Rypma and Harvey Weingarten, all of whom contributed to the completion of this thesis in less obvious, but important ways. Don Shattuck is thanked for helping and for enduring.

Finally, my acknowledgements would not be complete if I did not mention my family, especially my parents. The love, support (emotional and financial) and encouragement that my mother and father have given me has carried me through this venture as well as many others. The other

Youngs, Barbara, Martin, David and Pat, also have contributed to this supportive environment. My father deserves additional thanks for his careful reading of the thesis and the numerous comments he made on my use and abuse of the English language.

While this research was being designed and conducted, I was supported by Social Sciences and Humanities Research Council of Canada Doctoral Fellowships and a Queen Elizabeth II Ontario Scholarship.

Table of Contents

List of Tables

List of Figures

List of Appendices

INTRODUCTION

During the past decade, a number of investigators in the fields of cognitive psychology, linguistics and artificial intelligence have been attempting to describe the structure of the traditional story and to delineate the cognitive processes that are used in story comprehension and recall. In contrast, earlier studies of language comprehension and memory concentrated on issues such as the grammatical knowledge of an idealized speaker-listener and on how people learned unrelated series of sentences, word lists and nonsense syllables. However, people generally comprehend and remember series of related words and sentences as they occur in conversations, stories, and expository prose. Consequently, the present upsurge of interest in the comprehension and recall of stories is welcome: These recent studies are investigating the cognitive processes that people use to understand and remember materials they actually encounter on a regular basis.

In delivering the Sir Frederick Bartlett Memorial Lecture, Bower (1976, p. 533) commented that the study of understanding and memory for stories is particularly exciting because it provides scientists with "an experimental microcosm in which (is) revealed the operation of the most sophisticated cognitive machinery that men have assembled." Moreover, as Bower indicates, such studies begin to close the traditional gap between memory research and psycholinguistics, personality, social and educational psychology. It seems likely that children and adults listening to or reading stories understand the plot of the story, the

story characters and the motivations for their behaviour with the same processes that they use to understand events, people and behaviour in the real world.

The general purpose of this thesis is to contribute to the literature on the cognitive processing of stories by examining children's acquisition of knowledge about the structure of stories and their ability to use that knowledge to understand and remember stories. At a more specific level, the thesis examines the effects of experience with stories in the preschool years on the acquisition and use of knowledge about the structure of stories. In other words, when preschoolers listen to the proverbial bedtime story, what do they learn?

A review of the literature that describes the structure of stories and investigates story comprehension and recall is appropriate as the theoretical and empirical work in this area provides the background for the present research. Initially, in the literature review, a brief historical overview of the research on story comprehension and recall, and on the structure of simple stories is presented. Subsequently, the current theoretical and empirical work with adults in this area is considered. Then, the available literature on children's knowledge of the structure of stories and on their comprehension and recall of stories is discussed. Finally, the specific questions addressed by the three experiments in this thesis are introduced, and the contribution of this research to the literature on the cognitive processing of stories is clarified.

Bartlett's Investigations of Memory for Stories, and the Story Schema

The seminal work on the understanding of and memory for stories is Bartlett's (1932) Remembering. Bartlett argued that the then-current studies of memory that used the traditional nonsense syllable paradigm introduced by Ebbinghaus were artificial, as they simplified the stimuli but not the responding organism. Consequently, Bartlett (1932, p. 47) chose to use materials that "might fairly be regarded as interesting and sufficiently normal for the subjects concerned not to force upon them ad hoc modes of observation and of recall ...(and that) obviate the necessity for long practice."

Bartlett conducted his studies with many types of meaningful material using a variety of methods. In the studies that are most relevant to the present review, Bartlett used folktales in what he termed the methods of repeated and serial reproduction. In the repeated reproduction paradigm, Bartlett chose to use an American Indian story, The War of the Ghosts (See Appendix I), and other non-English folktales because it seemed likely that the cultural unfamiliarity, supernatural element and dramatic nature of these stories as well as their lack of obvious causal relationships would produce interesting data, especially on the memorial "transformations" or distortion of the original material. Bartlett had a number of individuals read the story twice at their normal reading rate and then, reproduce it several times at intervals varying from 15 minutes to 6 years. Using subjective methods of analysis, Bartlett found that verbatim recall of the material after only a brief delay was rare. Moreover, individuals tended to transform

details, invent new events, and introduce logical connections in their initial attempts at recall. If individuals were asked to recall the story at frequent intervals, their recall took on a standard form across reproductions. In contrast, individuals who recalled the story after lengthy delays continued to transform the structure of the original story and to invent new events and connections.

In the serial reproduction paradigm, Bartlett, who was interested in the cultural transmission of ideas, rumours and folktales, altered the repeated reproduction paradigm such that person A's recall of the story was given to person B to give to person C, and so on. In addition to studying other materials, Bartlett used folktales from unfamiliar cultures, such as the aforementioned The War of the Ghosts. Not surprisingly, verbatim recall of a passage by the first individual in a chain was rare, and transformation and deletion of the original text was common. The distortions produced over a series of individuals were so marked that the final passage bore little resemblance to the original.

On the basis of the data obtained in his studies using the repeated and serial reproduction paradigms, Bartlett concluded that individuals did not have reproductive memories, but rather that they formed an "impression" of the original text and used that "impression" to guide their construction of the story. In an attempt to explain his results, Bartlett discussed the term "schema" as it had been used by the British neurologist, Sir Henry Head. Although the term seems to have

originated with Kant (1781, pp. 104-107), Head (1920, cited in Bartlett, 1932, pp. 199-200) used the term in a discussion of posture:

> "Every recognisable (postural) change enters into consciousness already charged with its relation to something that has gone before, just as on a taximeter the distance is presented to us already transformed into shillings and pence. ...For this combined standard, against which all subsequent changes of posture are measured before they enter consciousness, we propose the word 'schema'.
> ...Schemata modify the impressions...in such a way that the final sensations of position or of locality rise into consciousness charged with a relation to something that has gone before."

Bartlett found Head's term useful in accounting for his data. Individuals in his study presumably had a schema of what the typical story was like. In reading Bartlett's stimulus stories, their schemata affected their comprehension of the text. In what Bartlett termed an "effort after meaning," the reader of a tale such as The War of the Ghosts used the story schema to make the incoming text conform to this prior knowledge of stories, to "...connect something that is given with something other than itself (Bartlett, 1932, p. 227)." In remembering the folktale, the individual used the story schema to guide reconstruction of the original text. In essence, the individuals in Bartlett's study used the story schema at the time of encoding and during recall to make stories such as The War of the Ghosts conform more closely to the typical British story.

Unfortunately, Bartlett's intriguing, but imprecise observations were ignored until the sixties, as his Gestaltist orientation and methods were quite radical in an era when behaviourist and

associationist ideas and methods flourished. However, Bartlett's concept of the story schema has come to play a critical explanatory role in most of the recent research on story comprehension and recall. Current researchers agree that comprehension and recall are constructive, and that the constructed meaning of a text is the product of an interaction between the text and the individual with his or her interests, emotional attitudes and preexisting knowledge of the world and of stories.

Revival of Interest in the Structure of Stories, Story Comprehension and Story Memory

The recent revival of interest in schemata, in the structure of simple stories and in story understanding and memory has its origins in several distinct lines of research, including artificial intelligence, cognitive and educational psychology, and structural linguistics. Although researchers in each of these areas have different methods of inquiry and spheres of interest, a commonality across these disciplines is a shared interest in the structure of knowledge, the cognitive processing of complex material such as stories, and the representation of meaning.

During the last decade, researchers in artificial intelligence have been attempting to formulate algorithmically explicit and psychologically realistic computer programs that understand stories and other forms of connected discourse. Perhaps the earliest computer simulation of story comprehension was Charniak's (1972) dissertation on children's stories. Charniak found that comprehension of a single

sentence of a story required a considerable amount of background knowledge. Sentences in a story often were abbreviated and elliptical, and assumed background knowledge that was not explicitly expressed in the story. A reader had to possess an organized body of knowledge and use it in a predictive fashion to understand a story. For example, in a story about a birthday party, it would be assumed that the reader was knowledgeable about birthdays, being familiar not only with birthday cakes, games, parties and presents, but also with the structure of birthday parties, birthday games and present giving. More generally, the reader had to have knowledge about objects, situations, actions and events, and sequences of events and actions.

Several years after Charniak's investigation, Schank (1975, 1982a) adopted Abelson's (1975) notion of a "script" to describe the organized knowledge of the world about frequently experienced events (e.g., a birthday party, a restaurant, a lecture or a hockey game) that people use in understanding and remembering connected discourse. Around the same time, other investigators in the artificial intelligence literature were labelling similar knowledge structures as frames (Minsky, 1975; Winograd, 1977) and memory schemata (Bobrow & Norman, 1970; Rumelhart & Ortony, 1977). Although these terms are not synonymous, the concepts are closely related and a discussion of one of them provides a detailed introduction to any other. In this thesis, the term script will be adopted to describe general knowledge about sequences of behaviour primarily because this concept has been tested in artificial intelligence research (e.g., Schank & Abelson, 1977) and used

in psychological research on story and text comprehension (e.g., Anderson, Spiro & Anderson, 1978; Bower, Black & Turner, 1979; Bower & Clark-Myers, 1980; Bower & Belleza, 1982; Den Uyl & Van Oostendorp, 1980).

During the same period that concepts such as scripts and frames appeared in the artificial intelligence literature, cognitive and educational psychologists' interest in the structure of simple stories and story comprehension and memory was rekindled. During the late sixties and early seventies, Bartlett's constructivist view of comprehension and memory and his notion of the guiding role of the schema had received considerable support. Contrary to the prevailing Chomskyan assumptions of the time, it became evident that the meaning of a text was not found in the literate content of that text, but rather it was constructed from it. In a variety of studies (e.g., Bransford, Barclay & Franks, 1972; Sachs, 1967), it was clear that people construct a representation of the meaning of a text when reading it and store that representation in memory rather than the actual surface structure of the text. Moreover, additional research supported the view that the superordinate notions of the theme and title of a passage affected comprehension and memory of the individual sentences in the passage (Bransford & Johnson, 1972; Dooling & Lachman, 1971; Pompi & Lachman, 1967). Finally, a number of demonstrations showed that the reader's prior knowledge affected text comprehension and recall (e.g., Johnson, Bransford & Solomon, 1971; Sulin & Dooling, 1974). One consequence of these demonstrations was that psychologists aiming to understand the

nature of human comprehension and memory became interested in using texts and stories in their studies rather than simple word lists as the constructive aspects of comprehension and memory were most evident when complex material was used.

In an influential paper, Rumelhart (1975) maintained that stories have an internal structure and outlined a schema or grammar that described that structure. Subsequently, a number of investigators have written story grammars derived from Rumelhart's schema that describe the underlying structure of stories (e.g., Mandler & Johnson, 1977; Stein & Glenn, 1979; Thorndyke, 1977).

Working in the more general area of the processing of discourse and the presentation of meaning, Walter Kintsch (1974) developed a propositional model of discourse comprehension that was later applied to studies of story comprehension and memory. A proposition in Kintsch's model contains a predicate and a series of "arguments" (e.g., nouns, adjectives, adverbs, etc.). In a series of papers presented in his 1974 book and in additional studies (e.g., Kintsch, Kozminsky, Streby, McKoon & Keenan, 1975), Kintsch demonstrated the psychological validity of his model. Kintsch's data supported the view that the comprehension of discourse is semantic and propositionally based.

Finally, work in linguistics in the late sixties and seventies prompted a renewed interest in the structure of simple stories. The study of narrative by the French structural linguists (or semiologists who follow the traditions of de Saussure, the linguist, and study sign systems or codes), coupled with Chomsky's work on generative grammar, as

well as linguistic and anthropological research on folktales made the study of narrative a prominent field in linguistics in the past decade (Grosse, 1977; Rieser, 1977). In both psychological circles and in text-linguistics, Teun van Dijk's (1972) dissertation, Some Aspects of Text Grammar, has been especially influential. In his thesis, van Dijk outlined a grammar of the narrative, that is, a formal structure (schema in Bartlett's terminology) that describes well-formed narrative texts. Hé also introduced the terms "narrative macrostructure" and "microproposition", terms that roughly can be translated as the "gist of the text" and "a simple sentence" respectively. Using the category labels that Labov and Waletsky (1967) adopted to describe the structure of natural narratives, people's stories of their experiences, van Dijk proposed that simple stories consisted of an exposition, complication and resolution, and optionally, an abstract, an evaluation and a coda (i.e., moral). In a later section of this review, the theory of narrative proposed by van Dijk (1972) will be discussed in greater detail. At this point, however, it is worth noting that van Dijk's work has become well-known in cognitive psychology as he has collaborated with Walter Kintsch on a number of theoretical and empirical endeavours (e.g., Kintsch & van Dijk, 1975, 1978; van Dijk & Kintsch, 1977).

Current Approaches in Research on the Story Schema and the Cognitive Processing of Stories

Current investigators (e.g., Bower, 1978; Johnson & Mandler, 1980; Kintsch & van Dijk, 1975, 1978; Mandler & Johnson, 1977; Poulsen, Kintsch, Kintsch & Premack, 1979; Rumelhart, 1975; Stein & Glenn, 1978;

Stein & Trabasso, 1982; Trabasso, Stein & Johnson, 1981; Thorndyke, 1977) agree that simple stories have a definite structure, and a constant set of constituents including a setting, a protagonist, a theme, a plot, an episode or episodes and a resolution or outcome of the episode(s). Those abstract constituents are combined in a regular way so that the story becomes a coherent memorable whole. Surprisingly, for both linguists and psychologists, the Soviet linguist Propp had reached the same conclusions by 1928. Propp analyzed Russian folktales, described their narrative structure and identified thematic and "syntactic" units of the narrative. However, his work was unknown in most of Europe and North America until 1968 when The Morphology of the Folktale was published in English. In fact, since the beginning of this century, linguists, anthropologists and historians of folk tales (e.g., Colby, 1973) have studied the common structure that underlies folktales. Folktales, being part of an oral tradition, and thus passed from generation to generation, presumably have to conform to a simple, regular memorable structure to survive. Forgetting exerts a strong selective pressure on stories, ensuring survival of only the "fittest" folktales and eliminating the rest.

The notion of a definite story structure, a story schema, can be used to represent an adult's knowledge about the form of simple stories. Presumably on the basis of hearing, reading and viewing hundreds of stories (e.g., Bower, 1976; Mandler & Johnson, 1977; Thorndyke & Yekovich, 1980), adults have acquired a body of knowledge, a schema (or series of interrelated schemata) that describes the typical story and

its variants. Usually, theorists maintain that individuals abstract the prototypical properties of stories from their experience with stories, and presumably, use this prototype or story schema to judge if a new text is a story (e.g., Bower, 1976; Mandler & Johnson, 1977; Stein & Trabasso, 1982; Thorndyke & Yekovich, 1980). An alternative view that is implicit in much of the current literature on classification learning (e.g., Brooks, 1978, Note 1, Note 2; Medin & Schwanefluge1, 1981; Medin & Smith, 1981) is that adults have stored a body of stories in memory that serve as examples or instances of the typical structure of a story. In this latter view, a new story would serve as a retrieval cue to the individual who would access the story schema, a body of exemplars in memory, and subsequently decide if the new text was a story. In either case, it is not assumed that an individual is conscious of forming or using a story schema. Given individual differences in experience with stories, it is assumed that there are idiosyncratic variations between individuals' story schemata, although any person with extensive experience with stories would have a story schema. The story schema is not thought to have an immutable form, but rather experience with stories with a novel structure presumably leads to modifications in a story schema.

Psychologists studying the structure and cognitive processing of stories agree that adults use the story schema for several purposes: to interpret and comprehend new stories they hear, to guide their construction of a new story or summary of a familiar story, and to remember a story (e.g., Bower, 1976, 1978; Kintsch & van Dijk, 1975,

1978; Johnson & Mandler, 1980; Mandler & Johnson, 1977; Thorndyke, 1977). However, two different methods of describing the schematic structure of stories have emerged. The story schema model that Kintsch and van Dijk have proposed (1975, 1978) differs in some respects from the related story grammar model that Rumelhart (1975) developed and others (Johnson & Mandler, 1980; Mandler & Johnson, 1977; Stein & Glenn, 1979; Thorndyke, 1977) have modified. Nevertheless, proponents of these models share a number of assumptions about the underlying structure and cognitive processing of stories. Moreover, all of these investigators have adopted Kintsch's (1974) propositional scoring methods or variants thereof.

Kintsch's Propositional Representation of Meaning

Kintsch's (1974) well-developed propositional model for representing meaning in memory has proven to be a valid and useful analytic tool for investigations of comprehension and memory for discourse. A text base that represents the meaning of the text is constructed from a list of ordered propositions in Kintsch's model. In essence, a proposition is constructed from word concepts that are part of one's lexicon and thus are stored in semantic memory, a person's knowledge. Each proposition consists of a predicate or verb and one or more arguments that describe or qualify the predicate. The arguments may be word concepts (indicated by the word) or other propositions (indicated by their number in the text base). For example, Kintsch (1974, p. 62) derives the following text base or propositional structure from the sentence "Jane slept on the sofa after the dance.":

1 (SLEEP, JANE) = α
2 (LOCATION:ON, α, SOFA) = β
3 (TIME:AFTER, α, DANCE) = γ

Proposition 1 or α is repeated in propositions 2 and 3, or β and γ, and connects the propositions in the text base. Additionally, the repetition of α also orders the propositions such that it is superordinate to β and γ because α is repeated as an argument of β and γ. The ordering of the propositions provides an index of their importance in the text. In the example given, the fact of Jane's sleeping is more important than the time or location of her sleeping.

Kintsch (1974, 1975) and his colleagues (Kintsch et al., 1975) have reported a number of experiments that aimed to test the validity of the propositional representation of meaning. If propositions are a meaningful psychological variable, reading times for texts should be related to the number of propositions in the text base when the number of words is controlled. Moreover, the number of propositions recalled should be related to reading time in a regular way. Kintsch and Keenan (Kintsch, 1974) used 14 to 16 word sentences with 4 to 9 propositions in the corresponding text base, and found that subjects' reading time increased as a direct function of the number of propositions. Furthermore, the number of propositions recalled was positively related to time spent reading the passage and accounted for approximately 25% of the variance in reading times (Kintsch, 1975).

Kintsch (1975) reported that the complexity of the surface structure of a passage, when the propositional content was held constant, was positively related to reading time. However, surface

structure of a text did not affect its long term memory representation (Kintsch, McKoon & Keenan, 1974). Using questions that concerned propositions explicitly stated in the surface structure as well as ones that were only implicit in the surface structure but present in the text base, Kintsch et al. (1974) found that explicitly stated information was verified faster than implicit information, both immediately and 30 seconds after reading. After delays of 20 minutes and 48 hours, however, there was no difference between the times for verifying explicit and implicit information. Thus, the results support the view that one's memory for a text is not based on its surface structure, but rather on the propositional text base. In a related study, Baggett (1975) found that memory for the surface information contained in picture stories persisted for a longer period of time. It was not until 72 hours had elapsed that there was no difference in the time it took subjects to verify pictures that were actually seen and those that contained information that was only implicit in the picture stories. Nevertheless, when subjects were given a task that demanded them to access their surface memory for the pictures after 72 hours, they could do so. However, if they had to answer written questions about whether or not an event occurred in the picture story, there was not a difference in the time it took to verify explicitly seen and implicit information from the picture stories both immediately and 15 minutes after testing. Bagget concluded that, although a strong surface memory for pictures exists, memory for pictures is propositional in nature. Thus, when subjects have to respond to written questions about

information in a picture story, they access their nonpictorial, propositional memory rather than their surface memory of the picture.

In the propositional model, the hierarchical level of a proposition, as determined by its number of shared arguments, is taken as an index of that proposition's importance in the text. One prediction that follows from this notion is that important propositions, ones high in the hierarchy, should have a higher probability of being processed and recalled than unimportant ones. To test this prediction, Kintsch et al. (1975) asked subjects to read short paragraphs and subsequently to recall them. They analyzed the probability that propositions were recalled as a function of their level in the text base. The results showed that hierarchical level was negatively related to the probability of recall, with the highest level propositions (i.e., number 1 in hierarchy) being recalled most frequently.

The aforementioned studies provide strong support for the validity of propositions as psychological variables. In view of these results, it is not surprising that propositional techniques of analysis are used in most studies of story structure and processing.

The Kintsch and van Dijk Approach to the Story Schema and the Cognitive Processing of Stories

In 1975, Kintsch and van Dijk published their first joint article on the schematic structure and cognitive processing of stories. Given his interest in the propositional representation of meaning in memory and in resultant questions about the hierarchical structure of a text, the study of the story schema and the cognitive processing of

stories was a likely area of research for Kintsch to pursue. Similarly, cognitive psychology was a germane area for van Dijk who, having recognized the necessity of empirically testing his theoretical notions about macrostructures (van Dijk, 1972, 1976, 1979), was conducting "rather primitive experiments (van Dijk, 1980a, p. 10)" on story processing in collaboration with his students of theoretical poetics.

The notion of the story schema used by Kintsch and van Dijk is derived from the extensive anthropological, linguistic and philosophical literature on story structure, that, in large part, originated with Vladimir Propp in 1928. In this literature, the exterior level or surface text of a story is distinguished from what is known, in the language of the French structuralists, as the "immanent level" of the story (Grosse, 1977). The immmanent level includes both the universal structure of the narrative, that is, the story schema proper, and general knowledge scripts about human behaviour needed to interpret the actions in the narrative. In most research on stories, the two components of the immanent level of stories are confounded although some recent research by Bower and his colleagues (e.g., Bower, 1978; Bower et al., 1979; Owens, Bower & Black, 1979) has separated these components.

The story schema specifies that a story includes types of actors and functions. Functions are major actions in the story (e.g., departure, struggle, rescue of the hero, punishment) that propel the story through the narrative sequence (i.e., from the initial situation to the denouement). In contrast to Propp's (1928) conceptions, the order of actions in a story is not considered to be fixed (Grosse, 1977;

van Dijk, 1972). However, the narrative category to which an action belongs is part of a fixed sequence. A story begins with an action which serves as an "exposition" and is followed by an action in the "complication" category and finally, by one in the "resolution" category. The exposition (E) of the story introduces the main character(s) and outlines the physical, temporal and/or socio-cultural circumstances of the character(s). Reference to this initial setting permits the next part of the story, the complication (C), to develop. The complication presents something remarkable or interesting, an unexpected change in the course of events. The resolution (R) ends the events precipitated by the complication, restoring a stable state. The reactions of the protagonist or narrator to the sequence of events ("evaluation") and a moral derived from the story ("coda") may follow the resolution. Together, the exposition, complication and resolution form an episode. All stories consist of at least one episode. Frequently connectives are used to signal a change in the narrative category (Kintsch, 1977; van Dijk, 1976, 1977, 1980b), just as "once upon a time..." signals the beginning of a story, the exposition. For example, "suddenly," "unexpectedly," "but then," and "however" often indicate a transition from the exposition to the complication. Similarly, the transition from the complication to the resolution may be signalled with "so," "thus," or "finally."

Complex stories can be built by combining episodes on the basis of certain rules of concatenation and insertion. When episodes are concatenated, a proposition or series of propositions will belong to two

narrative categories from different episodes (e.g., Resolution of episode 1, and exposition of episode 2, i.e., R_1 & E_2). Using an example from Grosse (1977), in a story about a hold-up, the success of the previously planned hold-up is both the resolution of the first episode and the exposition of the second, as the second episode concerns the police investigations that lead to the identification and punishment of the robbers.

In addition to the embedded episodes that are formed by rules of insertion (e.g., $E_1C_1E_2C_2R_2R_1$), an inserted episode may belong to a narrative category in the other episode. For example, the complication of episode 1 may consist of episode 2 (i.e., $C_1=E_2+C_2+R_2$). In some complex stories, "bracketing" also may occur. In essence, this occurs when there are two main actors in a story, a protagonist and antagonist, and an action has quite different functions for the two participants. Thus, two plots can develop simultaneously and interdependently. For example, in The Three Little Pigs, the wolf and the pigs have antithetical goals. The three pigs are introduced and set out to establish their homes in the world (E_1). A second exposition, that is also a complication for the pigs, occurs when the wolf is introduced. The resolution of the wolf episode occurs when the wolf lands in the stew pot and dies; it is also the resolution of the third pig's struggle to build a home and find food. The demise of one actor is the rise of the others.

The story schema described above is used in comprehending a story. The schema provides an organizational structure for the input

material and allows the reader or listener to generate the "macrostructure" or gist of the story (Kintsch & van Dijk, 1975, 1978; van Dijk, 1977, 1980a, 1980b). In essence, the story schema is a general framework, an expectation about the input material. By way of analogy, the schema is a framework of categories or slots that stand in relation to one another. The actual content of the story allows one to fill these slots with particular actions and/or objects from the story.

What, then, are the cognitive processes that a reader or listener uses to comprehend, recall, and/or summarize a story? Kintsch and van Dijk (1978) recently proposed a partial model to describe discourse comprehension and production. For input, the model uses Kintsch's (1974) propositional representation of textual material. The individual propositions and their relations to one another constitute the microstructure of the text. The semantic macrostructure of the text describes the text at a more global level, and theoretically, is generated by a series of rules that reduce and organize the microstructure into a series of macropropositions. Several levels of macrostructure may be produced as the rules also may be applied recursively to already-formed macropropositions.

Kintsch and van Dijk (1978) propose that the three macrorules formulated by van Dijk (1977, 1980b) can account for the process of reducing a text to a macrostructure: selection or deletion, generalization, and construction. When macropropositions are being inferred from the explicit text base, the global truth and meaning of a text are preserved by the macrorules. The selection rule permits one to

delete details if they are not necessary for comprehending other propositions in a discourse. Thus, in a story in which a protagonist ate in a restaurant, irrelevant propositions about sitting down, ordering from the menu, paying the bill and tipping may be deleted. Only a macroproposition such as "He ate in a restaurant." would be stored. The generalization rule operates on sequences of propositions and replaces them with a more general proposition by selecting the immediate superset or superconcept. For example, if a protagonist has a cat, a dog and a budgie at home, the generalization rule would subsume these propositions into the more general proposition "She has pets," but not into "She has vertebrates." The third macrorule, construction, also operates on sequences of propositions and replaces them with a more general proposition. However, in contrast to the generalization rule, which operates on given facts, the construction of a new macroproposition is based upon an inference that produces a summary proposition that is not part of the text-base or entailed by it. Thus, in a story in which Mary goes to the airport, buys a ticket, and stands in a departure lounge, a macroproposition "Mary took a plane" would be constructed by inference. A constraining zero rule also applies so that macropropositions in the text base are not altered. Moreover, an upper bound is placed on the application of macrorules so that it will only apply on sequences of propositions. In this way, meaningless generalizations such as "She did something" are not produced.

Kintsch and van Dijk (1978) assume that a story is processed in chunks of several propositions at a time. During this initial

processing, the propositions may be stored in long-term memory. After the completion of the first processing cycle, a subset of propositions is stored in a short-term memory buffer. The propositions in the buffer, probably more important ones (i.e., shared arguments with other propositions) and more recent propositions, remain there while the next chunk of propositions is processed. After the processing of the second chunk, a subset of the most important propositions encountered in the two cycles is held in the buffer. This continues until the end of the text. Throughout this cyclical processing, the macrorules will be applied. Moreover, all the while, the reader's or listener's knowledge of the schema is controlling macrostructure or gist information, by determining which micropropositions or constructions and generalizations are relevant for the schematic structure of the story. Drawing upon an earlier analogy, micropropositions and macropropositions are assigned to the slots the story schema provides. Thus, the final sequence of macropropositions derived from the text has the schematic structure of a story. The story schema places some semantic constraints on processing, in addition to those required for coherence, and so on. For example, a complication macroproposition must be an interesting or remarkable event that disrupts the equilibrium of the setting. A resolution requires an event that will restore equilibrium.

A number of experimental predictions follow from the Kintsch-van Dijk model of processing. For example, propositions that participate in a number of processing cycles will have a higher probability of recall than those that do not. Consequently, propositions that are important

in a schematic story should be remembered frequently. The available evidence supports this prediction (e.g., Byrd, 1981; Denhière & Le Ny, 1980; Kintsch & van Dijk, 1978; Spilich, Vesonder, Chiesi & Voss, 1979). The model also has been successfully used to predict the readability of texts (e.g., Kintsch & Vipond, 1980; Miller & Kintsch, 1980).

Several studies have investigated the model's assumption of a short-term memory buffer that holds already processed propositions while new propositions are processed. Spilich et al. (1979) examined this assumption by fitting the model to some recall data obtained from adults, and found that the best fit for these data assumed two buffers. Spilich et al. suggested that the second buffer was an "active list" in long term memory while the first was the working memory buffer described by the model. Daneman and Carpenter (1980) provided converging evidence for the model's assumption of the short-term working memory buffer when they found that readers can, upon request, recall the last words of unrelated sentences they have read. Fletcher (1981) used the Kintsch and van Dijk (1978) model to predict which propositions from a variety of texts should be held in the short-term memory buffer. In a cued recall task that occurred while subjects were reading the texts, he found that the propositions that should have been in the buffer were recalled more accurately and identified more quickly than others, including those read in the same processing cycles. Thus, the data support the model's assumption about the availability and use of a short-term working memory buffer. Presumably the propositions held in the buffer are used to guide the integration of new propositions into

the long term representation of the text, and allow the reader or listener to develop a coherent representation of the text.

Kintsch and van Dijk (1978) and other investigators in the area (e.g., Bower et al., 1979; Poulsen et al., 1979; Schank & Abelson, 1977) agree that the comprehension and recall of stories entails not only use of the story schema but also the use of scripts that are needed to interpret the story (Bower et al., 1979; Kintsch & van Dijk, 1978; Owens et al., 1979; Poulsen et al., 1979; van Dijk, 1977, 1980a, 1980b). Scripts have nothing to do with the story per se, but rather belong to a general theory of knowledge. Scripts enable a listener, reader or viewer to interpret the actions within a story. For example, the exposition of a story could introduce a hockey player whose ambition is to score 60 goals in a certain season. In the complication category, the player, when crossing the blue line, could fall and suffer an unexpected injury that seems likely to frustrate his attempt to attain his objective. In the resolution category, the player might reach his target because the injury heals faster than expected. In the case of such a story, a script pertaining to the game of hockey would be called upon to interpret the events of the story such as the significance of the blue line and of scoring so many goals (Schank & Abelson, 1977). An adult's knowledge includes hundreds of stereotypic actions, such as eating in a restaurant, going to a lecture, visiting the doctor and so on. These scripts enable understanding when a person reads, hears about or observes someone engaged in a routine activity. Thus, scripts are used along with the story schema to comprehend the story and produce its

macrostructure or gist (Bower, 1978; Bower et al., 1979; Kintsch & van Dijk, 1978; Owens et al., 1979; Poulsen et al., 1979).

Prior to reviewing the empirical studies of the use of the story schema and scripts in story comprehension, recall and summarization, the story grammar models should be discussed. Proponents of this approach have suggested that a set of grammatical rules, analogous to those governing sentence formation, govern story formation.

The Story Grammar Models

At the same time that Kintsch and van Dijk were formulating their model of story comprehension and Schank was formulating ideas about scripts, David Rumelhart (1975) was developing his theory about the story schema. Rumelhart (1975) maintained that the internal structure for a story could be described by a grammar in the same fashion that the internal or deep structure of a sentence was described by a grammar (cf. Chomsky, 1957, 1965). Theoretically, once a grammar was written, a story, like a sentence, could be labelled as grammatical or ungrammatical (Rumelhart, 1975). Rumelhart's (1980a) intention, however, was to describe the constituents of a story and to test the psychological reality of those constituents by empirically evaluating predictions made by the grammar. Rumelhart adopted the linguists' convention of rewrite rules for writing his story grammar. In linguistics, rewrite rules are used to break a sentence into its constituent parts. Initially, the rules are applied to the "Sentence" and produce constituents such as "Noun Phrase." Then, successively smaller units such as "Noun Phrase" and "Verb Phrase" are rewritten

until the lowest constituents, the words or morphemes, are generated (Taylor, 1976). Rumelhart (1975) applied rewrite rules to the "Story," breaking it down into its constituent parts. Initially, a "Story" was rewritten into a "Setting (i.e., exposition)" and an "Episode." A "Setting" allowed an "Episode" to occur. An "Episode" consisted of smaller units, including an "Event" (i.e., complication in Kintsch & van Dijk), and a "Reaction," the "Event" initiating the "Reaction." In turn, the "Event" and "Reaction" could be rewritten. The "Reaction," for example, consisted of an "Internal Response" and an "Overt Response." The protagonist in Rumelhart's rewritten story applied a "Plan" that had a "Consequence (i.e., resolution)." Eventually, the individual phrases in the story were generated from the rewrite rules. Rumelhart also described 13 summarization rules to describe how the story was reduced. Since 1975, Rumelhart (1977, 1980b; Rumelhart & Ortony, 1977) has revised his schema, replaced rewrite rules with computer programs that define the theory, and emphasized how the protagonist is problem solving as he/she seeks his/her goal. In 1975, Rumelhart used the term "story schema" as a label for his grammar. Subsequently, he has used the term in a much broader sense to cover notions such as scripts (e.g., Rumelhart, 1977b, 1980a, 1980b; Rumelhart & Ortony, 1977). To avoid potential confusion, Rumelhart's "schema" for stories will be called a grammar as will the other comparable story grammars. When used, the term story schema will reflect Kintsch's and van Dijk's assumptions.

Within two years of Rumelhart's original description of the story grammar, Thorndyke (1977), Mandler and Johnson (1977), and Stein and Glenn (1977) proposed three similar modified versions of Rumelhart's grammar. Thorndyke (1977) emphasizes the goal-directed nature of stories and the hierarchy of goals a protagonist may have. Mandler and Johnson (1977), and Stein and Glenn (1977) have proposed story grammars that are more similar to Rumelhart's than Thorndyke's as they do not stress goal hierarchies and goal-seeking behaviour. The four story grammars differ from Kintsch's and van Dijk's model in that the structure of a story and its semantic content are linked in the story grammars. For example, attempts, motivations and outcomes are terminal categories. Thus, the story grammar models are very specific and can be used in research only with very simple stories that usually are constructed specifically for this purpose. The general constituents of the story grammars are subsumed in Kintsch's and van Dijk's exposition-complication-resolution structure. The latter, more general schema model can be used to describe the structure of pre-existing children's stories and folk tales. An additional advantage of Kintsch's and van Dijk's model is their description of the role of the story schema in story comprehension and recall. In contrast, proponents of the story grammar model have not yet described a comprehension model that allows the reader or listener to analyze the story constituents, and then, to assign them to a structural category.

Adults' Use of the Story Schema and Prior Knowledge in Story Comprehension, Recall and Summarization

During the past decade, a large body of empirical work has assessed the psychological validity of models of the story schema. In spite of the diversity of theoretical orientations, experimental hypotheses and research methodologies that characterizes the literature, these investigations of the story schema and its role in cognitive processing have produced a body of remarkably consistent results. However, the area is not without controversy.

Research on the cognitive processing of schematic stories has focussed primarily on three questions. First, do variations in the structure of a story account for differences in understanding and remembering stories? If the distinction between the story schema and the semantic content of stories is psychologically real, then investigations of the aforementioned question should be able to demonstrate that comprehension and recall of stories is affected by variations in the structure of the stories that are independent of semantic content. Second, are some elements of a story more important than others? If distinctions between importance levels are valid, then the more important elements of a story (i.e., the macropropositions) should appear more frequently than less important elements in story summaries and recall protocols. Third, does knowledge of the world interact with knowledge of the story schema and affect the comprehension, encoding and recall of stories? If scripts (i.e., knowledge of the world) and knowledge about the structure of stories

each make a contribution to story comprehension and recall, then it should be possible to demonstrate that variations between individuals' scripts are associated with differences in how these people understand and remember the same stories.

(A) The Story Schema and Importance Levels

In fact, a number of studies have simultaneously addressed questions about the validity of the story schema and the relative importance of story propositions. A consideration of some representative data from these studies is merited. Do structural variations in stories affect cognitive processing? Are some propositions in a story remembered more frequently than others?

Bartlett provided the first observations about how structural variations in stories affected story memory. He also anticipated current notions about "levels" of importance. The War of the Ghosts was subject to more elaborations and deletions in recall than the more schematic stories and texts used in the same studies. Interestingly, in spite of these elaborations and deletions, some elements of the text were recalled more frequently than others (e.g., black issuing from the mouth). The same trend was found with other stories. Bartlett's evidence, however, was descriptive. In recent years, more objective methods of assessing story memory (for example, Kintsch's (1974) propositional model) have been used to investigate the questions Bartlett raised.

In one of the earliest recent investigations of story memory, Thorndyke (1977) systematically varied the amount of structure in a

story and examined the effects of these variations on story comprehension, memory and summarization. Thorndyke began with two schematic stories, and then constructed three variants of both of these stories such that each variant removed "more schema" from the story. In the first variant, only the location of the sentence describing the theme of the passage was changed so that it appeared at the end, rather than the beginning, of the text. In the second variant, the theme was omitted. In the third variant, the information was presented in a descriptive rather than narrative format by removing intersentential connectives. However, the actual content of each sentence, and the order of sentences, with the exception of the relocated theme sentence, were held constant across these texts. Finally, Thorndyke constructed a variant of each of these four stories by randomly permuting the order of sentences within the text so that intersentential coherence was destroyed, althdugh he maintained that the syntactic and semantic content of each sentence was preserved. Nevertheless, the destruction of intersentential coherence undoubtedly led to semantic changes in terms of the entire text as the meaning one takes from a sentence often is determined by the meaning extracted from the previous sentence(s) (e.g., Bransford, 1979).

Thorndyke found that both recall and the rated comprehensibility of the texts decreased as the amount of schema decreased. In fact, the ratings of the least schematic versions of the stories and the random passages were comparable as was the amount recalled from both. Individuals who listened to schematic stories recalled more than

individuals who heard distorted stories. When Thorndyke analyzed the recall data in terms of a hierarchical system that specified the importance of propositions in the original stories, he found that important propositions which were central to the story's gist were recalled most frequently by subjects in the normal story condition. Recall of these central propositions systematically deterioriated as a function of the amount of schema in the story: Adults who heard the most deschematized stories recalled inessential details (i.e., micropropositions) as frequently as macropropositions. Finally, Thorndyke found that adults' summaries of the stories increased in length as the schematic structure of the story decreased. Summaries of the least schematic stories and the random versions of the stories were very long, and contained many details and descriptions of individual events. In contrast, the comparatively brief summaries of the schematic stories contained propositions that were central to the story and excluded unimportant details and actions.

Thorndyke's results indicate that the distinction between the schematic structure of a story and its semantic content is psychologically valid. Moreover, his data show that some propositions are more important than others but only in the context of a schematic story. Important propositions that are central to the gist of a story are recalled more frequently than inessential details. A number of investigators have confirmed Thorndyke's findings that the rated comprehensibility and/or the memorability of a story is dependent upon it being schematic (e.g., Kintsch & van Dijk, 1975; Kintsch & Greene,

1978; Kintsch, Mandel & Kozminksy, 1977; Mandler, 1978), and that propositions that are more important in the story are recalled more frequently (e.g., Kintsch & van Dijk, 1975; Kintsch & Greene, 1978; Kintsch et al., 1977; Mandler, 1978; Yekovich & Thorndyke, 1981). Moreover, when the causal and temporal relationships that make a schematic story coherent are obscured and when information is omitted from a story, subjects produce elaborations and distortions in recall that make the text more consistent with a schematic story (e.g., Kintsch & van Dijk, 1975; Kintsch & Greene, 1978; Mandler, 1978; Spiro, 1977; Thorndyke, 1977). The schematic structure of stories also affects reading time (e.g., Haberlandt, 1980; Kintsch & van Dijk, 1975; Kintsch et al., 1977) and the length and quality of story summaries (e.g., Kintsch et al., 1977; Kintsch & Greene, 1978; Rumelhart, 1977).

The psychological validity of the episode in schematic stories has been investigated in studies that have examined the cognitive processing of multi-episode stories. If the episode is psychologically real, then comprehension and recall of stories should vary as a function of episodic structure. There are some data to support this hypothesis. Haberlandt (1980), for example, found that reading times for propositions at episodic boundaries were longer than for propositions within an episode. As this difference could not be accounted for by considering the semantic and syntactic complexity of the propositions, Haberlandt argued that high-level macropropositions are being constructed and transferred to long term storage at this point. Black and Bower (1979) reported converging data from a study in which two

episode stories varied in the number of propositions within an episode. Although the number of propositions within an episode affected the probability that those propositions would be recalled, it had no effect on the probability of recalling propositions from the other episode. Yekovich and Thorndyke (1981) also have found that the episodic structure of a text is related to recall. The conditional probability of recalling adjacent within-episode propositions was significantly higher than that for adjacent propositions that were between episodes. Mandler (1978) constructed two-episode stories in which the propositions from each episode were interleaved. Although some adults recalled the interleaved stories as presented, the majority recalled them as two distinct episodes (Mandler, 1978), even when the importance of verbatim recall was stressed (Mandler & DeForest, 1979).

The available data show that the schematic form of single-episode and multi-episode stories affects their comprehension and recall. It also is apparent that propositions in a story vary in levels of importance. When remembering stories, the more important propositions are recalled more frequently than less important ones. Of course, these generalizations are based on group data. How much variability is there within a group? If individuals have varying life experiences, and thus differ in their knowledge, do they also differ in the way they understand and remember stories?

(B) The Role of Prior Knowledge in Story Comprehension and Recall

Bartlett (1932) assumed that memory for The War of the Ghosts was subject to gross elaborations and deletions because the story was

not schematic for British subjects. This observation of Bartlett's has led to a number of recent investigations of the cultural specificity of the story schema. However, this is not the only form of prior knowledge that has been examined in studies of story comprehension and recall. Individuals who differ in their cultural histories and those who differ in their knowledge about a specific topic have been compared when they read or listen to a story and remember it. The role that script-based knowledge plays in the cognitive processing of stories also has been the subject of a number of inquiries.

Kintsch and van Dijk (1975) conducted one of the first recent studies on cross-cultural variations in the story schema. American students were presented with both a story from the Decameron and an Apache myth, and were asked to summarize them. The length and word difficulty of the stories were comparable. The Apache myth, however, did not readily conform to a story schema. The story propositions recalled in summaries of the Decameron stories were highly similar across subjects. The agreement between the subjects' summaries of the Apache myth was significantly lower. Kintsch and Greene (1978) have reported related findings in a study that used Decameron stories and Athabaskan Indian myths as materials. The Athabaskan myths used had a different structure than typical North American and European stories (Scollon & Scollon, 1981). The individual sentences of Decameron and Indian stories received comparable comprehensibility, imagery, and bizarreness ratings from a group of subjects. However, a second group of subjects rating the entire story on the same measures found the

Indian story to be more bizarre. When a group of judges rated a series of story summaries that had been written by a third group of subjects, the Indian stories received lower rankings. A subsequent study showed that in addition to the poorer quality of the summaries of the Indian stories, there was a bias operating against them in judges lacking a schema for those stories. Kintsch and Greene also examined serial reproduction of stories. Sequential recall of schematic Grimm's fairy-tales was accurate across a five-person chain. In contrast, a number of deletions and gross distortions were noted when Athabaskan Indian stories which deviated from the story schema were transmitted in the same way.

The above results were consistent with the hypothesis that the schema varies from culture to culture. However, Mandler, Scribner, Cole, and Deforest (1980) claim that the data from their cross-cultural study refute that hypothesis. When Vai subjects, semi-literature rural farming people in Liberia, were presented with schematic stories, the pattern and the amount of their recall was comparable to that of University of California (San Diego) students. However, the Vai-speaking subjects' judgments of the stories indicated that they thought they were "real" Vai stories. The fact that the surface structure of the stories had been altered so that dragons and princesses became water people and chiefs' daughters, for example, presumably played a role in these judgments. Nevertheless, the structural aspects of the stories were consistent with Vai expectations. However, Mandler and her colleagues present no a priori reason for expecting the test stories to

be of an unfamiliar form for the Vai. The Vai have been subjected to outside influences since the nineteenth century when Muslim missionaries came to Liberia (Mandler et al., 1980). Moreover, English has been the official language in Liberia in the twentieth century. Thus, even if Vai stories had followed a different schematic structure for centuries, it is not unlikely that stories with a new schematic form would have been disseminated by the Muslims and English who have been imposing their culture on the Vai in the past century. In contrast to Mandler et al., Bartlett, and Kintsch and his colleagues, chose the American Indian stories used in their studies because both the schema and the semantic content of these stories were unfamiliar.

Hypotheses related to the cultural specificity of the story schema are difficult to test. Ideally, one would like to have two sets of stories with each set conforming to a dramatically different story schema. That, in fact, is possible if American Indian stories are used. However, as Kintsch and Greene have indicated, it is impossible to find Apache or Athabaskan Indians in this century who have not been exposed to the North American variety of European culture. The same difficulties are likely to be encountered in Africa, Asia and South America (cf. Lee & DeVore, 1968, 1976).

Richard Anderson and his colleagues have taken a somewhat different, but complementary approach to studying the role of cultural variability in the cognitive processing of stories. Rather than concentrating on the story schema, they have varied the semantic content of stories such that the prior knowledge required to process the text

was expected to vary with individuals with different life experiences. This approach to the study of cultural differences in discourse processing has been quite successful in terms of clarifying the role that cultural knowledge plays in story comprehension and recall.

In what is probably the most interesting study of cultural knowledge, Steffensen, Joag-Dev and Anderson (1979) examined East Indian and American students' cognitive processing of two descriptive passages about an Indian and an American wedding. The scripts for Indian and American weddings are dramatically different. For example, while a family's social status and financial interests are primary concerns in the Indian wedding, North American weddings emphasize elaborate ritual and romance (Steffensen et al., 1979). Additionally, males make the significant decisions for Indian weddings while the bride and her mother share this responsibility in North America. Given these brief examples, perhaps it is not surprising to learn that subjects in the study read their native text more rapidly and recalled more of it; they also produced more appropriate elaborations of the native passage and more distortions of the foreign passage. An independent group of Indian and American judges had rated the importance of propositions in the passages, and the overlap in ratings was minimal. Subjects in the study were more likely to recall propositions from both passages that had been rated as important by members of their cultural group than those rated as unimportant. Anderson and his colleagues have argued that the passages about marriage are banal and predictable to a native, but somewhat bizarre to a foreigner. For example, Indian students were not

familiar with the "something old, something new, something borrowed, something blue" custom in North America and wondered why the American bride would wear an heirloom wedding dress as it was "too old and out of fashion."

Anderson et al. have maintained that the North American Indian stories that Bartlett, Kintsch, van Dijk and Greene have used are bizarre in the same way as their wedding texts, that is, only to a foreigner who lacks the knowledge to interpret the text. However, Scollon and Scollon (1981) have found that the structure of Athabaskan myths, such as those used by Kintsch and Greene, differs from the tripartite structure of North American and European stories. Moreover, as the Anderson et al. Indian and American wedding texts were not stories and as their structures did not vary, the data on comprehension and recall of those texts clearly do not permit any conclusions about the cultural specificity of the story schema. Nevertheless, the Anderson et al. study does clarify the significant role that cultural knowledge plays in the comprehension and recall of prose. Bartlett (1932) himself had recognized that culturally specific knowledge about events influenced story comprehension and recall. For example, he found that students in India elaborated different details when serially reproducing a story than students in England did. However, he maintained that both the structure of a story and knowledge of the world affected memory for stories. The available data allow the possibility that his observations are accurate, but the definitive studies remain to be done.

In another study examining the role of prior knowledge in the cognitive processing of texts (Anderson, Reynolds, Schallert & Goetz, 1977), physical education students and music education students read two texts. One passage could be interpreted as a description of either a prison escape or a wrestling match, while the second described either an evening rehearsal of a woodwind ensemble or a card game. After reading the passages, the subjects recalled them and answered multiple choice questions that were designed to determine a subject's interpretations of the ambiguous passages. The results of the multiple choice tests indicated that physical education students were more likely than music majors to adopt a wrestling interpretation of the one passage. Not surprisingly, music majors were more likely than physical education majors to interpret the other passage in terms of a woodwind ensemble. Approximately two-thirds of the recall protocols contained theme-revealing elaborations and/or distortions that clearly showed subjects' interpretations of the passages. Analyses of the elaborations and distortions confirmed the results of the multiple-choice tests. Pratt, Krane and Kendall (1981) and Sjogren and Timpson (1979) have replicated these results and respectively shown that intonation cues and sex of the subject are variables that affect the passages' interpretations.

Voss and his colleagues have been investigating the role of expertise in the comprehension, recall and construction of texts (e.g., Chiesi, Spilich & Voss, 1979; Spilich et al., 1979; Vesonder, Spilich & Voss, 1980). More specifically, they have examined how individuals differing in their knowledge of baseball understand, remember and

construct texts describing a baseball game. Although these studies of expertise address different questions than the story schema literature, the data also contribute to our understanding of the role of prior knowledge in the cognitive processing and construction of prose.

Spilich et al. (1979) found that baseball "experts" remembered more and different information than baseball "novices" in a free recall task and in their answers to questions about the text. Experts tended to recall important information about the game while novices focussed on irrelevant details such as the weather. Subsequently, Spilich et al. attempted to fit the data to the aforementioned Kintsch and van Dijk (1978) text comprehension model. As noted above, the best fit was obtained when both a microstructure and macrostructure buffer, rather than just one working memory, were assumed. The microstructure buffer was like a baseball scorecard and allowed the experts to keep track of the flow of the game while they monitored new information. Novices had difficulty identifying relevant game actions and thus, did not keep important information in working memory while reading new information.

In a related study, Chiesi et al. (1979) found that baseball experts detected more changes in the text in a recognition task than novices. Moreover, the experts were more likely than novices to recognize changes in the text that were important in terms of the flow of the game. Although the expert and novice groups had been matched on reading comprehension scores, the experts could recall more of a baseball text in both free- and cued-recall tasks than the novices. The experts also needed less information to make recognition judgments, and

made better use of contextual information in cued-recall. Chiesi et al. suggested that the primary difference between the experts and novices was the experts' ability to relate sequential information about the game, that is, to keep track of the flow of game.

More recently, Vesonder et al. (1980) reported that half-inning accounts of a game produced by baseball experts and novices differed in several respects. Experts' texts contained more elaborate descriptions of game actions and related state changes than novice texts. Although the amount that experts and novices recalled from their own texts two weeks after they were written was comparable, experts were better able to recall the "flow" of information in their texts than novices. When other experts and novices read representative expert and novice generated texts, the knowledge levels of the author and reader interacted. Experts recalled expert and novice passages with equal facility while novices' recall for novice passages was much better than for expert passages. Vesonder et al. suggested that their experts' encodings of the text were more unique than the novices in the sense that similar events were more discriminable for the experts than the novices; thus, later retrieval was facilitated (cf. Tulving & Thomson, 1973). Furthermore, like the expert chess player (cf. DeGroot, 1965), the baseball experts were able to recognize and recall game-related patterns with accuracy, and to integrate sequences of significant game-related information.

Scripts are another form of prior knowledge used in story comprehension, recall and construction. The availability of script-

based knowledge seems to facilitate the cognitive processing of stories. Studies related to the use of scripts by adults have emphasized the process of script application rather than differences between individuals' scripts. Moreover, descriptive texts rather than stories have been used in the majority of these studies.

Anderson, Spiro and Anderson (1978) have borrowed Ausubel's (1963) term "ideational scaffolding" to describe how a script, a body of knowledge about a stereotyped action or event, aids story comprehension and recall. To test their hypotheses about ideational scaffolding, Anderson et al. asked a number of individuals to read narratives about either a meal at an expensive restaurant or a trip to the supermarket. The narratives contained the same food items and characters. Foods from categories that were included in people's restaurant scripts were recalled more frequently by individuals who read the restaurant narrative than by those who read the supermarket narrative. The character to whom a food was served in a restaurant was also more likely to be recalled than the character who put a food in the grocery cart at the supermarket. However, the differences in the order of recall were not found across the two narratives, although it was expected that order would be easier to retrieve when applying a restaurant script. Anderson et al. maintained that the restaurant script provided a better scaffold to support the learning of the food categories and the characters to whom foods were attributed.

Bower and his colleagues (e.g., Bellezza & Bower, 1982; Bower et al., 1979; Bower & Clark-Myers, 1980; Owens et al., 1979) have examined

both the content and the application of scripts in text. In a study designed to develop script norms (Bower et al., 1979), individuals were asked to write lists of the actions one usually performs in stereotyped situations such as attending a lecture or visiting a doctor. There was a high level of agreement on the characters, the actions, the order of these actions and the props in the scripts. Perhaps for this reason, false recognition of actions omitted from a script was frequent (e.g., Bower et al., 1979; Bower & Clark-Myers, 1980). When unusual information was included in a script-based text (e.g., tripping over a body when entering a lecture hall, or seeing the waiter help himself to a diner's "pheasant under glass"), this information was recalled more frequently than usual script actions (e.g., Bower et al., 1979; Owens et al., 1979; Bower & Bellezza, 1982). Pursuing some suggestions that Anderson, Spiro and Anderson (1978) made about cognitive processing of scripts, Bellezza and Bower (1982) showed that scripts could serve as cognitive cuing structures in a manner consistent with Tulving's and Thomson's (1973) encoding specificity principle. Tulving and Thomson maintain that the most effective cues for the retrieval of information from memory are those that were available when one learned or encoded an event. Bellezza and Bower (1982) have presented some data that are consistent with the view that, during comprehension, the unusual information in script-based stories becomes associated with the stereotypic script event that usually appears in that script "slot." In recall, the script is activated again, and remembering the stereotypic script event serves as a cue for recalling the unusual information that

was processed with the usual event during comprehension. However, Bellezza's and Bower's data indicated that scripts serve as cognitive cuing structures only for events that met the constraints associated with the corresponding script slot.

Clearly, there is considerable evidence supporting the hypothesis that stories follow a schema that specifies their abstract constituents. Research on the psychological validity of the story schema has demonstrated that adults use the story schema to guide their comprehension, recall and summarization of stories. Culturally specific knowledge and script-based knowledge also have a major role to play in the cognitive processing of stories. The available data indicate that the gist or macrostructure of a schematic story is well remembered in recall and summarization tasks as long as adults have the knowledge to comprehend the text. Secondary details at the microstructure level generally are forgotten or omitted. Moreover, if an element in the macrostructure is not recalled, subjects usually add propositions which fulfil the same function in the macrostructure as the forgotten propositions. In this thesis, the general importance of the story schema and prior knowledge for adults' cognitive processing of stories is taken as established. However, several questions of interest remain unanswered: At what age do children begin to process stories in the same way as adults? How and when do they acquire knowledge about the story schema? Are they able to apply their culturally-based and script-based knowledge to the understanding and remembrance of stories?

Children's Use of the Story Schema and Prior Knowledge in Story Comprehension and Recall

To date, the majority of story-related research studies involving children have concentrated on replicating adult studies with middle-class children. Unfortunately, as the forthcoming discussion of that literature will show, this approach has left considerable gaps in our knowledge. Notwithstanding this trend in the developmental literature, it also is the case that there are some interesting variations from the adult literature in the hypotheses investigated and the experimental methods adopted in developmental studies of knowledge about stories.

The classic work on story comprehension and recall in children is provided by Piaget (1926, 1969). In one study (Piaget, 1969), he found that children under 8 years of age had great difficulty both in constructing stories from a set of two pictures and in rearranging a series of shuffled pictures into a story. Piaget (1926) also found that 6 and 8 year old children could not retell from memory stories just heard. In their attempts to do so, the children confused cause and effect relations and distorted the temporal sequence of events. However, Piaget's data are influenced by the stories he used. Two of his stories, Epaminondas and Niobe, are essentially schema-conforming but they are written in a cryptic style (Mandler & Johnson, 1977; Poulsen et al., 1979; Stein & Trabasso, 1982; Trabasso, Stein & Johnson, 1981). Furthermore, the relationships between episodes in those stories often are indicated by temporal connectives when causal ones are

implied. Piaget's third story, The Swan Story, does not readily conform to a story schema (Mandler & Johnson, 1977). By rewriting Piaget's Epaminondas and Niobe stories in clearer language and inserting the appropriate connectives, Mandler and Johnson (1977) obtained quite accurate recall from first and fourth grade subjects. This rewriting, however, may not have been necessary. Trabasso et al. (1981) decided to reanalyze Piaget's data as so many recent studies have failed to replicate his results. Piaget (1926) presented enough data to allow reanalysis only for the Niobe story. In fact, the mean correlation between the order of events in the story and in the children's recall protocols was .98. Thus, Piaget's often cited (e.g., Fraisse, 1963) claim that young children cannot recall the events of a story in their correct temporal order is not supported by his data for at least one story.

A number of recent studies have shown that middle-class, school-aged (i.e., > 5 years) children can recall a story in its correct order as long as it is presented in normal sequence (e.g., Mandler & Johnson, 1977; Stein & Glenn, 1979). However, developmental changes are apparent. For example, Mandler and Johnson (1977) found that adults recalled more of an orally presented schematic story than fourth-grade children. Similarly, fourth graders recalled more than first graders. More importantly, however, the pattern of recall varied with age. A comparison of adult's and children's recall protocols indicated that some aspects of the story were more salient for the adult than for the younger child. In particular, those aspects of the story that entail

reference to the psychology underlying the protagonist's actions were more frequently recalled by adults. Comparable differences were found between first- and fourth-grade children. However, the adults, and children of both ages, did not differ in their ability to recall the story events in their correct temporal sequence. That ability to recall the events of a story in their proper sequence also has been observed in first- and third-grade children (Stein & Glenn, 1979), and 4- and 5-year-old children (Stein & Garfin, 1977). Moreover, comparable results have been found with kindergarten- and second-grade children when pictures stories are used instead of orally presented stories (Asp, Johnson & Trabasso, Note 3; Day, Stein, Trabasso & Shirey, Note 4).

Young children seem able to comprehend the events in a story, and the temporal relationships between them, and to preserve this information in recall. However, these data alone do not provide evidence that the children are using their knowledge of the story schema to guide comprehension and recall. The events in the stories used with the children have been in their normal sequence - the story schema has been present in the stories. Consequently, the results of the aforementioned studies could be accounted for in two ways. The children may have used their own knowledge of the story schema to guide comprehension and recall. Alternatively, the children may have been able to use the story schema already present in the material for the same purposes. Thus, children's ability to comprehend and recall a story presented in its normal order is not evidence that they have learned the story schema. However, if children can construct a

schematic story or reconstruct a scrambled "story" so that it conforms with a schematic structure, then the inference that the children have learned the story schema is justified. What happens when young children are asked to construct and reconstruct stories?

Some evidence of young children's knowledge of the story schema has been gleaned from studies of the stories that young children generate themselves. In contrast to adults, children tell stories that are both short enough and simple enough to make them useful for study. Developmental changes in the structure of stories that children construct have been assessed by a number of investigators working from a variety of perspectives (e.g., Ames, 1966; Applebee, 1978; Botvin & Sutton-Smith, 1977; Pitcher & Prelinger, 1963; Stein & Glenn, 1977; Sutton-Smith, 1981; Sutton-Smith, Botvin & Mahony, 1976). A commonality across these studies is that all of the children have been from upper-middle-class homes. When the IQ scores of the children were reported, most children fell in the superior range (>115) and very few (<10%) were of average ability. Thus, these children's stories probably were more advanced than those produced by a random sample of children of the same ages. Although different indices of structural complexity were used in these investigations of children's stories, similar developmental patterns have been observed. In all of the analyses, the structural complexity of stories increased with age. The greatest changes have occurred between the ages of 2 and 5 years. The trappings of a story, such as formal exposition (e.g., Once upon a time...) and resolution (e.g., ...happily ever after) markers and consistent use of the past

tense have been found in the stories of middle-class children as young as 3 years. Children between the ages of 2 and 3 tended to emphasize the exposition of a story and often omitted a formal ending. In fact, these very young children often introduced the character who then had some complicating event occur that introduced a state of disequilibrium (Applebee, 1978; Sutton-Smith, 1981). Then, the children's stories would end so that a state of equilibrium was never reintroduced; if, for example, The Three Billy Goats Gruff was being constructed, the goats would never outsmart the troll and get to the meadow. While children over 3 included equilibrating resolutions, the 2-year olds did not appear to see the need to reestablish a state of equilibrium. Multi-character, multi-episode stories were rare in children younger than 6, but became more frequent thereafter. The weight of the evidence from these studies suggests that these somewhat exceptional children acquire knowledge about the schematic form of stories at a very early age and quickly learn to construct schematic stories. What evidence is there to indicate that young children can reconstruct a scrambled story into a schematic sequence?

Brown and her colleagues (Brown, 1975, 1976; Brown & Murphy, 1975) have studied preschool children's ability to reconstruct scrambled sequences of related and unrelated pictures. When a sequence of pictures could be related logically as in a story, rather than arbitrarily, 4-year-old children were more successful on the reconstruction task. However, given a narrative that provided a context for reconstructing the otherwise arbitrarily-related pictures,

performance on the reconstruction task improved with these sequences. A similar pattern of results was found in a recall task if children made up a narrative to help them remember a sequence of pictures. Brown's materials, however, consisted of very short picture sequences (i.e., 4 pictures on average) that, at best, were extremely short and simple stories.

Poulsen et al. (1979) used more complex materials than Brown in a study of 4- and 6-year-old children's story comprehension, recall and reconstruction. The four picture stories adopted for the study ranged from 15 to 18 pictures long. The children's descriptions of the properly sequenced pictures indicated that they were interpreted as a story. However, when the children were asked to reconstruct scrambled pictures into a story, the 4-year-old children performed very poorly on the task, placing only 3% of the adjacent pairs of pictures in their corect order. The 6-year-old children had 27% of the adjacent pairs in their correct order, while in the original scrambled order, none of the adjacent pairs were in correct order. Furthermore, the younger children resorted to the use of simple labels to describe each picture in the "reconstructed" sequence, while the older children behaved like Bartlett's subjects and tried to interpret the pictures in terms of a story. Comparable developmental differences were noted in recall. Although these data might be taken as an indication that 4-year-old children had not acquired knowledge of the story schema, a methodological issue merits consideration. In the Poulsen et al. study, the 15 to 18 picture sequences were scrambled so that no two

pictures were in their proper successive order. Thus, these picture sequences were comparable to texts that Thorndyke used in his random condition. Thorndyke constructed these texts by randomly permuting the sentences in his regular texts. Hence, intersentential causal and temporal relations were destroyed. The adults in Thorndyke's study rated the random texts as quite incomprehensible and their recall levels for the passages were low. In light of this, the performance of the children in the Poulsen et al. study may be attributable to the overwhelming difficulty of the task rather than to a lack of knowledge about the story schema. The 6-year olds' attempts to describe the poorly reorganized pictures as a story suggests that they had acquired some knowledge about stories. It is possible that 4-year olds, in spite of their limited expository skills (Brown, 1975), might demonstrate similar knowledge in a less demanding reconstruction task.

A number of other studies have examined young children's ability to use a story schema to guide recall by studying their memory for stories that deviate from a schematic structure. When the deviations are "normalized" in recall, investigators infer that the story schema plays a guiding role during comprehension and/or retrieval. In a study of this type, Stein and Glenn (1979) presented second- and sixth-grade children with 12-sentence-long stories that contained systematic displacements of two sentences. For example, resolution category sentences would occur in the exposition. The recall patterns of children of both ages indicated that they either reorganized the material into the proper sequence, or integrated the discrepant

propositions into the story at their point of occurrence and repeated them at the appropriate point in the story. The type of narrative categories displaced and the distance of the displacement did, however, have an effect on recall. Displacements of exposition and resolution category statements were most likely to interfere with recall. In a similar study, McClure, Mason and Barnitz (1979) found that third-grade children had more difficulty rearranging stories than sixth- and ninth-grade children.

Further evidence that young children have learned the story schema and use it to guide comprehension and recall was found when a narrative category (e.g., the resolution) was omitted from a story (Stein & Glenn, 1977). In recall, first- and fifth-grade children added new propositions to the stories that logically belonged in the deleted narrative category. The older children's recall protocols, however, included more of these inferences than the younger children's. Similar evidence of a developmental difference in the ability to handle deviations from the story schema has been provided by Stein and Nezworski (1978a). Stories with well-marked temporal inversions such as flashback statements (e.g., A resolution statement followed by "It happened because...") were presented to one group of 6- and 10-year-old children while normal stories were presented to other children of the same ages. Recall in the older subjects hearing inverted stories was comparable to that of the control subjects who heard a normal story. Several types of inversions, however, led to more complete recall in the older subjects than in their matched controls. The facilitating effect

of inversions was not observed in any of the younger subjects.

In their aforementioned studies of recall of interleaved stories, Mandler (1978) and Mandler and DeForest (1980) included children as well as adults in their sample. Children from the second, third, fourth and sixth grades had more difficulty than adults in recalling interleaved stories in their presented form. Even when the instructions for verbatim recall were stressed, the youngest children recalled over a third of the stories in their canonical form. In contrast, sixth graders and adults respectively told 10% and 4% of the stories in this fashion. These data suggest that the story schema and its episodic structure play a guiding role in retrieval processes in young middle-class children. Glenn (1978) also has presented evidence indicating that the episodic structure of the story is psychologically valid for upper-middle-class children in second grade. When episode length was varied, the organization of recall protocols was not affected although the amount recalled was. When episodes were interleaved in stories, the children often deleted an episode, or the beginning or end of one episode, in recall. Thus, deletions occurred at episodic boundaries suggesting that the episodic structure was important in retrieval processes.

Denhiere and Le Ny (1980) also have noted that the episodic structure of a story affects children's recall. Moreover, they report that children, like adults, recall important propositions in a story more frequently than less important ones. When 7-, 8-, 9-, 10- and 11-year-old children recalled a story, many of the same propositions were

included in the protocols across all age groups. However, older children recalled more overall. Using Kintsch's and van Dijk's (1978) method of identifying macropropositions on an a priori basis, Denhiere and Le Ny found that the propositions recalled by more than half of each age group were macropropositions. Furthermore, there were some interesting developmental differences in recalling the story's macrostructure: For example, after hearing the story once, only the three oldest groups recalled the entire macrostructure of both episodes. The 8-year-old children recalled the macrostructure of one episode while the 7-year olds did not recall the macrostructure of either episode after one reading. However, after two readings, all but the 7-year olds recalled the macrostructure of both episodes. The 7-year olds, after the additional reading, recalled the macrostructure of one episode. In a second study 7-year-old children recalled the macrostructure of two one-episode stories after one reading, but required two readings before recalling the macrostructure of two additional stories.

Denhiere and Le Ny subsequently examined how 8- and 11-year-old children and adults assigned importance ratings to the propositions of the four one-episode stories used in the study with 7-year olds. The adults' and 11-year olds' judgments of the most important and least important propositions were highly and positively correlated. The levels of agreement between the adults and the 8-year olds, and between the 8- and 11-year olds were much lo[illegible] While the adults and 11-year olds favoured macropropositions fr[illegible]xposition, complication and resolution in their ratings of the m[illegible] important propositions, the 8-

year olds favoured exposition statements over complication and resolution statements. Denhiere and Le Ny compared the importance ratings gathered from these three groups to the immediate and delayed recall protocols of 7-, 8-1/2- and 11-year-old children who heard the same stories. In both the immediate and delayed recall, the agreement between the recalled propositions and those the adults and 11-year olds rated as most important was high and positive for all children. In contrast, the 8-year-old children's judgments of importance did not correlate significantly with the propositions that the 7-, 8-1/2- and 11-year-old children recalled. Thus, it seems likely that the 8-year olds' difficulty is metacognitive in nature: They are not aware of the processes they used to guide their understanding and encoding of a text and its retrieval from memory.

The rigid, automatic nature of young children's cognitive processing that Denhiere and LeNy noted also has been apparent in several studies of preschoolers' ability to understand script-based texts (e.g., McCartney & Nelson, 1981; Nelson, 1977; Schank, 1982; Schank & Abelson, 1977; Wimmer, 1979). Although preschoolers' recall of script-based texts often was well sequenced and emphasized important events, these children, in contrast to adults, had difficulty processing unexpected script events. Anomalies such as a customer washing dishes in a restaurant or being unable to pay for groceries checked out at the supermarket usually were deleted in recall and the normal script was followed in a rigid manner (Schank & Abelson, 1977). Moreover, Wimmer found that if a script violation occurred (e.g., a customer lost money)

and contradictory information followed (e.g., customer who lost money pays), 4-year-old children did not recognize the inconsistencies spontaneously and often could not be induced to do so. In contrast, 6-year-old children often identified the inconsistencies spontaneously and almost always could be induced to recognize them. By using probe questions while reading a picture story, Wimmer determined that the 4-year-old children's apparent inability to recognize inconsistencies arose from a failure to understand the script violation initially. Very young children seem to use their script-type knowledge to guide comprehension, but they do so in a rigid, automatic fashion that often impedes understanding.

In contrast to the adult literature, very few studies have examined the effects of variability in prior knowledge on children's story comprehension and recall. However, data from several recent studies suggest that prior knowledge influences children's comprehension and recall in the same manner noted in adults. Anderson and his colleagues (Reynolds, Taylor, Steffensen, Shirey & Anderson, 1982) had black and white eighth-grade children read a text that could be interpreted as a description of either a fist fight or "sounding." "Sounding" has been described by Labov (1972) as a form of ritual insult that is common among black preadolescent and adolescent males. Sounding occurs only when three or more individuals have congregated because an audience is required to judge the "sounds." Typically, derogatory insults are directed at the sounders' relatives, especially their mothers. Subjects who read the ambiguous sounding or fighting text

recalled it and answered a series of probe questions. As predicted, black subjects were more likely to give a sounding interpretation to the text while white subjects favoured the fight interpretation. Analyses of elaborations and intrusions in recall as well as answers to the probe questions and a theme analysis of the protocols showed that the children's cultural background affected their comprehension of the passage.

Landis (1982) presented second- and fifth-grade children with a story about either a famous or a fictitious character, and a week later administered a recognition task. Children in the study who read the famous character text behaved like adults do in a comparable task (e.g., Anderson, 1981; Byrd, 1981) and falsely "recognized" new sentences about the character as ones that had occurred in the text. Children who heard about the fictitious character were not prone to these errors. Presumably, children, like adults, integrated the new information acquired from the text with any prior knowledge about the topic. Thus, children in the famous-character condition could not discriminate between what they learned from the text about the character and what they already knew.

The weight of the evidence from the developmental studies indicates that middle-class children as young as 4 years of age can make use of the story schema to guide comprehension and recall of a story presented in its normal order. This is not particularly surprising in light of the fact that 2-year-old upper-middle-class children's stories indicate that they have learned some of the linguistic and schematic

conventions adopted in story construction. The available data are not adequate for answering questions about middle-class 4-year olds' ability to use the story schema to reconstruct stories. It is clear, however, that 6-year-old children achieve some success in reordering scrambled story pictures, and display an "effort after meaning" as they attempt to describe scrambled pictures as a story. The recall protocols of 6-year olds also suggest that the story schema plays a guiding role in the comprehension and/or retrieval of structurally deviant stories. In fact, children in this age range remember stories in their canonical order rather than their input order even when verbatim recall is requested.

The developmental literature has not addressed a number of interesting questions about children's knowledge and use of the story schema. For example, sex and ethnic differences and differences between stories have not been investigated to date. In fact, this is not particularly surprising. Currently, relatively little is known about young children's knowledge of the story schema and their comprehension and recall of stories. Consequently, investigators have focussed their attention on fundamental issues such as what children know about the story schema and how they understand and remember stories relative to adults. Thus, age and the amount of structure in a story are the variables of interest at this juncture in time. Presumably, once the effects of variations in age and story structure are understood clearly, other variables such as sex, ethnicity and different stories will become matters for investigation.

Given the limitations in our understanding about children's knowledge and use of the story schema, it is reasonable that current investigators have chosen to examine the basic developmental questions in this area. However, it is difficult to comprehend the conspicuous absence from the literature of research on one of the most rudimentary questions about children's knowledge and use of the story schema: How and when is knowledge of the story schema acquired? What is the nature of the acquisition process?

Present Research

As the foregoing literature review has shown, most of the available research on children has concentrated on the products of acquiring a story schema rather than the process. Although the developmental research has confirmed the hypothesis that there are age-related differences in understanding, remembering and constructing stories, the processes involved in learning these skills remain obscure. Given the importance of the story schema in guiding the processes of story comprehension, recall and summarization, the identification of factors that account for its development and the description of that process are important issues. The present thesis reports a series of three experiments designed to examine the effects that experience with stories has on children's knowledge and use of the story schema. This thesis identifies populations that differ in their ability to understand and remember stories and their knowledge of the story schema, specifies the nature of those differences, and explores the process of acquiring knowledge about the story schema.

Experience with stories is assumed to be a critical factor in the development of the story schema (Bower, 1976; Mandler & Johnson, 1977; Stein & Trabasso, 1982; Thorndyke & Yekovich, 1980). However, this intuitively plausible hypothesis has never been assessed experimentally. At least two quite different approaches are available for investigating the hypothesis that the story schema is learned through extensive experience with stories. One method of testing this hypothesis would be to identify, child by child, two or more naturally-occurring populations of children that differ in their experience with stories in the preschool years, and then, to examine their knowledge and use of the story schema as a function of the known variations in their experience with stories. Then, if these populations were found to differ in their knowledge and use of the story schema, the conclusion that experience with stories was causally responsible for these differences would be permissible. However, this approach would be costly in terms of time. As the data obtained from both parents and children on preschool children's experience with stories through questionnaire methods almost certainly would be of questionable validity and reliability (e.g., Cronbach, 1949; Nunnally, 1959; Wrightstman, 1972), other methods of identifying these populations, such as extensive home observations, would have to be adopted. The literature on social class differences in preschool children's experiences in the home points to a second, more economical method of investigating the effect of experience with stories on the acquisition of knowledge about the story schema. Studies of North American lower-class children during the past

50 years have demonstrated repeatedly that lower-class children have few experiences with stories in their preschool years relative to their middle-class peers (e.g., Ausubel, 1967; Burks, 1928; Coleman, 1966; Deutsch, 1962, 1964, 1967a, 1967b; Heath, 1982a, 1982b; Milner, 1951; Saterfiel, Cagle & Grace, Note 5; Skodak & Skeels, 1949). Consequently, it is reasonable to hypothesize that the acquisition of knowledge about the story schema and the ability to understand and remember stories is delayed in lower-class children. If, in fact, randomly selected middle- and lower-class children were found to differ in their knowledge and use of the story schema in a manner consistent with the known class difference in experience with stories, then the data would provide correlational evidence that experience with stories was a critical factor in learning the story schema. If, subsequently, one could demonstrate that providing lower-class children with experience with stories led to the acquisition of knowledge about the story schema, then a causal relationship between experience with stories and learning the story schema also could be inferred. In fact, the experiments reported in this thesis conform to this second approach. The first two studies provide correlational evidence about the role that children's experience with stories plays in the acquisition of knowledge about the story schema. The third study was designed to test the hypothesis that there is a causal relationship between children's experience with stories and their knowledge and use of the story schema.

The first experiment aimed to investigate the hypothesis that there are social class differences in 4-year-old children's abilities to

comprehend and recall stories and in the development of their knowledge of the story schema. Subsequently, in Experiment II, these hypotheses were investigated in 6-year-old lower- and middle-class children. The results of these experiments were combined to permit specification of developmental changes in the nature of social class differences in the acquisition of knowledge about the story schema and in the ability to understand and remember stories. Then, in Experiment III the effects of a treatment program on 4-year-old lower-class children's knowledge of the story schema and on their comprehension and recall of stories were examined.

Thus, the experiments reported in this thesis examine both quantitative and qualitative developmental differences in children's ability to use a story schema to guide their comprehension and recall of normal stories. They also focus on the children's knowledge of the story schema by requiring them to demonstrate that knowledge in a reconstruction task. Finally, they investigate the relationship between experience with stories and the process of acquiring both knowledge about the story schema and the ability to use it for understanding and remembering stories.

EXPERIMENTS I & II

Middle-class children and adults use the story schema to guide their comprehension and recall of stories. If a story is robbed of its schematic structure (e.g., Poulsen et al., 1979; Thorndyke, 1977), it is more difficult to understand and remember than its canonical counterpart. Propositions that are important to a story are well remembered, but the same propositions lose their importance and memorability if the schematic structure is removed from the story (e.g., Thorndyke, 1977).

Given the psychological reality of the story schema and its importance in determining the comprehensibility and memorability of information contained in the story, the processes of acquiring knowledge about the story schema and of developing the ability to use it in story comprehension and recall are of interest. As noted above, it is assumed that experience with stories is a critical source of knowledge about the schematic structure of stories. That experience presumably provides the child with knowledge about the way in which stories typically begin and end, about how they develop and about the usual sequence of events. A child also must learn a number of scripts to understand many stories (e.g., Charniak, 1972). Scripts are learned in the course of experience with the world, and include knowledge about stereotyped action and event sequences and the causal and temporal relations that typify those sequences. The story schema does not include script-based knowledge. Rather, only the story-specific knowledge concerning the plot-based

structure of the story is represented in the schema. The story schema, however, subsumes script-based knowledge just as the hockey story example cited above required the "hockey script" for comprehension.

Lower-class preschool children certainly have experience in the world, and undoubtedly have learned a number of scripts. Notwithstanding this script-based knowledge, the following hypotheses are reasonable:

(1) Lower-class children's ability to describe and recall normal stories is delayed relative to that of their middle-class age peers.
(2) Lower-class children have acquired less knowledge about the story schema than their middle-class age peers, and thus, have more difficulty rearranging scrambled stories and describing and recalling them.

Why are these hypotheses tenable? Lower-class preschool children grow up in homes where there are few books and they seldom have storybooks read to them or available for perusal (e.g., Ausubel, 1967; Burks, 1928; Deutsch, 1962; Heath, 1982a, 1982b; Milner, 1951; Saterfiel et al., Note 5; Skodak & Skeels, 1949). Thus, if experience with stories is a necessary condition for acquiring knowledge about the story schema, then the predicted social class differences in development of this knowledge should be observed. As all of the aforementioned research on the use of the story schema by young children has been conducted with middle- and upper-middle-class children, the available data do not address the class-difference hypotheses.

Experiment I was designed to examine these hypotheses by studying 4-year-old lower- and middle-class children's comprehension and recall of normal stories, and their reordering and subsequent

comprehension and recall of scrambled stories. Experiment II was designed at the same time to address the identical hypotheses in 6-year-old children and to permit a comparison of the 4- and 6-year-old children from both social classes. However, given the time-consuming nature of data collection and analysis, the decision to conduct Experiment II was contingent upon obtaining data in Experiment I that supported the rejection of the null hypothesis. Experiment II was conducted, and the data from it were combined with those from Experiment I because developmental changes in the understanding, remembering and reordering of stories and variation in those changes as a function of social class had been specified as topics for investigation when the studies were designed. Following this a priori decision, the two experiments will be considered as a single unit in this thesis.

The experimental demonstration of social class differences in knowledge about the story schema and in the comprehension and recall of stories was of minimal interest in itself. The literature already is replete with a catalogue of the lower-class child's deficiencies (e.g., Ginsburg, 1972; Hess, 1970). However, in the present case, the empirical demonstration of a class difference was of obvious theoretical and educational significance. If lower-class children showed the predicted developmental delay, then it would be possible to study the processes of acquiring knowledge about the story schema and learning to understand and remember stories in these children. Moreover, methods of facilitating acquisition of that knowledge could be identified experimentally, and hopefully, adopted in educational settings.

The experimental design of Experiments I and II is patterned after that used by Poulsen and her associates. Unlike other investigators, Poulsen et al. (1979) presented their stories pictorially rather than orally. Given that children can "read" pictures accurately and consistently at a very early age without training (e.g., Denburg, 1975), this strategy seems particularly appropriate for use with lower-class children. There also is considerable evidence (e.g., Baumeister & Smith, 1979; Brown, 1979; Rusted & Coltheart, 1979) that children's recall of prose is facilitated by the use of pictures. Moreover, the available literature indicates that the pattern of middle-class children's recall of pictorially-presented stories is comparable to that found with orally-presented stories (Asp et al., Note 3; Day et al., Note 4).

Poulsen et al. analyzed children's descriptions of the pictures and their recall protocols propositionally. The methods described in Kintsch (1974) were followed except that modifiers and negations were not scored as separate propositions. As the propositional method of analysis obviates many of the difficulties created by possible class differences in syntactic skills and vocabulary favoring middle-class children, a variant of Kintsch's propositional scoring system, that is described below, was adopted for use in the present study.

The study includes both 4- and 6-year-old children. The choice of ages was made on the basis of the literature reviewed above. While 6-year-old middle-class children seem reasonably familiar with the story schema, at least as it exists in normal stories, 4-year-old middle-class

children seem to be in the process of acquiring knowledge about the story schema. If there are substantial differences between class groups in the acquisition of this knowledge, they should be apparent in the younger age group. However, script-based knowledge and understanding of causal and temporal relationships may facilitate the comprehension and recall of normal stories in children who lack knowledge about the structure of simple stories. Consequently, the several additional years of experience in the world, even without any additional experience with stories, may have a positive effect on story comprehension and recall. By including 4- and 6-year-old lower-class children in the study, developmental changes in understanding and remembering stories and in knowledge about the story schema can be examined. The inclusion of 4- and 6-year-old children from middle-class backgrounds permits one to compare age-peers from the two groups, to examine developmental changes, and to investigate if and how social class modifies those developmental changes.

The children in this study both described and recalled picture stories as did children in the Poulsen et al. study. The description phase was included for two reasons. First, recall is often a poor index of comprehension, even in young middle-class children (e.g., Brown, 1975; Perlmutter & Myers, 1979; Perlmutter & Ricks, 1979), who have both difficulty with the notion of intentional recall and limitations in their expository skills. A second concern that favoured the use of description was the necessity of using stories that were long enough that their schematic organization might be expected to have an effect.

Consequently, it was possible that recall alone would not be a valid index of comprehension. Moreover, the recall protocols might not include sufficient data to permit a thorough analysis of story comprehension and incomprehension. It seemed reasonable, however, to expect that, even if recall was poor, sufficient data could be obtained in the description procedure to provide information about the children's comprehension of the stories. Furthermore, from a levels of processing perspective (Craik & Lockhart, 1972), it also seemed likely that the description phase of the procedure would facilitate recall as the children would encode not only the pictures, but also their descriptions of them.

Several design features of the Poulsen et al. study were not repeated. Four series of picture sequences constructed from children's stories were used in their study. The order of the four sequences was counterbalanced across conditions. Two of the stories proved to be more difficult for all the children. The original stories were narratives with pictures from which the narrative was deleted for the study. The other two stories were picture stories without narrative and were easier for all the children. Consequently, all the picture stories in the present study were constructed from children's picture books that do not have an accompanying narrative. Furthermore, the author of the four books was the same. This strategy should eliminate marked differences between texts. Although differences between stories are a matter of interest, that question is not a concern in this thesis.

Another change from the Poulsen et al. study can be found in the recall procedure used in the present experiments. An unusual procedural strategy was adopted for the recall phase because young children generally perform poorly in free recall (e.g., Brown, 1975; Hall, Cole, Reder, & Dowley, 1977; Mandler & Johnson, 1977; Perlmutter & Myers, 1979; Perlmutter & Ricks, 1979; Piaget, 1968). For example, Hall et al. (1977) found that 48% of their 4-1/2 year old subjects refused to recall stories and Mandler and Johnson (1977) replaced 38% of their first-grade subjects and 19% of their fourth-grade subjects for failure to recall stories. It seems reasonable to hypothesize that young children might refuse to recall a story because they think it is foolish to repeat every detail of a story to an adult who has just viewed the story with the subject or presented it orally. In fact, that logic is quite sound. At best, one might expect children to summarize briefly a story in recall to the adult who had presented the story to the child. Consequently, in the recall phase of this study, the child tells the story to a second adult rather than to the experimenter who presents the picture stories to the child. Certainly, the literature on young children's communication skills (e.g., Hutchison, 1977; Shatz & Gelman, 1973) supports the view that the most complete recall protocols will be obtained from both lower- and middle-class children when they relate the story to an interested adult who is not familiar with the story.

All children in this study described and recalled four stories. Two of the stories were in normal order and two were in a scrambled order. In the case of the scrambled stories, the children were asked to

rearrange the "mixed up" pictures so that they made a story before they described and recalled the pictures. The scrambled stories and the picture rearrangement task are critical manipulations as the study is designed to test the hypothesis that the development of the story schema is delayed in lower-class children. As noted in the literature review, children may be able to comprehend the events of a normal story and the causal and temporal relationships between them, and to preserve them in recall without having acquired any knowledge of the story schema. In normal stories, the story schema is already present. Consequently, successful comprehension and recall of a normal story can be accounted for in at least two ways. Children who have acquired knowledge of the story schema may use it to guide comprehension and recall. Alternatively, children may use the story schema already present in the material for the same purposes. Thus, children's ability to comprehend and recall a story in its normal order is not proof that they have learned a story schema and use it in story comprehension and recall. However, if children can impose a schema on the scrambled pictures in the rearrangement task that results in a story-like sequence, that would constitute evidence of their knowledge of the story schema.

Initially, the picture sequences were 18 pictures long. Furthermore, the picture rearrangement task was to follow the description and recall phases. However, somewhat surprising results in a study gathering adult data for the purpose of developing a scoring procedure led to a further procedural change. A total of 40 community college students studying early childhood education were given the four

picture stories, and asked to write a sentence or two describing each picture and how it related to the story. Half of the students were given stories in normal order. The remaining half were informed that the stories were scrambled and that they would be asked to rearrange the pictures into what they thought was the correct order after describing them. In the rearrangement phase, the adults informed the experimenter of the difficulty of the task and continually made comments such as "I can't do it now that I've described them." The majority of subjects left their desks to sit on the floor and look at the pictures and rearrange them. Only 14 of 20 adults completed the task in two hours. While many of their rearrangements were logical, few were comparable to the original sequence. In view of the obvious difficulty of rearranging the pictures after they had been described as a story, a methodological change was made so that rearrangement preceded description.

Additional pilot work was conducted with 5- and 6-year-old middle-class children assessing their ability to rearrange 12 versus 18 pictures that were scrambled so that no adjacent pairs were correct. The children were asked to "fix up the pictures" so that they made a story. The objective of this study was to determine the final number of pictures used in each story such that the task would be neither to easy nor too difficult for the older middle-class subjects in the study. A total of 40 children participated in this study, 20 in each length of picture sequence condition. Five children rearranged each of the four stories within each length condition. The mean percent of adjacent pairs correct for 18 pictures was 38.8 and mean differences between

stories were marked (range - 24.7% to 57.6%). In the 12-picture condition, 54.5% of adjacent pairs were correct and the differences between stories were minimal (range - 50.8% to 58.2%). Consequently, the final picture sequences were 12 pictures long.

Class differences favoring middle-class children were expected in this study. Middle-class 4-year-old children with their attendant experience with stories were expected to be able to use the schema present in the normal story and to schematize partially the scrambled story. However, comprehension and recall of the scrambled story was expected to be poorer than for the normal story unless the 4-year olds had a well developed story schema. At the same time, it was anticipated that the difference between the normal and scrambled conditions would be less for the lower-class child. Children in this group were not expected to be able to make the same use of the story schema which exists in the normal stories. Thus, performance of the lower-class 4-year-old children in both conditions should be similar, although performance on the scrambled pictures might be slightly poorer because of the obscuring of causal and temporal relationships. If the 4-year-old groups differed in picture rearrangement in the anticipated direction, no interaction between class and story order was expected. Both class groups of 6-year-old children were expected to surpass the lower-class 4-year olds in terms of their comprehension and recall of normal stories as their understanding of causal and temporal relationships is relatively well-developed (Piaget, 1929, 1930). However, it seemed likely that the performance of the lower-class 6-year

olds with scrambled stories would be poorer than the middle-class 6-year olds' and possibly, comparable to that of the middle-class 4-year olds. In terms of the scrambled pictures, an interaction between the age of the child and story order was anticipated. However, if the 4-year-old middle-class children had the predicted success in rearranging the scrambled pictures and thus, some knowledge of the story schema, an interaction between the age of child and the class of the child and story order was expected. The performance of the lower-class 4-year olds in the normal and scrambled conditions was expected to be comparable as was that of the middle-class 6-year olds. In contrast, it seemed likely that middle-class 4-year olds and lower-class 6-year olds would have considerably more difficulty with scrambled stories than normal stories.

Method

Subjects

A total of 48 English speaking 4- and 6-year-old children were included in the study. Equal numbers of children from upper-middle- and lower-class backgrounds participated in the study. The Blishen Occupational Class Scale (Blishen, 1958, 1976) a six point Canadian scale based on census data on education and occupation, was used to index social class. The child's father's occupation was used to determine a child's position on the scale unless his or her mother was the primary wage earner. As the Blishen scale does not include unemployed persons and recipients of welfare in any category, these individuals were placed in category 7. Upper-middle class was defined

as categories 1 and 2 on the scale. Those categories include professional and managerial occupations. University students at the undergraduate and graduate levels were classified as category 2 individuals unless they were in professional schools leading to category 1 occupations. Lower-class was defined to include category 6 which comprises unskilled laboring occupations and the aforementioned category 7. The mean class ranking for the 4-year-old lower-class children was 6.9 while it was 1.83 for the middle-class 4-year-old children. The comparable rankings for the 6-year olds were 6.74 and 1.42 respectively.

The children participating in the study were drawn from day care centres and public schools in the Hamilton-Toronto area. The selection procedure for the children entailed obtaining a list of the children from the schools and day care centres that included the children's first names, birth dates, native language and parents' occupations. The names of the eligible children were determined and selection was randomized with restrictions on the sex composition of each group when the number of eligible children exceeded the required number. The mean age of the lower-class children was 4 years, 6 months, while it was 4 years, 3 months for the middle-class children. The comparable ages for the grade 1 children were 6 years, 10 months and 6 years, 11 months respectively. In each classroom, the number of males eligible for inclusion in the study exceeded the number of females. As social class and age differences rather than sex differences were the focus of concern, it seemed reasonable to equate the number of males and females in each

class and age group. In both the lower-class 4-year-old and the middle-class 6-year-old groups, there were 7 males and 5 females, while there were 8 males and 4 females in the middle-class 4-year-old and lower-class 6-year-old groups. Thus, there were 15 males and 9 females within each class group and within each age group.

Stimulus Materials

The picture sequences used to elicit stories from the children were constructed from commercial children's books illustrated by Mercer Mayer. The four illustrated stories were as follows: A Boy, A Dog, A Frog and A Friend (Mayer, 1971), Frog on His Own (Mayer, 1973), Frog, Where Are You? (Mayer, 1969), and One Frog Too Many (Mayer & Mayer, 1975). None of these books has accompanying narrative, and thus, the pictures alone tell the stories. The original stories were multi-episode stories that included an average of 25 pictures. The stories were shortened to 12 pictures, first by eliminating episodes and then, when necessary, by eliminating redundant pictures in a manner consistent with that specified by Kintsch's and van Dijk's (1978) deletion rule. Frog, Where Are You? consisted of one episode, while the remaining three stories were two-episode stories in which the second episode was embedded in the first. Frog, Where Are You? included one exposition picture, eight complication pictures, and three resolution pictures. The other three stories all had two exposition pictures. A Boy, A Dog, A Frog and A Friend had eight complication and three resolution pictures. In Frog on His Own, there were nine complication and two resolution pictures. One Frog Too Many included seven pictures in the

complication category and four in the resolution category. In the three stories with embedded episodes, one picture served as both a complication picture for the first episode and an exposition picture for the second episode.

The pictures were photocopied, glued to bristol board and individually laminated. The scrambled order for all stories was pictures 2, 9, 3, 1, 6, 10, 8, 11, 7, 4, 12, and 5. This order is such that no adjacent pairs are in order. In two stories, three of the 11 adjacent pairs are pictures from the same narrative category (e.g., exposition) while only 2 of the 11 pairs are thus related in the other stories.

Procedure

The initial phase of the procedure entailed the experimenter (the author) and assistant familiarizing themselves with the children. While it is difficult to specify the components of this activity, it was considered critical especially in the case of the lower-class children. The experimenter and assistant, who both have had extensive experience working with young children, spent approximately one week functioning as extra teachers in the day care centres prior to beginning the experiment with the 4-year olds. In the case of the 6-year olds, the experimenter and assistant spent 3 days as extra teachers with the lower-class children and 2 days with the middle-class children. The actual length of the familiarization period was determined by the experimenter's and assistant's judgments of when the children were comfortable and "ready" to participate in the study.

Given that a frog is a central character in all of the stories and a turtle in two of the stories, it was necessary to make certain that all children were familiar with frogs and turtles. Consequently, live frogs were taken to the day care centres and public schools during the initial phase of the study. A turtle was also taken to all but the middle-class 4-year olds' day care centre. Unfortunately, because of the vagaries of Canadian winters, a turtle could not be found when the middle-class 4-year-old children participated in the study. However, all of the children in this group recognized and spontaneously labelled a picture of a turtle. Moreover, when asked to point to the "thing that sometimes lives in the same pond as frogs" in Plate 10 of the Peabody Picture Vocabulary Test (Dunn, 1959), all children chose the turtle and again spontaneously named it "a turtle." The children spent a great deal of time observing and discussing the amphibious visitors. Interest in subsequently seeing the stories with the frogs and turtle was high.

Each child described and recalled two normal stories, and rearranged, described and recalled two scrambled stories. The assignment of the four stories to normal and scrambled conditions was counterbalanced across children so that each story appeared equally often in positions 1 through 4. Given the length of the stories, the children were to participate in a minimum of two testing sessions. In each session, the child was asked to describe and recall a normal story, and to rearrange, describe and recall a scrambled story. A normal story was always presented first and then followed by a scrambled story. The third story was always in normal order and the fourth story was always

scrambled. Although most children completed the procedure in two sessions, one 6-year-old child and two 4-year-old children in the low income group participated in three sessions because the experimenter judged their attentional limits as being strained and suggested a change of activity at the end of the first story. The maximum interval between sessions was one week. All sessions were conducted in a room separate from the other children.

The instructions for the normal order stories were as follows:

> "I have some (more) pictures with the frog in them. The pictures tell a story. I want you to look at them quickly. Then we'll look at them again. Then (emphasized) you can tell me about them."

The child looked at the pictures as the experimenter presented them. If a child talked about the pictures during this phase, the experimenter mentioned that the first look would be a quick one, and the child could talk about them later. After the child had seen the pictures and had an opportunity to form an impression of the story, the experimenter said:

> "Now, let's look at them again. Tell me what's happening in the story."

After the child had completed his/her description of the story, the child was asked to recall the story to the assistant. Before the assistant entered the room, the child hid the pictures. Then, the assistant was invited in and the instructions were as follows:

> "(Assistant's name) doesn't know the story you just told me. And we won't let her see the pictures. Maybe you can tell her about the story. I think she'd like that."

At that point, the adult listener said: "Oh, I'd really like to hear that story." The experimenter then said: "Tell her what happened in the story."

The instructions for the scrambled stories were as follows:

> "I have some (more) pictures with a frog in them. The pictures are supposed to tell a story. But right now the pictures are all mixed up! Do you think you can fix the pictures so they tell a story? Fix them so they tell a good story."

The child then rearranged the pictures. The following prompts were used when necessary:

> "Where does this picture belong?"
> "What pictures does this picture go with?"
> "Where should this picture be?"
> "Are there any others you want to change?"

After the child rearranged the pictures, the procedure was identical to that used with the normal stories: The child described and recalled the "story" as she or he had rearranged it.

Adult Sample

A total of 32 adults, early childhood-education students at a community college participated in a study designed to collect norms on adults' comprehension and rearrangements of the stories. The students were not asked to provide information on their parents' occupations, but generally students in the program in question come from homes where the fathers are skilled workers, managers and professionals. Thus, their families range from upper-working-class to upper-middle-class. The students wrote descriptions for two normal stories, and rearranged and described two scrambled stories so that an adult standard for the

picture descriptions could be established. The adults were given individual copies of the four stories arranged in the same normal, scrambled, normal, scrambled order as the children received them and counterbalanced in the same manner. The adult descriptions of the normal stories provided an objective method of determining which statements or propositions were central to the story and which were unimportant details. The adult picture rearrangements and their accompanying picture descriptions also provided objective information on adult performance on the scrambled story task. Overall, the adults had 88% of the adjacent pairs of pictures in the correct place. When describing the rearranged stories, 93% of the statements made by at least half of the adults who described normal stories also were made by at least half of the adults who described scrambled stories. Thus, adults were quite successful in rearranging the pictures, and they described the pictures in the same manner as adults describing normal stories. Consequently, it was not worthwhile to develop a separate scoring system for scrambled stories.

Scoring

The author transcribed the tape-recorded protocols. The transcription and scoring manual describes the conventions adopted for use (see Appendix II). In order to establish the reliability of the transcriptions, the assistant transcribed the description and recall phases for a normal and scrambled story for eight children, including two from each class for both age levels. The two children in each of the four groups were randomly selected from their group after the

experimenter had completed the transcriptions. Percentages of agreement between the two transcribers for the accuracy of word transcriptions and for utterance boundaries were calculated. The respective percentages are 98.5% and 99.9%.

The transcripts were analyzed propositionally in a manner comparable to that developed by Kintsch (1974) (see Appendix II). All transcripts were scored by the author. Both the description and recall portions for a normal and scrambled story were scored by the assistant for eight children, randomly selected from their age and class groups in the manner described above. A reliability of .98 was obtained between the two scorers.

The scoring of the protocols was based on the system used by Poulsen et al. (1979). The statements or propositions were classified in three ways:

(1) Each statement was labelled as either a core statement, an extra statement, or a spurious statement. Core statements were determined by the adult descriptions of normal stories: A core statement is something that at least 50% of the adults said. The average number of core propositions per picture for the four stories was 2.7, 3.1, 2.5, and 2.7 for A Boy, A Dog, A Frog and A Friend, Frog on His Own, Frog, Where are You? and One Frog Too Many respectively. An extra statement consists of inessential but correct detail. A spurious statement is either a far-fetched or totally false statement about a picture.

(2) In the second scoring classification, story statements and narrative conventions were scored. Story statements cannot be made on the basis of seeing any one picture, but rather depend on an understanding of the story, of the relationships

between pictures. Story statements are either core, extra, or spurious statements. Narrative conventions include setting statements (e.g., "Once upon a time..."), temporal connectives (e.g., "and then", "finally", "suddenly", and so on) and resolution statements (e.g., "And they lived happily ever after.").

(3) Each statement was assigned to the picture that elicited it. Then, each picture in the four stories was assigned to a narrative category: the exposition, complication, or resolution. The experimenter and a second adult agreed on the assignment of pictures to the narrative categories for the 4 stories. Subsequently, all statements each child made for the 4 stories in recall were assigned to the narrative category of the picture which elicited the responses. Generally, this was straightforward as most statements made in recall are repetitions of statements made in description. However, there were some spurious responses made in recall which could not be assigned to any picture as they had not occurred in description, and they were either false or so far-fetched that they could not be assigned to a picture. Such responses were deleted from this classification.

The assignment of pictures to the narrative categories is illustrated in Table 1 for Frog on His Own (Mayer, 1973). Frog on His Own consists of two episodes, with the second episode being embedded into the first. The episodes are distinguished by a change in actors. As can be seen in Figure 1, picture 1 functions as the exposition of episode 1 introducing a boy walking with his dog, frog and turtle to the park. The complication of the episode begins in the next picture when the frog leaps out of the pail. In picture 3 it is apparent that the boy has not detected his absence. Picture 4 not only continues the first episode but it also begins the second episode when several new characters are introduced, including a mother, a baby and a cat. The complication of the second episode begins in picture 5 when the frog

Table 1

Narrative Structure of Frog on His Own (Mayer, 1973)

Episode 1:

Exposition 1: Boy walking to park with dog, frog and turtle (Picture 1)

Complication 1: Frog jumps away without boy noticing (Pictures 2 & 3)

Episode 2:

Exposition 2: Frog sees mother, baby buggy and cat (Picture 4)

Complication 2: Frog jumps in buggy and difficulties ensue (Pictures 5-10)

Resolution 2: Frog is rescued from cat (Picture 11)

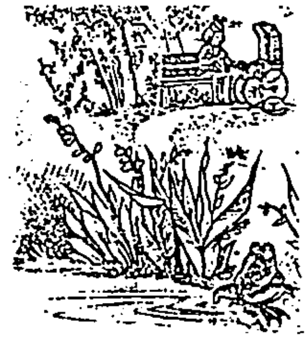
Resolution 1: Frog is rescued by his old friends and thus, reunited with them (Pictures 11 & 12)

Figure 1. The Frog on His Own (Mayer, 1973) story

1

2

3



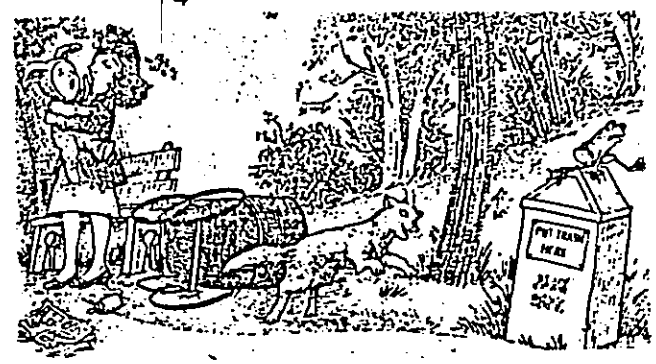
4

5

6

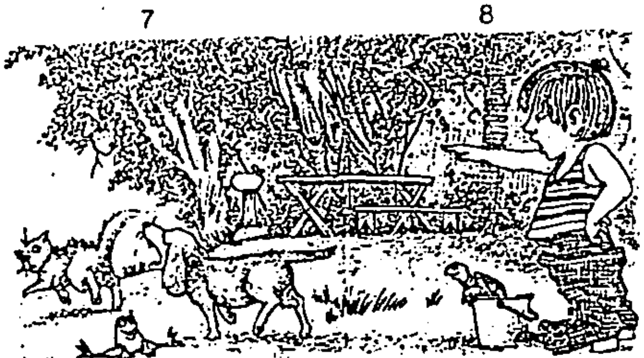
7

8



9

10



11

12

leaps into the carriage. The complication continues in pictures 6 through 10. Then, in picture 11, the runaway frog's adventures in the embedded episode are resolved. Picture 11 is also the beginning of the resolution for episode 1 as the frog is reunited with the boy, the dog and the turtle. Picture 12 is the continuation of the resolution for Episode 1: The frog is reunited with his old friends and they leave the park together. Boy, Dog, Frog and Friend and One Frog Too Many have the same narrative structure as Frog on His Own. Frog, Where Are You? consists of only one episode.

A statement such as "The frog leaped out of the pail," which occurred to Picture 2 of Frog on His Own would be scored as (1) a core statement (because 50% of the adults made it) and (2) a complication statement (because Picture 2 is part of the complication). The statement "The frog's old friends returned," in response to Picture 11 of Frog on His Own, would be scored as (1) a core statement (because 50% of the adults made it), (2) a core story statement (as it indicates an understanding of the story sequence), and (3) a resolution statement (as Picture 11 is a resolution picture).

Inter-rater reliabilities were calculated for the core-extra-spurious classification as well as for the story statement classification. Sixteen stories, chosen on the same basis noted above, were scored independently. The agreement between raters for the core, extra and spurious classifications is respectively .99, .95 and .97. The percentage of agreement for core story statements is 96.6% while it

is 100% for the extra story statements. Disagreements were resolved in favour of the author except in the case of an obvious scoring error.

Results

Separate analyses of variance were carried out on each measure for both the description and recall phases of the study. Unless otherwise specified, the data were analyzed by a 2 x 2 x 2 split-plot analysis of variance, with the class and age of the subjects as between-subjects variables, and story condition (i.e., normal versus scrambled) as the within-subjects variable. A .05 significance level is used throughout. The results for the different types of scoring will be presented separately. The description protocols will be discussed first, and then, the recall data.

Rearrangement of Scrambled "Stories"

The children were asked to rearrange the scrambled picture stories prior to describing them and recalling them. If a child rearranged the pictures so that they corresponded to the original ordering, one could infer that the child possessed knowledge about the story schema. Consequently, it was important to study the children's success on the picture rearrangement task. Each child's rearrangement was compared with the original order of the story in two ways: First, the percentage of adjacent pairs of pictures in correct order was calculated, and second, a rank order correlation between the child's order and the original story order was calculated. The latter method of analysis was used because it considered not only individual pairs of pictures but also the ordering of pairs. The correlation between the

original story order and the experimenter's scrambled order for the pictures was .38 (p = n.s.). The mean correlation between the original story order and the middle-class 4-year-old children's ordering of the stories is .50 ($p < .05$), while the correlation is .25 (p = n.s.) for the lower-class 4-year-old children. The lower-class 6-year olds' correlation is identical with that of the lower-class 4-year olds, $\bar{r}$ = .25, p = n.s. In contrast, the middle-class 6-year olds' correlation is .82 ($p < .005$).

If adjacent pairs are considered, the pattern was similar. Middle-class 6-year olds have 85.5% of the adjacent pairs correct, while middle-class 4-year olds have 49% of the adjacent pairs of pictures correct. However, lower-class 6-year olds place only 34% of the picture pairs in the correct adjacent order. The comparable figure for the lower-class 4-year olds is 29%. In the experimenter's original scrambled order, 0% of the adjacent pairs of pictures are in correct order. In contrast, the adult sample placed 88% of the adjacent pairs in correct order. A 2 X 2 analysis of variance of the percentage of correct adjacent pairs in which the age and class of the children are the factors, shows that the interaction between age and class is reliable, $F(1,44) = 14.53$. Given the above data, it is not surprising that the main effect of class was large and significant, $F(1,44) = 74.67$. The age effect was also reliable, $F(1,44) = 24.99$. Clearly, the middle-class children are more successful than the lower-class children

on this task. However, only the middle-class 6-year olds are performing at a level comparable to the adults'.

Total Number of Responses

Although the majority of the analyses examined the content of the children's statements in description and recall, the actual number of statements also was examined. The total number of statements children make in description and recall for normal and scrambled stories is presented in Table 2. As can be seen in Figure 2, the lower-class 4-year olds say less when describing scrambled stories relative to normal stories, whereas the 6-year-old lower-class children and the middle-class children of both ages say more about scrambled stories than normal stories, $F(1,44) = 4.26$. Overall, the lower-class children say less than the middle-class children, $F(1,44) = 9.29$, but as Figure 2 and Table 2 show, the lower-class 6-year olds' limited number of statements relative to the 4-year-old lower-class children accounts for this effect, $F(1,44) = 18.67$.

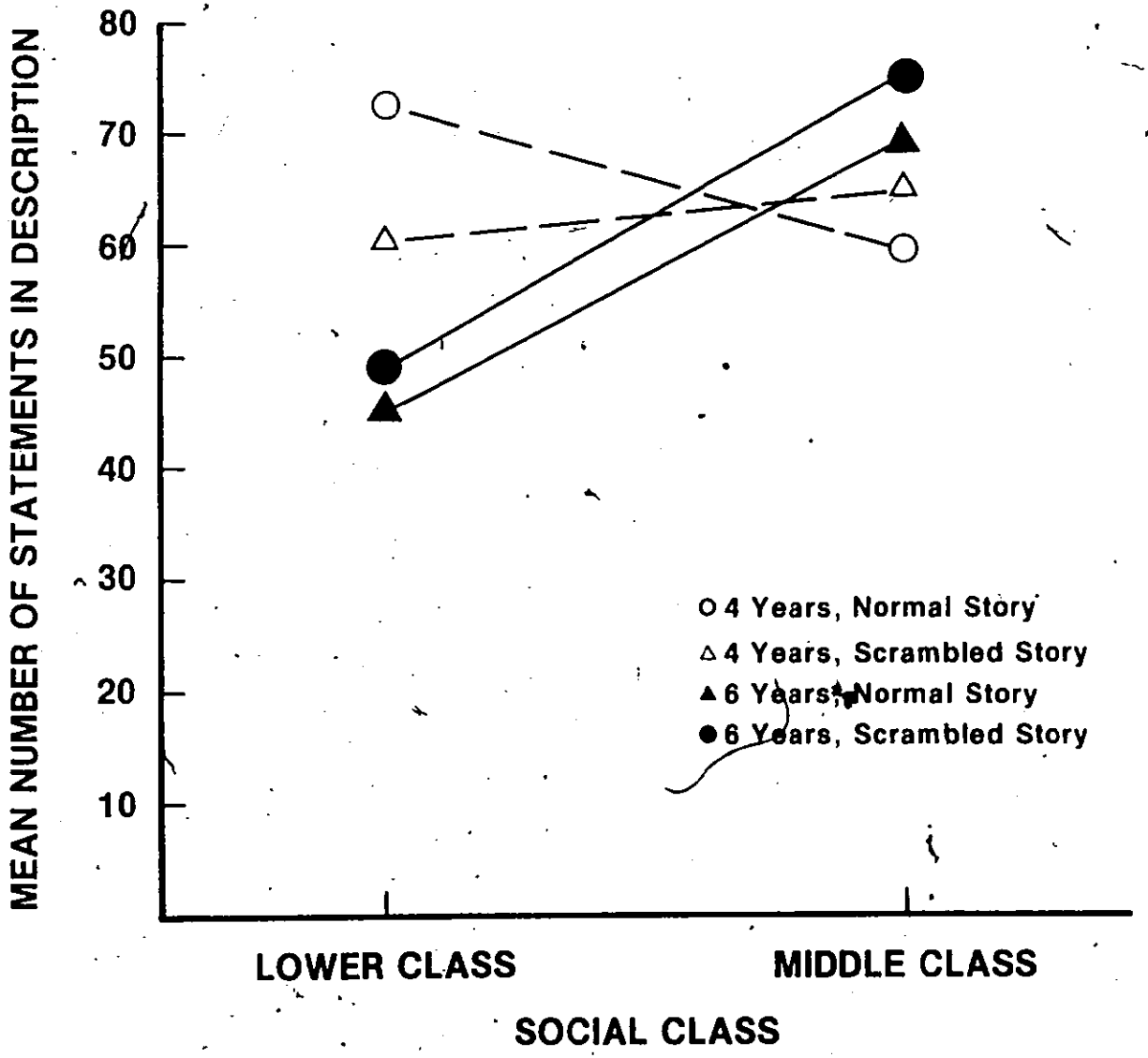
In fact, the older children recall approximately the same number of statements as they make in description, whereas the younger children recall fewer. Certainly this age difference is consistent with the literature on development of intentional recall (e.g., Brown, 1975, 1978). As can be seen in Table 2, 6-year olds say more in recall than 4-year olds, $F(1,44) = 4.18$. Middle-class children remember more than lower-class children $F(1,44) = 13.00$. All groups say more when recalling the scrambled stories than they do when recalling the normal stories $F(1,44) = 6.83$. Of course, these quantitative analyses provide

Table 2

Mean Number of Statements in Description and Recall, and Standard Deviations (In Parentheses)

AGE		4 Years		6 Years	
	SOCIAL CLASS	Lower Class	Middle Class	Lower Class	Middle Class
STORY ORDER	Normal Story				
	Description	72.1 (17.1)	59.0 (12.1)	44.9 (12.0)	68.9 (10.1)
	Recall	40.8 (16.6)	49.3 (6.6)	44.5 (15.6)	61.7 (12.8)
	Scrambled Story				
	Description	60.4 (13.5)	65.0 (14.1)	49.3 (14.5)	74.5 (13.3)
	Recall	46.0 (16.7)	53.7 (16.8)	46.08 (19.9)	70.0 (12.8)

Figure 2. Number of statements in description as a function of experimental condition


MEAN NUMBER OF STATEMENTS IN DESCRIPTION
80
70
60
50
40
30
20
10
4 Years, Normal Story
4 Years, Scrambled Story
6 Years, Normal Story
6 Years, Scrambled Story
LOWER CLASS
MIDDLE CLASS
SOCIAL CLASS

no information about the content of the statements the children make. In order to evaluate the quality of their responses, additional analyses are necessary.

Response Type Analysis

All of the children's statements in description and recall were scored as either core, extra, or spurious statements. The aforementioned criteria for these scoring categories were derived from the adult samples' descriptions of the pictures that comprised each story. In light of the large class differences in the quantity of statements made in description and recall, and the age difference in recall, the response type analyses were conducted on proportional data. The numerator was the child's number of either core, extra, or spurious statements in description or recall, and the denominator was the child's total number of statements in the same phase of the experimental session. Each response type was analyzed separately. Although the potential problems associated with using a statistic assuming a normal distribution with proportional data were recognized (e.g., Meyer, 1970), the analysis of variance is robust in terms of violations of the assumptions of normality especially when the sample is large (e.g., Hayes, 1973; Winer, 1971). Consequently, an analysis of variance was used with these data as it provided the best method of obtaining a summary statistic.

Core Statements. Core statements are those statements that were included in at least 50% of the adult protocols. The proportion of core statements the children from each class and age group make in

description and recall is presented in Table 3. The 4-year-old children include a smaller proportion of core statements in their descriptions than the 6-year-old children, $F(1,44) = 82.82$, and lower-class children make proportionately fewer core statements than middle-class children, $F(1,44) = 27.42$. Core statements are proportionately more frequent for normal stories than scrambled stories, $F(1,44) = 60.64$. However, as Figure 3 indicates, middle-class 4- and 6-year olds and lower-class 4-year olds make small reductions in the proportion of core statements they use in describing a scrambled story as compared to a normal story. In contrast, the lower-class 6-year olds make a relatively greater reduction in the proportion of core statements used to describe a scrambled story, $F(1,44) = 7.33$. The effect of class certainly diminishes with age, but it still is apparent when the children describe scrambled stories. It is interesting to note that the proportion of core statements that 6-year-old lower-class children use to describe a scrambled story is comparable to that of 4-year-old middle-class children describing a normal story. Nonetheless, the majority of statements that lower- and middle-class 6-year-old children use to describe a normal story are core statements.

In recall, as in description, the 4-year olds include a smaller proportion of core statements in their protocols than the 6-year olds, $F(1,44) = 88.9$. Middle-class children make proportionately more core statements than lower-class children, $F(1,44) = 37.52$. Core statements are more frequent for normal stories than scrambled stories $F(1,44) = 31.97$. The interaction of class and age also is significant

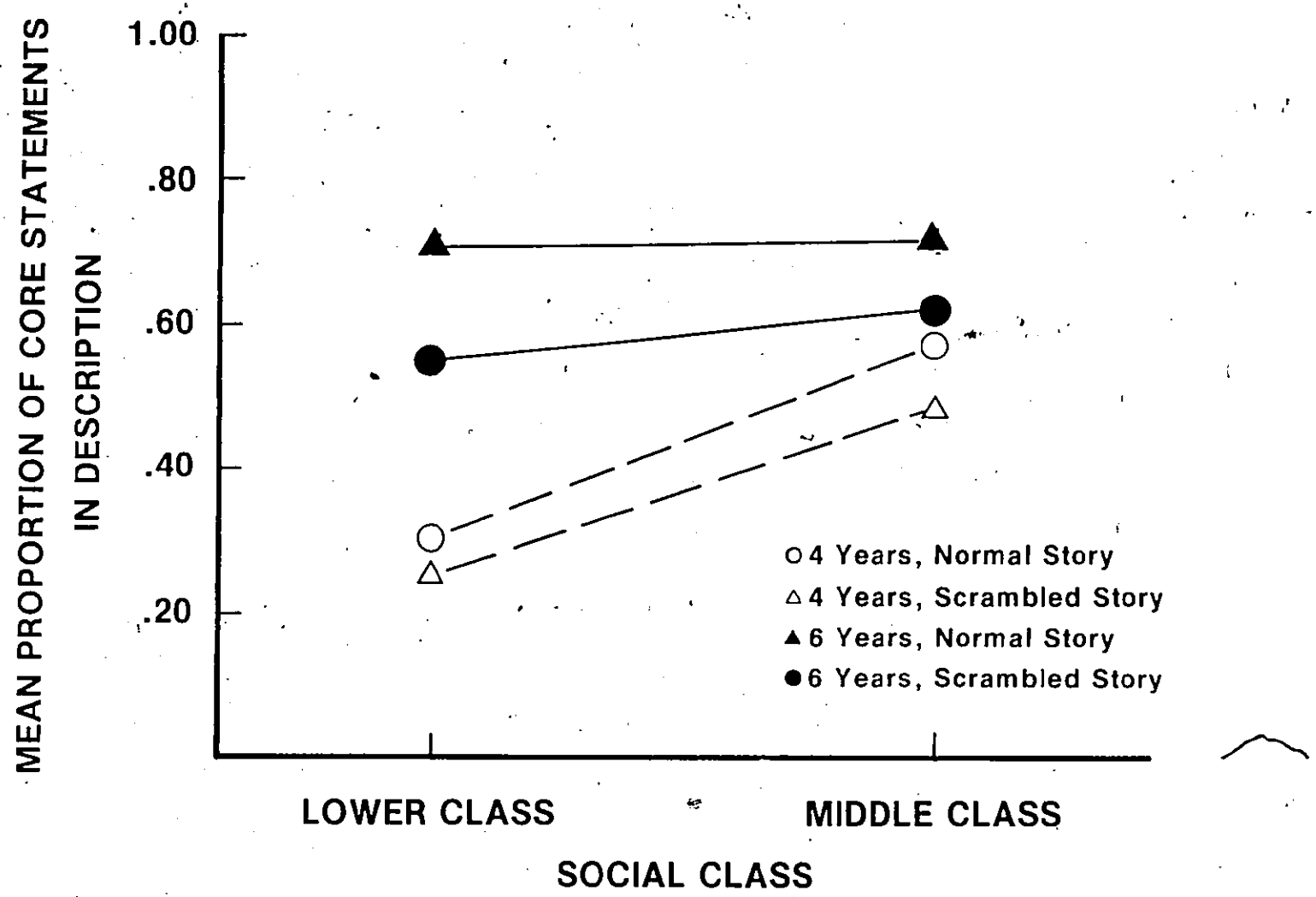
Table 3

Proportion of Core Statements in Description and Recall

(Standard Deviation In Parentheses)

AGE		4 Years		6 Years	
	SOCIAL CLASS	Lower Class	Middle Class	Lower Class	Middle Class
STORY ORDER	Normal Story				
	Description	.30 (.15)	.57 (.08)	.71 (.10)	.70 (.07)
	Recall	.30 (.15)	.57 (.12)	.65 (.08)	.72 (.08)
	Scrambled Story				
	Description	.25 (.11)	.47 (.09)	.55 (.11)	.62 (.08)
	Recall	.19 (.11)	.41 (.15)	.52 (.15)	.66 (.08)

Figure 3. Proportion of core statements in description as a function of experimental condition


MEAN PROPORTION OF CORE STATEMENTS IN DESCRIPTION
1.00
.80
.60
.40
.20
4 Years, Normal Story
4 Years, Scrambled Story
6 Years, Normal Story
6 Years, Scrambled Story
LOWER CLASS
MIDDLE CLASS
SOCIAL CLASS

$F(1,44) = 6.48$. As Table 3 shows, the difference between the percentage of core statements that lower- and middle-class 4-year-old children make in recall is much greater than that between the 6-year olds from the two class groups.

Extra Statements. Extra statements were not made by 50% of the adults, but are judged as correct statements about a picture. The proportion of extra statements made in the description phase of the study does not vary as a function of class. However, when compared to the 4-year-old children's extra statements ($X = .45$, $\sigma = .12$), fewer of the 6-year-old children's statements are extra ($X = .31$, $\sigma = .10$). This difference is reliable, $F(1,44) = 26.68$. Children in all groups make proportionately more extra statements when describing scrambled stories than they do when describing normal stories, $F(1,44) = 28.12$. While approximately 35% ($\sigma = .14$) of statements made about normal stories are extra, 41% ($\sigma = .11$) of the children's statements about the scrambled stories fall in this category.

In recall, the pattern of results related to extra statements is virtually identical with that noted in description. The effects of age, $F(1,44) = 20.81$, and story condition, $F(1,44) = 11.71$, are significant, and comparable in both direction and size with those described above. The 4-year-old children make more extra statements in recall ($X = .45$, $\sigma = .14$) than 6-year olds ($X = .33$, $\sigma = .11$). Moreover, extra statements are relatively more frequent in descriptions of scrambled stories ($X = .43$, $\sigma = .14$) than normal stories ($X = .35$, $\sigma = .13$).

Table 4

Proportion of Spurious Statements in Description and Recall

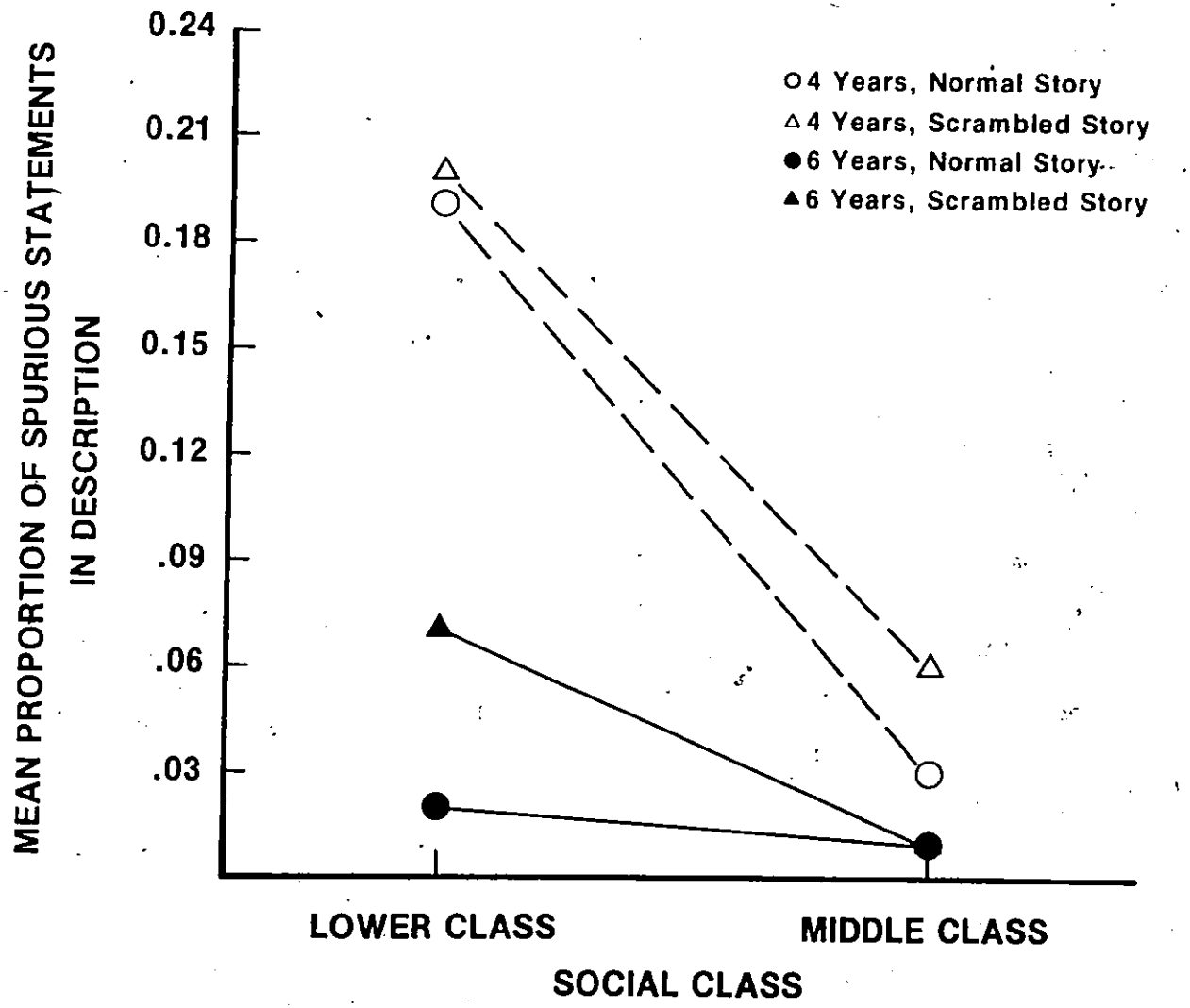
(Standard Deviation In Parentheses)

	AGE	4 Years		6 Years	
	SOCIAL CLASS	Lower Class	Middle Class	Lower Class	Middle Class
STORY ORDER	Normal Story				
	Description	.19 (.15)	.03 (.02)	.02 (.03)	.01 (.01)
	Recall	.21 (.20)	.02 (.03)	.02 (.03)	.00 (.01)
	Scrambled Story				
	Description	.20 (.16)	.06 (.04)	.07 (.04)	.01 (.01)
	Recall	.23 (.12)	.04 (.07)	.05 (.05)	.02 (.03)

Spurious Statements. Spurious statements include those that are judged as far-fetched or incorrect statements about a picture. The frequency of spurious statements in description and recall in the various experimental groups and conditions is shown in Table 4. In description, the interaction between age, class, and story condition, is significant, $F(1,44) = 8.12$. Figure 4 illustrates the nature of this interaction. Middle-class 6-year olds make very few spurious statements when describing a normal or scrambled story. Their lower-class age peers also include proportionately few spurious statements about normal stories in their descriptions. However, they do increase the proportion of spurious statements in their description of scrambled stories. In fact, the difference between the proportion of spurious statements used in normal stories and that used in scrambled stories is greater for the lower-class 6-year olds than the middle-class 4-year olds. Nonetheless, the proportion of spurious statements used by these 3 groups of children in both normal and scrambled stories is very low when it is compared with that of the lower-class 4-year olds. The main effects of age, $F(1,44) = 16.31$, class, $F(1,44) = 16.02$, and story condition, $F(1,44) = 14.11$, and the Age X Class interaction, $F(1,44) = 5.66$ also are reliable.

In recall, as in description, 4-year olds make more spurious statements ($X = .13$, $\sigma = .15$) than 6-year olds ($X = .02$, $\sigma = .04$), and lower-class children ($X = .13$, $\sigma = .15$) make more than middle-class children ($X = .02$, $\sigma = .04$). However, the Age X Class interaction is significant, $F(1,44) = 13.34$. Approximately 22% of the lower-class 4-

Figure 4. Proportion of spurious statements in description as a function of experimental condition


MEAN PROPORTION OF SPURIOUS STATEMENTS IN DESCRIPTION
0.24
0.21
0.18
0.15
0.12
.09
.06
.03
4 Years, Normal Story
4 Years, Scrambled Story
6 Years, Normal Story
6 Years, Scrambled Story
LOWER CLASS
MIDDLE CLASS
SOCIAL CLASS

year-old children's statements in recall are spurious. In contrast, only 3-1/2% of the lower-class 6-year olds' and middle-class 4-year olds' statements fall in this category. Moreover, only 1% of the middle-class 6-year olds statements in recall are classified as spurious.

Story Statements

Story statements are statements that cannot be made on the basis of seeing just one picture, but rather refer to the relationship betwen two or more pictures. Although it is possible to have core, extra and spurious story statements, extra and spurious story statements are very rare. In fact, relative to the total number of statements the children make, even core statements are infrequent. Given that using proportional scores for the analyses of story statements would result in a distribution that is skewed toward low values, the analyses of core and extra story statements were conducted on the actual number of statements. The number of core and extra story statements in the description and recall protocols of children from the four experimental groups is shown in Table 5.

Core Story Statements. In description, 4-year-old children make fewer core story statements ($X = 4.6$, $\sigma = 4.1$) than 6-year olds ($X = 9.0$, $\sigma = 5.0$), $F(1,44) = 22.75$. The class difference in this measure, $F(1,44) = 33.69$, also is reliable: Lower-class children include fewer core story statements in their story descriptions ($X = 4.1$, $\sigma = 3.5$) than their middle-class peers ($X = 9.5$, $\sigma = 4.9$). Moreover, children of both age and class backgrounds include more core story statements in

Table 5

Mean Number of Core and Extra Story Statements in Description and Recall and Standard Deviations (In Parentheses)

	AGE	4 Years		6 Years	
	SOCIAL CLASS	Lower Class	Middle Class	Lower Class	Middle Class
	Normal Story				
	Description				
	Core	3.0 (3.6)	7.2 (3.3)	7.0 (2.9)	12.5 (5.7)
S	Extra	0.7 (1.0)	1.8 (1.9)	1.5 (1.8)	2.8 (2.2)
T					
O	Recall				
R	Core	2.7 (3.8)	7.7 (3.2)	8.4 (4.1)	11.7 (2.5)
Y	Extra	0.4 (0.9)	1.9 (2.4)	1.6 (1.7)	2.4 (2.0)
	Scrambled Story				
O	Description				
R	Core	1.5 (2.2)	6.7 (4.0)	5.0 (2.9)	11.6 (3.7)
D	Extra	0.9 (1.4)	1.4 (1.4)	2.1 (2.1)	3.2 (2.2)
E					
R	Recall				
	Core	1.5 (1.9)	6.0 (3.0)	5.3 (3.5)	12.2 (2.2)
	Extra	0.8 (1.8)	1.7 (1.1)	3.2 (2.7)	4.1 (2.6)

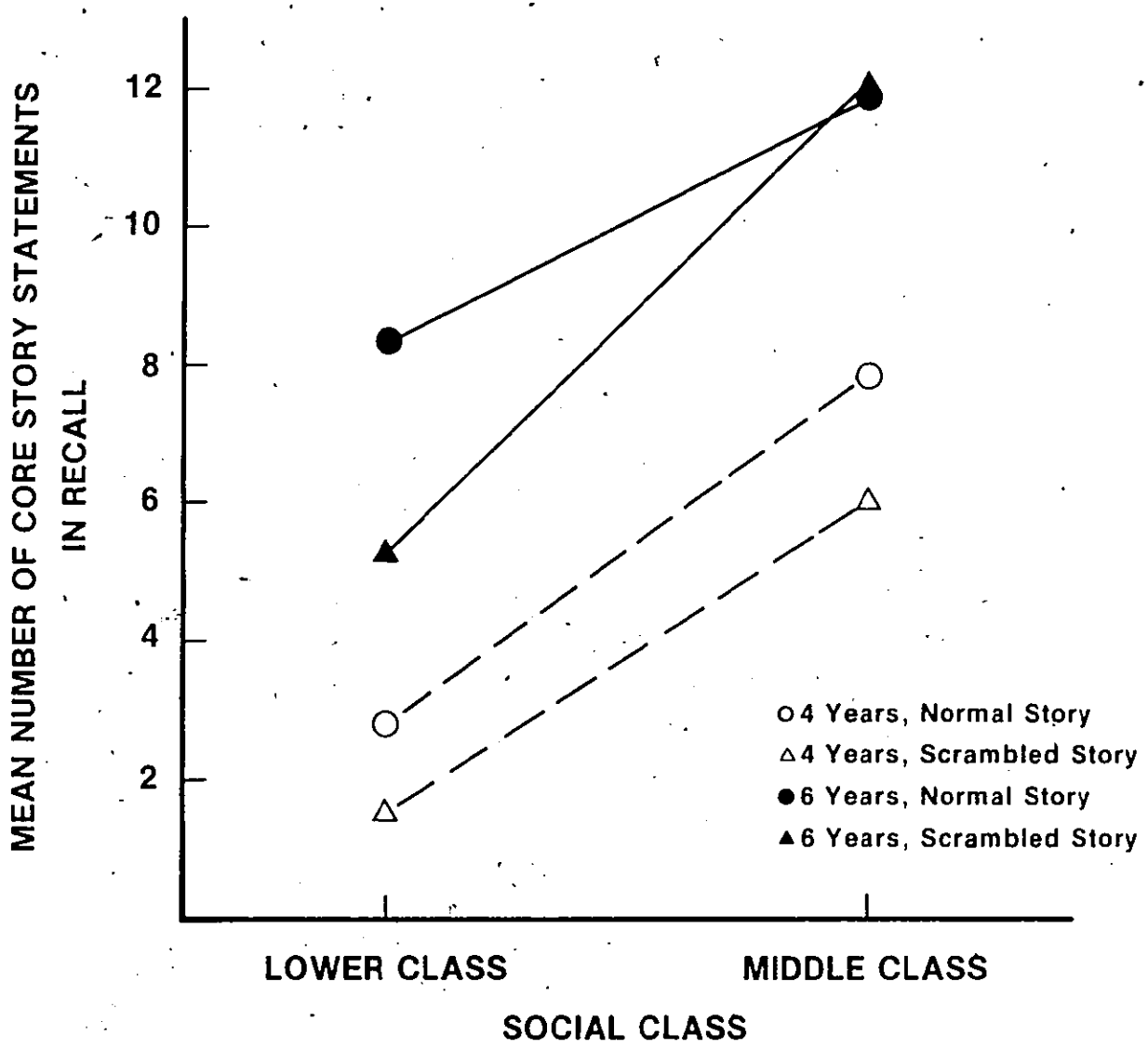
their descriptions of a normal story ($\bar{X}$ = 7.4, σ = 5.2) than is the case for the scrambled story ($\bar{X}$ = 6.2, σ = 4.8), $F(1,44) = 5.80$.

In recall, as in description, the main effects of age, $F(1,44) = 43.18$, class, $F(1,44) = 42.46$, and story condition, $F(1,44) = 7.50$ are significant. However, the interaction between age, class, and story condition is reliable, $F(1,44) = 4.26$. As Figure 5 indicates, the number of core story statements that middle-class 4-year olds and lower-class 6-year olds include in their recall protocols for normal and scrambled stories is similar, although lower-class 6-year olds are more affected by the change to a scrambled story. However, lower-class 4-year olds use very few story statements in their recall of normal ($\bar{X}$ = 2.7, σ = 3.8) and scrambled stories ($\bar{X}$ = 1.5, σ = 1.9). In contrast, 11.7 (σ = 2.5) of the middle-class 6-year olds' statements in recall of a normal story are core story statements, and 12.2 (σ = 2.2) of their statements about a scrambled story fall in this category.

Extra Story Statements. Very few extra story statements are included in the children's descriptions of normal and scrambled stories. However, the main effects of age, $F(1,44) = 9.7$, and class, $F(1,44) = 6.6$, are reliable. The 4-year-old children include fewer extra story statements ($\bar{X}$ = 1.2, σ = 1.5) in their descriptions than the 6-year olds ($\bar{X}$ = 2.4, σ = 2.1). Moreover, lower-class children's protocols include fewer statements of this type ($\bar{X}$ = 1.3, σ = 1.7) than middle-class children's ($\bar{X}$ = 2.3, σ = 2.0).

In the analysis of recall of extra story statements, the main effects of age, $F(1,44) = 13.54$, class, $F(1,44) = 5.13$, and story

Figure 5. Number of core story statements in recall as a function of experimental condition


MEAN NUMBER OF CORE STORY STATEMENTS IN RECALL
12
10
8
6
4
2
LOWER CLASS
MIDDLE CLASS
SOCIAL CLASS
4 Years, Normal Story
4 Years, Scrambled Story
6 Years, Normal Story
6 Years, Scrambled Story

condition, $F(1,44) = 5.64$, are significant (see Table 5). However, the Age X Story Condition interaction also is reliable, $F(1,44) = 4.62$. As Table 5 indicates, the 6-year olds make a greater increase in the number of extra story statements used in recalling a scrambled story relative to a normal story than the 4-year olds.

Narrative Conventions

The children's use of narrative conventions, such as "Once upon a time...," and "Finally...," is considered in this section. Table 6 lists the means number of narrative conventions children from each class and age group used in description and recall. The 4-year olds use fewer narrative conventions ($X = 11.1$, $\sigma = 10.2$) than 6-year olds ($X = 15.9$, $\sigma = 9.2$), $F(1,44) = 4.14$. Lower-class children also use fewer narrative conventions ($X = 10.3$, $\sigma = 10.0$) than middle-class children ($X = 16.7$, $\sigma = 8.9$), $F(1,44) = 7.45$.

In recall, as in description, lower-class children ($X = 12.8$, $\sigma = 10.6$) use fewer narrative conventions than middle-class children ($X = 22.98$, $\sigma = 8.8$), $F(1,44) = 28.3$. The number of narrative conventions also increases with age, $F(1,44) = 18.2$. However, as can be seen in Table 6, the older children use relatively more narrative conventions in recalling a scrambled story as opposed to a normal story than the younger children, $F(1,44) = 5.8$.

Narrative Category or Macrostructure Analysis

As noted above, each picture in the four stories belongs to either the story exposition, complication or resolution. If the total number of responses in either description or recall to the pictures

Table 6

Narrative Conventions in Description and Recall,

and Standard Deviations (In Parentheses)

AGE		4 Years		6 Years	
	SOCIAL CLASS	Lower Class	Middle Class	Lower Class	Middle Class
STORY ORDER	Normal Story				
	Description	6.9 (8.7)	13.9 (9.8)	12.0 (10.0)	14.7 (5.0)
	Recall	5.4 (7.8)	20.3 (7.5)	16.2 (9.0)	22.2 (7.1)
	Scrambled Story				
	Description	5.5 (5.0)	18.2 (11.5)	16.8 (11.8)	20.0 (7.6)
	Recall	6.4 (7.2)	19.3 (9.8)	19.0 (9.4)	30.0 (7.3)

belonging to each narrative category is calculated, by far the most responses occur to complication pictures. Children make fewer responses to resolution pictures, and still fewer to exposition pictures. In general, the structure of the stories accounts for these data. There are 29 complication pictures, 12 resolution pictures and 7 exposition pictures across the 4 stories. However, complication pictures also may be more interesting than the relatively static exposition or resolution pictures. Children in the study who had great difficulty recalling anything from a story generally remembered complication pictures such as Picture 7 or Picture 9 in Frog on His Own (see Figure 1).

Consequently, in an attempt to determine if and how the narrative structure of the stories influenced description and recall, the average number of statements per picture for each narrative category was calculated for each child's recall of the normal stories and the scrambled stories. This provides an index of the importance of each narrative category that is not confounded by the number of pictures in each category. If the function of a picture in the story is an important determinant of how a child interprets a picture, and if the story schema guides recall, there should be class differences in the average number of responses per narrative category. Given the picture rearrangement data, it is reasonable to expect that middle-class children's average number of responses to a picture in each narrative category will be related to the function of the picture in the schematic story while lower-class children's responses are less likely to be related to the narrative structure of the story.

A 2 X 2 X 3 split-plot analysis of variance, with age and class of child as between-subjects factors, and narrative category (i.e., exposition, complication, resolution) as the within-subjects factor, was conducted on the average number of responses per narrative category for both the recall of normal stories and scrambled. Table 7 presents the relevant means for the groups. In the recall of a normal story, the main effects of class, $F(1,44) = 15.28$, age, $F(1,44) = 23.28$, and narrative category, $F(2,88) = 5.27$ are significant. Moreover, the Class X Narrative Category interaction, illustrated in Figure 6, is reliable, $F(2,88) = 6.79$. Middle-class children place the most emphasis on resolution pictures, the next most on exposition pictures and the least on the complication pictures in their recall of normal stories. In contrast, lower-class children make the most statements about exposition pictures and the least about resolution pictures. Orthogonal contrasts show that the class differences in exposition statements, $F(1,44) = 9.46$, and resolution statements, $F(1,44) = 11.64$, are reliable.

In recall of the scrambled stories, a similar pattern of results occurs. There are significant differences in the number of statements made by 4- and 6-year-old children, $F(1,44) = 19.65$ and by lower- and middle-class children, $F(1,44) = 35.01$. More importantly, in terms of the present analysis, the interaction between class and narrative category is significant, $F(2,88) = 3.81$ (see Figure 7). In recalling scrambled stories, middle-class children make 2.7 statements ($\sigma = 1.40$) per exposition picture, 2.2 ($\sigma = .72$) per complication picture, and 2.67

Table 7

Average Number of Statements Per Narrative Category in Recall of Normal and Scrambled Stories
(Standard Deviations In Parentheses)

	AGE	4 Years		6 Years	
	SOCIAL CLASS	Lower Class	Middle Class	Lower Class	Middle Class
STORY ORDER	Normal Story				
	Exposition	1.11 (0.90)	2.00 (1.00)	2.21 (1.40)	2.92 (1.43)
	Complication	1.28 (0.50)	1.67 (0.54)	1.59 (0.71)	2.18 (0.54)
	Resolution	0.83 (0.84)	2.55 (0.80)	1.87 (0.65)	3.28 (0.99)
	Scrambled Story				
	Exposition	1.03 (0.89)	1.88 (1.34)	1.72 (1.17)	3.55 (0.92)
	Complication	1.38 (0.64)	1.75 (0.61)	1.67 (0.62)	2.65 (0.51)
	Resolution	0.78 (0.63)	2.24 (1.35)	1.59 (0.88)	3.09 (0.98)

Figure 6. Average number of responses in recall of normal stories for each narrative category as a function of social class

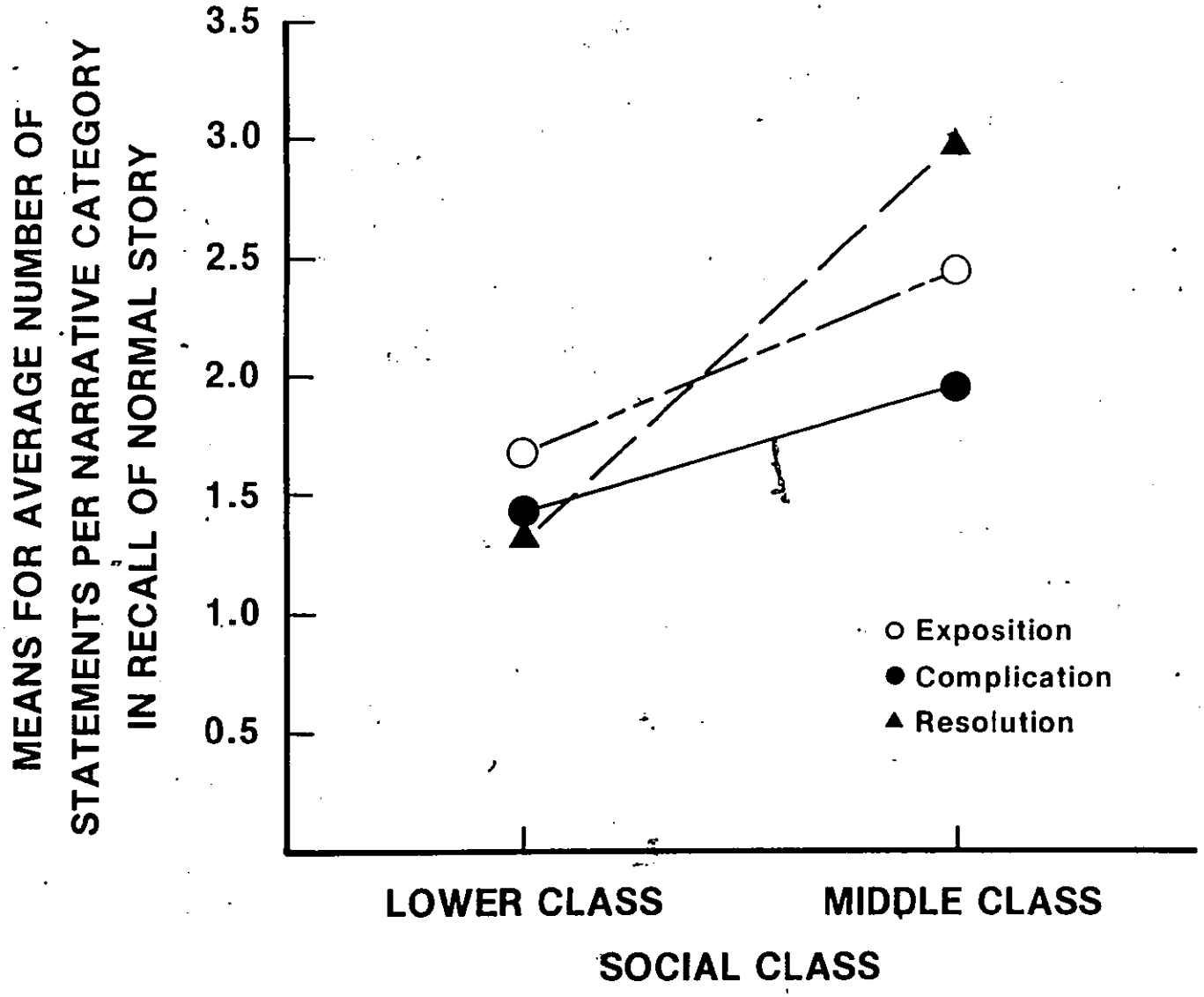
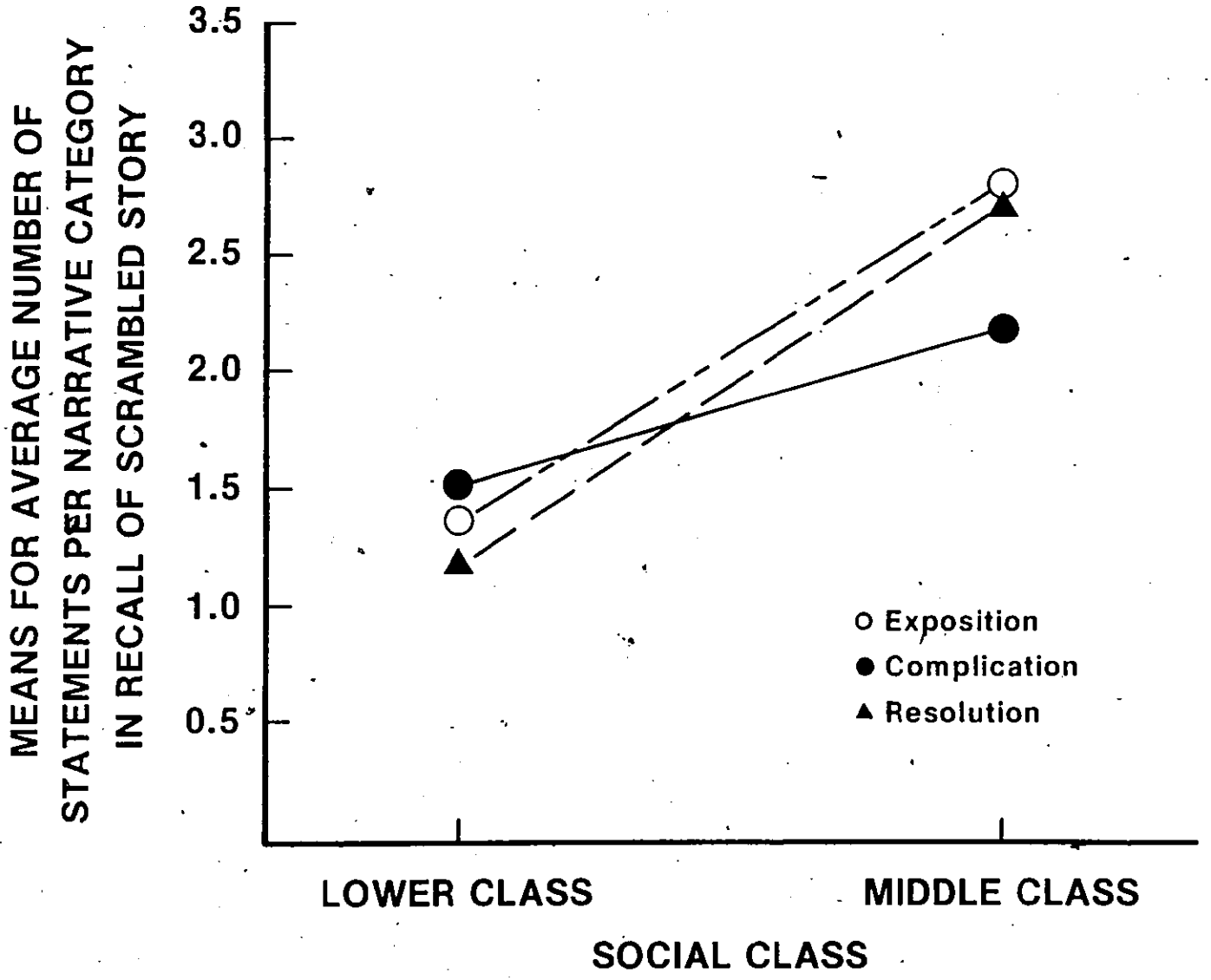

MEANS FOR AVERAGE NUMBER OF STATEMENTS PER NARRATIVE CATEGORY IN RECALL OF NORMAL STORY
3.5
3.0
2.5
2.0
1.5
1.0
0.5
Exposition
Complication
Resolution
LOWER CLASS
MIDDLE CLASS
SOCIAL CLASS

Figure 7. Average number of responses in recall of scrambled stories for each narrative category as a function of social class


MEANS FOR AVERAGE NUMBER OF STATEMENTS PER NARRATIVE CATEGORY IN RECALL OF SCRAMBLED STORY
3.5
3.0
2.5
2.0
1.5
1.0
0.5
Exposition
Complication
Resolution
LOWER CLASS
MIDDLE CLASS
SOCIAL CLASS

(σ = 1.23) per resolution picture. Lower-class children, on the other hand, make 1.38 statements (σ = 1.07) per exposition picture, 1.53 (σ = .63) per complication picture and 1.18 (σ = .86) per resolution picture. Thus, in the recall of the scrambled stories, the lower-class children emphasize the salient complication pictures rather than exposition and resolution pictures while their middle-class peers do the opposite. Non-orthogonal contrasts indicate that the class differences in the use of exposition, $F(1,44) = 24.46$, complication, $F(1,44) = 6.23$, and resolution, $F(1,44) = 30.03$, statements are reliable.

Discussion

The results reported above clearly support a number of conclusions regarding the hypotheses tested in this study. The results of the analyses of all of the story-related variables converge on the same conclusions:

(1) Middle-class 4- and 6-year-old children comprehend, describe and recall normal stories in a different way than lower-class children of the same ages.

(2) Middle-class children are more successful at rearranging scrambled stories into a schematic sequence than lower-class children. However, only the middle-class 6-year olds perform at an adult level on the task. Comparable class and age differences occur in the comprehension and recall of scrambled stories.

(3) The data comparing children's performance on normal and scrambled stories permit the inference that middle-class children, especially the 6-year olds have acquired more knowledge about the structure of simple stories than the lower-class children.

The class differences in performance on normal and scrambled stories, the picture rearrangement data and the narrative category analyses, in

particular, support the hypothesis that there are class differences favouring middle-class children in the acquisition of knowledge about the structure of simple stories, that is, the story schema.

When middle-class 6-year-old children describe a normal story, they emphasize those aspects of the pictures that adults think are central to the story (i.e., core statements). Moreover, these children not only describe what they see in a picture but also, by their use of story statements, they frequently indicate how that picture is related to previous events in the story. When middle-class 4-year-old children and lower-class 6-year-old children describe a normal story, they also emphasize the central details of the story and indicate an understanding of the relationships between pictures. However, when lower-class 4-year-old children describe a normal story, their descriptions stress the inessential details of the stories and include many far-fetched or spurious statements about the stories. The recall data for normal stories add strong support to these conclusions.

The data on scrambled stories and their relationship to the normal story data provide stronger evidence of a marked class difference in the story schema. Middle-class children of both ages were more successful than the lower-class children in rearranging the scrambled pictures into a logical sequence, although only the 6-year olds were close to ceiling on this task. The 6-year-old middle-class children's description and recall of the rearranged pictures were comparable to those they gave for normal stories. Propositions that were central to the gist of the story were emphasized rather than details of the story.

Core story statements indicating comprehension of the sequence of events in the story were included in description. These middle-class children provided evidence of their acquisition of an adult-like story schema which they used to schematize a scrambled array of pictures into a story-like sequence. However, the middle-class 4-year olds' description and recall of normal stories were more adult-like (i.e., more core statements) than their descriptions of scrambled stories. Nevertheless, the younger middle-class children were able to use the schema they imposed upon the pictures to comprehend the pictures and they identified the central ideas in the "story." The younger middle-class children also recalled many more core propositions than extra or spurious propositions.

Interestingly, the 6-year-old middle-class children, like those in the Poulsen et al. (1979) study, seem to make a special effort to "normalize" scrambled stories in recall. Their use of narrative conventions, the linguistic markers used in well-formed stories, peaks when they recall a scrambled story. Similarly, the number of core and extra story statements in the middle-class 6-year olds' recall of the scrambled stories is particularly high. In what Bartlett (1932) would term "effort after meaning," these children stress the relationships between pictures and use the linguistic markers that signal the presence of a story.

In contrast to the middle-class children, the lower-class children of both ages had difficulty in rearranging the scrambled stories into coherent schematized sequences. For the lower-class 4-

year-old children, it made little difference if the story was in normal or scrambled order. In fact, their description and recall protocols for the scrambled stories were comparable to those for the normal stories: Extra details (i.e., extra statements) and far-fetched interpretations (i.e., spurious statements) were stressed. The relationships between pictures in the story were not specified and central ideas were not identified. As these 4-year olds do not make use of the story schema in a normal story to guide comprehension and recall of that story, scrambling the stories has a minimal effect. In contrast, the 6-year-old lower-class children were able to use the story schema in a normal story to guide comprehension and recall. Once that schema was removed in the scrambled stories, however, the 6-year-old lower-class children were in difficulty. Their rearrangements were more like a random shuffling of pictures than an attempt to order them schematically. There was a large decrement in their ability to understand and remember the rearranged scrambled stories relative to the normal stories. At times, the switch from a normal to a scrambled story resulted in the lower-class 6-year olds performing more poorly than the middle-class 4-year olds. The data on core and spurious statements in descriptions and story statements in recall, for example, indicate this trend. Nevertheless, in the majority of the analyses on the description and recall of scrambled stories, the lower-class 6-year olds performed at a level comparable to that of the middle-class 4-year olds. In fact, the lower-class 6-year olds' protocols for scrambled stories are reminiscent of those produced by the adults who read the deschematized and random

passages in Thorndyke's (1977) study: Statements that were important and memorable in a story lost their salience and memorability when the context of the story was destroyed.

The analyses of narrative categories provide strong support not only for the view that the story schema plays a critical role in the comprehension and recall of stories, but also for the hypothesis that the development of the story schema is delayed in lower-class children. Exposition and resolution pictures, which generally are fairly static by themselves, are emphasized in middle-class children's recall of normal and scrambled stories. However, lower-class children of both ages tend to stress the more action-oriented complication pictures in recall. This difference suggests that the middle-class children's responses to a picture are determined, at least in part, by the function of the picture in the story. Static pictures become salient if they are interpreted in the context of the schematic structure of the story. Apparently, only the middle-class children in this study have acquired sufficient knowledge about stories to recognize the significant role that relatively dull pictures play in the macrostructure of a story.

Their recall of the stories seems to be guided by that knowledge: The "slots" specified by the story schema are instantiated when they remember the story. Lower-class children are less likely to instantiate the exposition and resolution slots. It seems unlikely that knowledge about the story schema is guiding their recall. Thus, as the lower-class children do not recognize the importance of exposition and

resolution pictures in the story, the dull pictures from those categories remain dull and seldom are remembered.

Overall, the data from the middle-class children confirm those discussed in the literature review. By 4 years of age, middle-class children seem to have acquired a body of knowledge about the structure of simple stories that they use to guide comprehension and recall. However, these 4-year-old children are not as well equipped as 6-year-old middle-class children are to handle stories that deviate from a schematic structure.

The data from the lower-class children are not consistent with those obtained in studies of middle-class children. The fact that 4-year-old lower-class children had almost as much difficulty understanding and remembering normal stories as they did with scrambled stories suggests that these children have not acquired the most rudimentary knowledge about the story schema. These children do not identify the salient aspects of the story and seldom describe the relationships between one picture and the next. Indeed, a minority of children in this group do not even infer the continuity between characters in one picture and the next. For example, after describing picture 1, a description of picture 2 in Frog on His Own (See Figure 1) might be "There's another boy and another frog and another dog." Although the 6-year-old lower-class children's performance, especially with the normal stories, represents an improvement when compared to the lower-class 4-year olds', the data show that, at best, their performance is comparable to 4-year-old middle-class children's. At worst, in the

picture rearrangement task, the 6-year olds perform at the same level as the 4-year-old lower-class children.

Certainly, the available results suggest that it would be worthwhile to study the processes of acquiring knowledge about the story schema and learning to use it in understanding and remembering stories in lower-class children. Experiment III seeks to determine if providing 4-year-old, lower-class children with extensive experience with stories improves their ability to understand and remember normal stories and to rearrange scrambled stories.

EXPERIMENT III

The results of Experiments I and II showed that lower-class children's abilities to understand and remember stories and to rearrange scrambled stories were poor relative to those of their middle-class age-peers. These findings lend support to the theoretical assumption, discussed in the literature review, that experience with stories is a critical factor in the acquisition of knowledge about the story schema and the ability to use that schema to guide comprehension and recall. If lower-class children were given experience with stories in their preschool years, would they learn about the story schema and use it in understanding and remembering stories? Would they be able to impose a schematic structure on a scrambled story? The third experiment addresses these questions.

A number of investigators have theorized that the story schema is learned and refined in the course of experience with stories (e.g., Bower, 1976; Mandler & Johnson, 1977; Rumelhart, 1980b; Rumelhart & Ortony, 1977; Stein, 1979; Stein & Glenn, 1979; Stein & Trabasso, 1982; Thorndyke & Yekovich, 1980). As noted in the literature review, generally theorists have maintained that individuals abstract the prototypical properties of stories on the basis of this experience (e.g., Bower, 1976; Mandler & Johnson, 1977; Rumelhart, 1975; Stein & Trabasso, 1982; Thorndyke & Yekovich, 1980). This prototype presumably is used to judge if a text is a story (e.g., Mandler & Johnson, 1977; Rumelhart, 1975; Stein & Trabasso, 1982). An alternative view that can

be derived from the literature on classification learning is that individuals acquire knowledge about the schematic structure of stories by storing a body of stories in memory that serve as examples or instances of the story (e.g., Brooks, 1978, Note 1, Note 2; Medin & Schwaneflügel, 1981; Medin & Smith, 1981). In this latter view, the story schema would be a body of exemplars in memory. When an individual hears or reads a new story, it would serve as a retrieval cue for the exemplars in memory. Upon retrieval, the individual would decide if the new text was similar to the body of exemplars. In either case, if the schematic structure of stories was well-learned, it would be used to guide story comprehension and recall.

Unfortunately, the theorizing on acquisition of the story schema has been somewhat perfunctory in nature and invariably brief. Hence, the literature on the cognitive processing of stories was of minimal use in designing Experiment III.

The subjects in Experiment III were 4-year-old lower-class children. The choice of this subject population was made on the basis of the results of the initial studies. The 4-year-old lower-class children were of particular interest because their comprehension and recall of both normal and scrambled stories was poor relative to the middle-class 4-year-old subjects'. Moreover, in contrast to their middle-class peers and to the 6-year-old lower-class subjects, these children's comprehension and recall of the material were similar for both normal and scrambled stories. The schematic structure of normal stories apparently did not facilitate comprehension and recall for these

children, and consequently, performance on normal and poorly rearranged scrambled stories (i.e., still scrambled stories) was comparable. Given that the 4-year-old lower-class children were close to floor level on the task, they seemed to be the most appropriate subjects for an intervention study designed to test the hypotheses that young children acquire knowledge about the story schema by repeatedly listening to stories, and that knowledge of that schema is necessary for successful comprehension and recall of stories. The most appropriate control population for the 4-year-old lower-class children receiving intervention was other lower-class children who did not receive the same treatment. Consequently, middle-class children were not included in the study.

Prior to describing the parameters of the study in detail, a caveat about intervention research that influenced the design of Experiment III deserves mention. Smith and Syddall (1978) recently reviewed a number of intervention studies on the effects of sociodramatic play tutoring on later behaviour. A major problem in the majority of the studies they examined was the lack of comparability between the nature of adult-child interaction in the experimental and control groups. Smith and Syddall suggested that such differential treatment accounted for the fact that experimental children's post-test scores increased on a wide variety of competence-related tests. When Smith and Syddall conducted a subsequent study in which adult-child interactions in the experimental and control groups were equated, tutoring in sociodramatic play led to differential gains relative to the

control group that were specific to the play experience. However, both the experimental and control group made comparable gains on a variety of measures unrelated to play.

Given Smith's and Syddall's demonstration of the effects of adult-child verbal interaction on treatment groups, it was important to ensure that the quantity and quality of adult-child interaction was equated across treatment groups in the present study. The only variable that should vary is the schematic structure of the verbal material presented to the children, while the semantic content should be held constant (cf. Thorndyke, 1977 for an example of such a design). Moreover, given the developmental changes that may occur over time in an untreated group of children, a no-treatment control group was seen as necessary. Consequently, three groups are included in the present study: a schematic story treatment group, an unschematic "story" control group, and a no-treatment control group.

Baseline data were obtained on the dependent variables assessed in the first two experiments. Prior to treatment, the children also were given a test that served as a test of receptive language and also provided a rough indicator of intelligence. All children were assigned randomly to one of three treatment groups. Children assigned to the schematic story treatment group were given experience with schematic stories. Children assigned to the non-story control group were exposed to the same semantic and pictorial content as the children in the story treatment group, but that content was not organized schematically. The no-treatment group is self-explanatory. In this design, the only

difference between the schematic story group and the non-story group is that the story group was exposed to the story schema while the non-story group is not. If the story schema is acquired through experience with stories, and if knowledge of the story schema facilitates the successful comprehension and recall of stories and is critical for successful rearrangement of scrambled stories, then the story group should show the greatest improvement on these post-intervention measures. Notwithstanding the above, children in both the non-story treatment and the no-treatment groups may show some improvement on these measures because of developmental changes. If the children in the schematic story treatment group make the greatest gains, it would be reasonable to infer that the story treatment is causally responsible for the differential improvement of the story treatment group on the post-intervention story measures. Moreover, it would be possible to conclude that children learn the story schema through experience with stories, and that knowledge of that schema is necessary for successful comprehension and recall of stories and for rearrangement of scrambled stories. However, as children in both the story and non-story treatment groups have experience with an adult that the children in the no-treatment do not have, children in the former groups may make additional gains, relative to the no-treatment group, on measures that are not story specific. For example, verbal skills may improve over time.

Experiment III is predicated on the assumption that lower-class children's lack of experience with stories in the preschool years is responsible for the relative delay in their acquisition of knowledge

about the structure of simple stories, their difficulty in comprehending and recalling such stories, and their inability to successfully rearrange a scrambled story. Presumably these children would learn about the story schema at the same time as their middle-class age peers if they had comparable experiences with books in their preschool years. Given these fundamental assumptions, it was important to ensure that the treatment method matched that of the middle-class preschoolers' experience with stories as closely as possible. From a pragmatic point of view, it is unfortunate that the majority of middle-class children's experiences with stories in their preschool years almost certainly occur in their homes in a one-to-one setting in which an adult can be especially responsive to a child's interests. From the author's point of view, there were several marked advantages to group administration of a lengthy treatment. First, it was more economical in terms of time and energy. Moreover, if the story treatment had the predicted effects, it seemed likely that it would be adopted by educators only if it could be administered to a group. Ultimately, a compromise between individual and large group administration was adopted. The maximum size for a treatment group was 6 children.

In selecting stories for the study, it seemed appropriate to concentrate on classic children's stories such as Goldilocks and the Three Bears, The Three Billy Goats Gruff, The Three Little Pigs, and The Gingerbread Man. They are well-structured from a schematic point of view, and undoubtedly are known by most middle-class Canadian and American children. Stories that have been awarded the Caldecott Medal

that honours Ralph Caldecott, a nineteenth century illustrator of children's books (Hildebrand, 1971), also were included in the selection. The medal-winning books are distinguished both by the high quality and the compatibility of text and illustration (Hildebrand, 1971; Todd & Heffernan, 1967). Picture stories that have received other awards, such as the Australian Picture Book of the Year Award, also were selected.

Finally, it is appropriate to discuss the length of the treatment phase of the study. In reviewing a variety of intervention studies, it is apparent that the length of treatment varies considerably (e.g., Consortium, 1977; Saltz & Johnson, 1974; Saltz, Dixon, & Johnson, 1977; Schweinhart & Weikart, 1980; Smilansky, 1968; Smith & Syddall, 1978; Weikart, Bond & McNeil, 1978). The literature suggests that 10 hours of treatment is close to the minimum treatment time that is associated with positive results. Given the nature of the present study, it seemed unlikely that fewer than 26 treatment sessions (i.e., approximately 10 hours) would have any effect, especially because each session would be relatively brief (i.e., 20 to 25 minutes). Consequently, there were 26 treatment sessions in the present study. It did not seem reasonable to plan a longer period of intervention entailing additional treatment sessions in the absence of any data on the effects of intervention.

In summary, the present study was designed to test the following two hypotheses:

(1) Young children acquire knowledge about the story schema by repeatedly listening to simple stories.

(2) Children who have acquired knowledge about the story schema comprehend and recall normal stories, and rearrange, comprehend and recall scrambled stories in a different way than children lacking such knowledge.

On the basis of the data obtained in Experiment I with 4-year-old children, the following results were expected from the pre-intervention testing:

(1) Children in all three groups will be unable to arrange scrambled "stories" into schematic stories.

(2) The children in all three groups will have difficulty comprehending and recalling normal stories.

(3) The children's comprehension and recall of poorly arranged scrambled "stories" will be comparable to their performance with normal stories.

The post-treatment predictions were as follows:

(1) Children in the schematic story group will show an improvement in their ability to arrange scrambled "stories" into schematic stories. Children in the unschematic "story" and no-treatment groups will not show the same degree of improvement.

(2) Relative to children in the unschematic "story" and no-treatment groups, children in the schematic story group will be better able to comprehend and recall normal stories.

(3) All children's comprehension and recall of scrambled stories will be comparable to their performance with normal stories.

(4) Children in the schematic story and unschematic "story" groups will show a greater change over time in their PPVT scores than children in the no-treatment group.

Method

Subjects. The 4-year-old children participating in the study attended either a morning or afternoon junior kindergarten class at a Toronto Board of Education school. The morning and afternoon classes were taught by the same teacher. The particular school was selected for several reasons. A Toronto Board of Education study of the inner city schools falling under its jurisdiction indicated that the culturally-heterogeneous population at this school is the most deprived in terms of level of parental income and education, and level of housing (Rutledge, Note 6). The school achievement of children at this school, also is low (Bates, Rutledge & Green, Note 7).

A total of 37 children, all of whom were born in 1977, were included in the study. Because of subject attrition caused by school transfers, the final sample consists of 33 children. All children belonged to class 6 on the Blishen Occupational Class Scale (Blishen & McRoberts, 1976) or to class 7 as defined in Experiments I and II, and all of the children lived in a high-rise public housing unit. A decision to include all of the children in morning- and afternoon - junior kindergarten classes in the study meant that some children did not have English as their first language. Moreover, the number of males in the classes exceeded the number of females. Consequently, assignment to the three treatment groups was random with the restriction that the sex and native language composition of the groups was comparable. There were 6 males and 5 females in both the unschematic "story" group and the no-treatment group, while there were 7 males and 4 females in the

schematic story group. In each group, 7 children were native English speakers and 4 learned English as a second language. Across the 12 non-native English speakers, there were six different first languages, and within treatment groups, the non-native speakers were a heterogeneous group.

Pre-Treatment Procedures

The four stories, the scoring procedures and the scrambled orders used in Experiments I and II were used in the present study. Each child described and recalled a normal story, and rearranged, described and recalled a scrambled story in the pre-treatment testing phase of the study. The instructions and method of administering the test stories were not changed for the present study. Moreover, the assignment of stories to the normal and scrambled positions and the counterbalancing of stories across treatment groups were not changed. The pictures in each story were described to the author, and recalled to a second adult. The second adult had been the assistant in Experiments I and II.

In the initial phase of the study, the experimenter and assistant spent 5 days at the school familiarizing themselves with the children. Again, live frogs were taken to the school as a frog is a central character in all of the test stories. Unfortunately, in Experiment III, Canadian immigration laws for salmonella-bearing American turtles, combined with the vagaries of winter, made it impossible for a live turtle to be taken to the school. As some children in Experiment I had not known what a turtle was until they saw

it, this actually was a serious concern. Consequently, prior to the first test session, each child was asked to point to the "thing that sometimes lives in the same pond as frogs" in Plate 10 of the Peabody Picture Vocabulary Test (PPVT) (Dunn, 1959). The majority of the children chose the turtle and spontaneously named it. However, some did not. After asking the child to find the turtle on the PPVT plate, the experimenter produced plastic wind-up turtles and allowed the child to play with them and to organize turtle races. By the end of this pre-testing session, all children could correctly label the turtles and the frogs.

Before treatment began, the children also were tested on the PPVT. Within each group, half of the children were tested on Form A of the PPVT, and the remaining half on Form B. Children were tested individually by either the experimenter or the assistant. Several cautionary comments that affect the interpretation of the PPVT scores deserve mention. The PPVT was administered with the intention of obtaining a rough rather than an accurate index of intelligence. The PPVT standardization sample included only native English-speaking children from Nashville, Tennessee (Dunn, 1959) and thus, the norms should be used cautiously. Moreover, the test only taps receptive vocabulary and hence, the construct validity of the test as a measure of intelligence is weak (Piers, 1965). The 6 month intervals that are adopted by Dunn in tabling IQ scores for preschoolers are associated with large changes in IQ for children on the age borderline (e.g., Lyman, 1965). Finally, the test has a long history of underestimating

the IQs of children from lower-class backgrounds especially on the first testing (e.g., Applebaum & Tuma, 1977; Goh & Lund, 1970; Seitz, Abelson, Levine & Zigler, 1975; Weinberg, Dietz, Penick & McAlister. 1974; Zigler, Abelson & Seitz, 1973; Zigler, Abelson, Trickett & Seitz, 1982). Consequently the PPVT scores should never serve as the basis for any clinical judgments about intelligence in lower-class children. The above notwithstanding, if all children receive the same treatment prior to testing (Seitz et al., 1975; Zigler et al., 1973, 1982), the PPVT does have a history of being a useful test to adopt as a control measure (cf. Piers, 1965), and it has been used successfully in a number of intervention studies to provide an index of change (e.g., Zigler et al., 1973, 1982).

Treatment Procedures

Treatment sessions were held every day of the school week for 26 days. The author read all the stories and unschematic "stories" to both groups. The assistant was unaware of the composition of the treatment groups.

Schematic Story Treatment. Children in the schematic story treatment condition heard 26 stories. Selection criteria for the stories, which ranged from 12 to 24 pages in length, were outlined above. A list of the stories and the number of pages in each can be found in Appendix III. For design reasons, redundant pictures were eliminated in some stories. The illustrated stories had accompanying text with each picture that was read verbatim. Children were not asked

any questions about the stories, but the experimenter answered any questions the children asked.

Unschematic "Story" Treatment. Children in the unschematic "story" treatment saw the same pictures and heard the same text as children in the schematic treatment group. However, each picture in the "stories" the group heard was drawn from a different story, although each picture appeared in its normal sequential position. For example, a "story" consisted of picture 1 from story A, picture 2 from story B, through to picture 26 of story Z. The experimenter answered any questions the children asked, but did not pose questions to the children.

Post-Treatment Procedures

The first post-treatment test session involved description and recall of a normal and scrambled story as described in the discussion of pre-treatment procedures. In a second post-treatment session, each child was tested on the form of the PPVT that had not been used with that child in the pre-treatment test.

Interval Between Testings

In both the pre- and post-treatment testings, all children were tested on the stories in one session, and on the PPVT in a second session. The intervals between the two story testings for the schematic story treatment group, the unschematic "story" group and the no-treatment group are 50.1, 47.3, and 49 days respectively. For the PPVT, the intervals in the same respective orders are 43, 41.5, and 44 days. Every effort was made to keep the intervals identical for all groups,

but with weekends, absenteeism and special school events, this was impossible. Children were tested in the same rank order whenever possible. However, if a child who was to be tested next was absent, other children were tested.

Attendance

For both the schematic story and unschematic "story" treatment groups, attendance was satisfactory and comparable. The children in the schematic treatment group were present for a mean of 21.6 (σ = 3.8) of the 26 sessions, while the 11 children in the unschematic group were present for a mean of 21.2 sessions (σ = 4.1).

Scoring

The experimenter (the present author) transcribed the tape-recorded protocols using the conventions described in Appendix II. In order to establish the reliability of the transcriptions, the assistant transcribed the description and recall phase for both a normal and scrambled story for 6 children. The transcripts were selected randomly after the experimenter had completed the transcriptions. Two restrictions governed the selection of the transcripts. First, one native and one non-native English speaking child from each of the three groups had to be selected. Furthermore, for each child, one description and recall protocol was from the pre-treatment testing while the other came from the post-treatment session. The percentages of agreement for the accuracy of word transcription and for utterance boundaries respectively are 98.3 and 99.8.

The transcripts were scored using the same system followed for Experiments I and II (cf. pages 70 to 73 and Appendix II). The experimenter scored all the transcripts. Because some of the scoring classifications require an element of subjectivity, the description and recall protocols for both a normal and a scrambled story for six children also were scored by the assistant. The transcripts were selected randomly in the manner described above. In all cases the reliability was quite high. The reliability for the number of propositions is 99.1%. The percentage of agreement between the raters for the core, extra and spurious classifications is respectively 99%, 98.8%, and 96.2%, while, in order, it is 100%, 90% and 100% for core story statements, extra story statements and spurious story statements. The agreement for narrative conventions was 99.3%. Disagreements were resolved in favour of the experimenter, except if an obvious scoring error was noted.

Results

Separate analyses of variance were carried out on each measure for both the description and recall phases of the testing sessions. Unless otherwise specified, the data were analyzed by a 3 X 2 X 2 split-plot analysis of variance with treatment group (i.e., schematic story, unschematic story, no-treatment) as a between-subjects variable, and story condition (i.e., normal versus scrambled) and time (i.e., pre-treatment versus post-treatment test) as the within-subjects variables. As the individual comparisons involved in the Treatment Group X Time interaction (2, 30 df) were a major a priori concern in these analyses,

orthogonal contrasts between treatment means (Kirk, 1968; Winer, 1971) were used to clarify the nature of the differences between treatment groups that varied as a function of time. The error term for these contrasts entails pooling what are often heterogeneous sources of variance (i.e., between- and within-subject error) (Cochran & Cox, 1957; Kirk, 1968; Winer, 1971). Consequently, the t or F ratios constructed for these tests are biased (Cochran & Cox, 1957; Kirk, 1968; Winer, 1971). Several procedures are available for correcting this bias so that the significance of the F or t ratio can be tested with the F or t distribution. If Cochran's and Cox's (1957) conservative t test is adopted, the t value is not affected in the contrasts of interest in this study. However, if the Satterthwaite approximation to the F test (Winer, 1971) is used, the degrees of freedom for that test range between 30 and 60 for the majority of the analyses in this study, depending on the ratio of the between-subject error to the within-subject error (Winer, 1971). However, as Winer (1971) indicates, the bias produced by not correcting the degrees of freedom when they are large is minimal. Nevertheless, in all orthogonal contrasts reported below, the lower limit for the degrees of freedom (i.e., 30 df) was adopted. A .05 level of significance was adopted for all statistical tests.

Initially, a number of analyses were conducted to determine if the effects of treatment group varied as a function of the children's native language. As there were no such differences, the data for the native and non-native English speakers in each group are pooled in the

analyses discussed below. The results for the different types of scoring will be presented separately. First, the PPVT and the rearrangement data will be described, and then the description and recall data for each scoring classification will be discussed.

PPVT Scores

The PPVT was normed on fluent English-speaking children (Dunn, 1959). In the present study, 12 children, including 4 in each treatment group, are acquiring English as a second language. If the caveats about use of the PPVT cited above are considered in conjunction with the definite lack of comparability between some children in this sample and Dunn's norming sample, the inappropriateness of considering the PPVT scores as anything but rough indicators of ability is clear. In fact, the raw PPVT scores may be more appropriate for consideration.

At the time of the initial testings, the respective mean raw scores for children in the schematic story, the unschematic "story" and the no-treatment groups were as follows: 28.27 (σ = 10.5), 32.73 (σ = 14.03) and 37.02 (σ = 13.16). The mean raw scores for the children in these groups at the time of the second testing are 45.9 (σ = 10.47), 40.73 (σ = 8.76), and 39.09 (σ = 8.8). A one-tailed t test that considered the difference in raw PPVT scores over time (Time 1 - Time 2) assessed the effect that being in a treatment group had on PPVT scores. Children in the no-treatment group make a minimal gain in their scores over time ($\bar{X}$ = 1.27, σ = 8.8) when compared to children in the combined treatment groups ($\bar{X}$ = 7.82, σ = 7.07), $t(31) = 2.31$. If differences in

normed scores rather than raw scores are considered, the effect of being in a treated group remains reliable, $t(31) = 1.9$. The respective mean normed scores at the time of the initial testing for the schematic story, unschematic "story" and no-treatment groups are 82.5 ($\sigma = 15.4$), 73.4 ($\sigma = 26.97$) and 85.5 ($\sigma = 23.4$). At the time of the second testing, the scores, in the same respective order, are 94.9 ($\sigma = 18.5$), 87.0 ($\sigma = 15.1$) and 85.2 ($\sigma = 16.5$). Thus, it is clear that being in either treatment group is associated with gains on the PPVT, whereas being in an untreated group is not.

Rearrangement of Scrambled "Stories"

Each child's rearrangement of the scrambled pictures was compared with the original story order by means of a rank order correlation, as this method of analysis considers not only individual pairs of pictures, but also the ordering of the pairs. In the particular task being considered, high negative correlations as well as high positive correlations indicate that the child has imposed some order on the scrambled pictures. Consequently, the absolute value of the correlations was used in calculating group means. The correlation between the original story order and the scrambled order presented to all children was .38 (p = n.s.). At the time of the first testing session, the respective non-significant mean correlations for children in the schematic story, the unschematic "story" and the no-treatment groups were .36 ($\sigma = .16$), .28 ($\sigma = .20$), and .34 ($\sigma = .22$). There were 3 children in the schematic story group and 2 in each of the unschematic "story" and no-treatment groups whose picture rearrangements were

significantly different than chance performance. Thus, the majority of the children in all treatment groups rearranged the pictures so that they were scrambled as much as or more than the original scrambled order. After treatment, the mean correlation for children in the schematic story group is .59 (σ = .20) ($p < .05$). In contrast, the children in the unschematic "story" and no-treatment control groups respectively had mean non-significant correlations of .24 (σ = .18) and .32 (σ = .12). In fact, none of the children in the control groups had significant correlations (although several correlations were .006 points below that required for the .05 level of significance), while 7 of the 11 children in the schematic story group did. A 3x2 split-plot analysis of variance, with experimental group as the between-subjects factor and time as the within-subject factor, was conducted on the correlations. In light of the data presented above, it is not surprising that the Experimental Group X Time interaction is reliable, $F(2,30) = 5.19$, as is the main effect of group, $F(2,30) = 6.26$. The schematic story group does not differ from the control groups at the first testing, $F(1,30) < 1$, but does after treatment, $F(1,30) = 22,96$.

The children's rearrangements of the pictures also were compared with the original story order by considering the number of adjacent pairs correct. In a 3 X 2 split-plot analysis of variance, the group x time interaction is reliable, $F(2,30) = 5.72$, as is the main effect of group, $F(2,30) = 6.4$. There are no differences between groups at the time of the initial testing. However, after treatment, children in the schematic story group have 4.09 of 11 adjacent pairs in their correct

position (σ = 2.02) while children in the unschematic "story" group and the no-treatment group respectively have only 1.54 (σ = 1.03) and 1.82 (σ = 1.25) of 11 pairs of pictures correct, $F(1,30) = 23.83$.

Total Number of Responses

The total number of statements children made in description and recall for normal and scrambled stories in the first and second testing session is presented in Table 8. In description, the interaction between time and story condition is significant, $F(1,30) = 6.0$. Children make more statements about scrambled stories than normal stories at the time of the first testing. As Figure 8 illustrates, the amount said about both normal and scrambled stories is comparable at the time of the second testing. The same pattern of results is noted in recall, $F(1,30) = 4.38$, as Figure 8 shows. The effect of time is also pronounced in recall, $F(1,30) = 15.29$, with children from all groups saying more at the time of the second testing ($\bar{X}$ = 23.76, σ = 10.6) than they do in the first testing session ($\bar{X}$ = 17.94, σ = 6.5).

Response Type Analysis

The transcripts were scored for the number of core, extra and spurious statements. As there are no group differences in the number of statements made in description and recall, the response type analyses are conducted on the actual number of statements each child made.

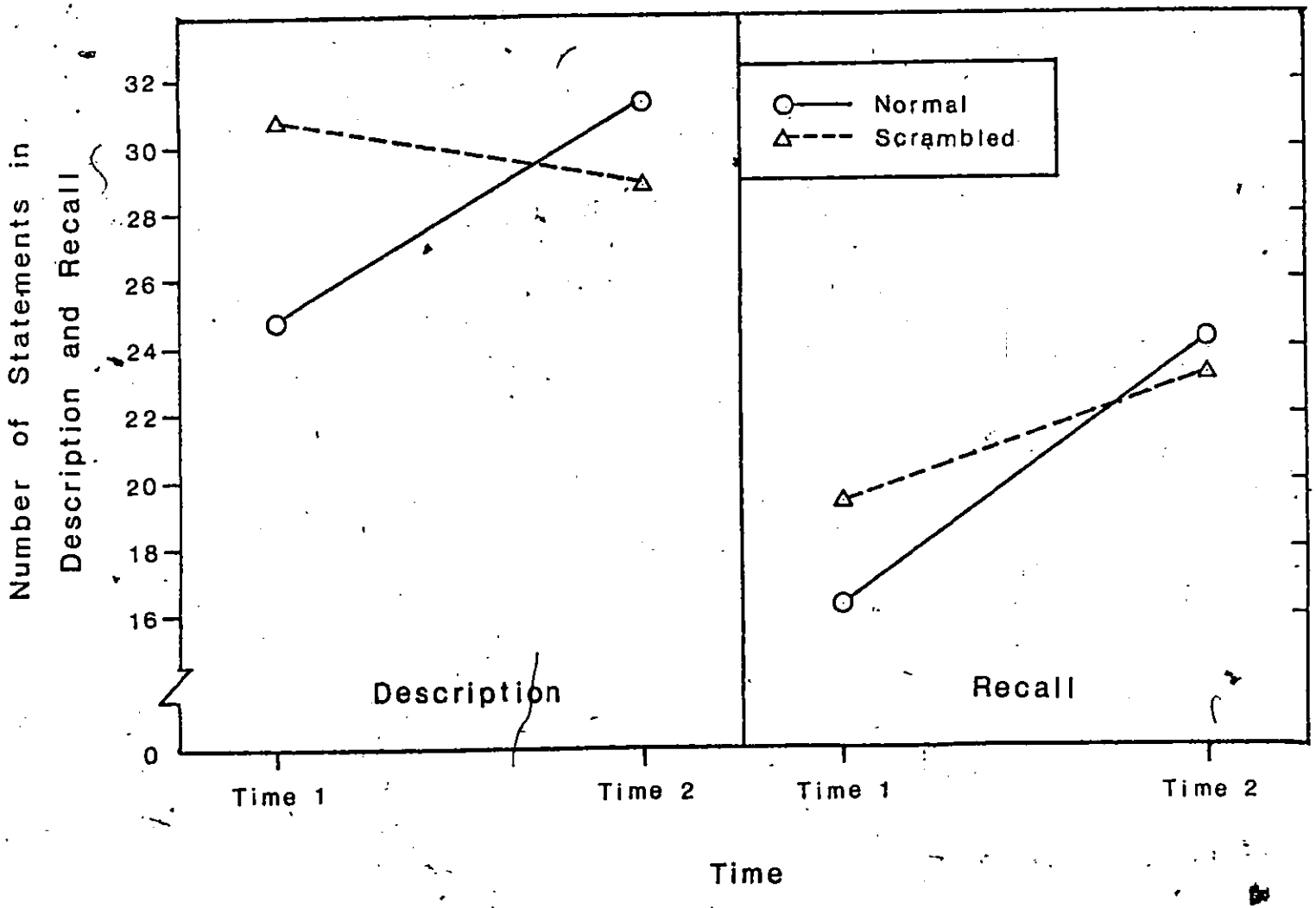
Core Statements. The mean number of core statements that children from each experimental group make in the first and second testing sessions when describing and recalling the stories is presented

Table 8

Mean Number of Statements in Description and Recall and Standard Deviations (in Parentheses)

		Description		Recall	
Treatment Group	Time	Normal Story	Scrambled Story	Normal Story	Scrambled Story
Schematic Story	Time 1	22.2 (4.7)	27.6 (9.5)	16.4 (5.1)	19.7 (5.6)
	Time 2	33.7 (10.3)	31.5 (9.9)	29.7 (12.7)	27.7 (11.6)
Unschematic "Story"	Time 1	27.0 (10.0)	32.0 (14.9)	16.9 (4.9)	20.7 (8.7)
	Time 2	29.6 (14.3)	28.6 (7.8)	22.6 (11.6)	21.1 (9.6)
No Treatment	Time 1	25.2 (8.6)	32.4 (12.3)	15.9 (5.3)	18.0 (8.0)
	Time 2	31.0 (13.5)	26.4 (6.0)	20.6 (8.8)	20.7 (6.9)

Figure 8. Number of statements as a function of testing time and condition for description and recall.


Number of Statements in Description and Recall
32
30
28
26
24
22
20
18
16
0
Normal
Scrambled
Description
Recall
Time 1
Time 2
Time 1
Time 2
Time

in Table 9. In description, the interaction between time and experimental group is significant, $F(2,30) = 10.86$ (see Figure 9), as is the main effect of group, $F(2,30) = 7.7$. Orthogonal contrasts between treatment means indicate that there is no difference between the schematic treatment group and the combined non-schematic "story" and no-treatment groups at the time of the first testing, $F(1,30)<1$. However, at the time of the second testing, children in the story treatment group make more core statements than children in the two control groups, $F(1,30) = 32.40$. Nonetheless, children in all groups make more core statements during description in the second testing session ($\bar{X} = 12.29$, $\sigma = 6.07$) than they do in the first session ($\bar{X} = 8.95$, $\sigma = 3.8$), $F(1,30) = 22.47$. Across both sessions, the number of core statements made about normal stories is greater ($\bar{X} = 11.54$, $\sigma = 5.49$) than the number for scrambled stories ($\bar{X} = 9.7$, $\sigma = 5.03$), $F(1,30) = 9.47$.

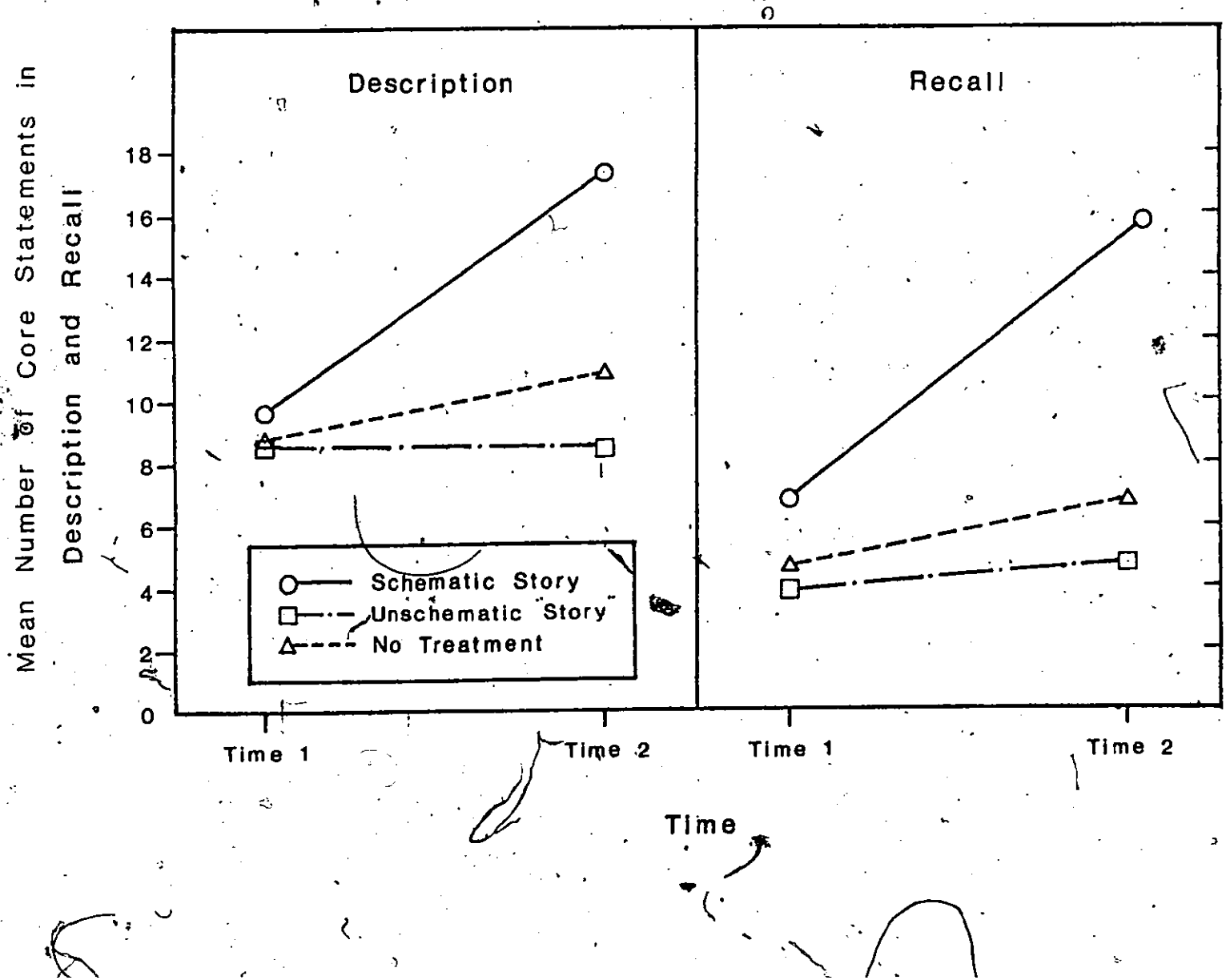
In recall, the interaction between time and experimental group, $F(2,30) = 9.7$, is comparable to that found for core statements in description. As Figure 9 illustrates, the schematic story group does not differ from the two control groups at the time of the first testing, $F(1,30) = 3.10$, but does at the time of the second testing, $F(1,30) = 48.75$. After treatment, children in the schematic story group make more core statements in recall than children in the non-schematic "story" and no-treatment groups. As Figure 9 suggests, the main effects of experimental group, $F(2,30) = 15.47$, and time, $F(1,30) = 24.24$, also are reliable.

Table 9

Mean Number of Core Statements in Description and Recall, and Standard Deviations (in Parentheses)

		Description		Recall	
Treatment Group	Time	Normal Story	Scrambled Story	Normal Story	Scrambled Story
Schematic Story	Time 1	10.7 (4.7)	8.5 (3.5)	6.2 (2.4)	7.4 (4.8)
	Time 2	18.4 (5.4)	16.4 (6.3)	15.8 (6.2)	15.6 (8.1)
Unschematic "Story"	Time 1	9.1 (4.2)	8.0 (3.6)	3.9 (2.3)	3.9 (2.9)
	Time 2	8.8 (4.2)	8.2 (3.6)	4.7 (4.8)	4.7 (3.4)
No Treatment	Time 1	9.2 (3.0)	8.2 (3.9)	5.4 (2.8)	4.0 (2.8)
	Time 2	13.1 (5.0)	8.8 (3.1)	7.5 (3.9)	6.1 (4.6)

Figure 9. Core statements in description and recall as a function of experimental group and testing time


Description
Recall
Mean Number of Core Statements in Description and Recall
0
2
4
6
8
10
12
14
16
18
Schematic Story
Unschematic Story
No Treatment
Time 1
Time 2
Time 1
Time 2
Time

Extra Statements. There are no significant main effects or interactions in the analysis of the number of extra statements made in description. Experimental group, story condition and testing time also do not affect the number of extra statements in recall.

Spurious Statements. The number of spurious statements children in the three groups make in description and recall in the two testing sessions is shown in Table 10. In description, spurious statements occur more frequently in the children's protocols when they are describing scrambled stories ($\bar{X} = 3.8$, $\sigma = 3.1$) than they do in their descriptions of normal stories ($\bar{X} = 2.4$, $\sigma = 2.97$), $F(1,30) = 8.98$. The Time X Experimental Group interaction is reliable, $F(2,30) = 6.83$. As Figure 10 illustrates, the experimental group does not differ from the two control groups in the number of spurious statements they make at the time of the first testing session, $F(1,30)<1$. After treatment, however, the children in the experimental group make fewer spurious statements than children in the combined control groups, $F(1,30) = 13.44$.

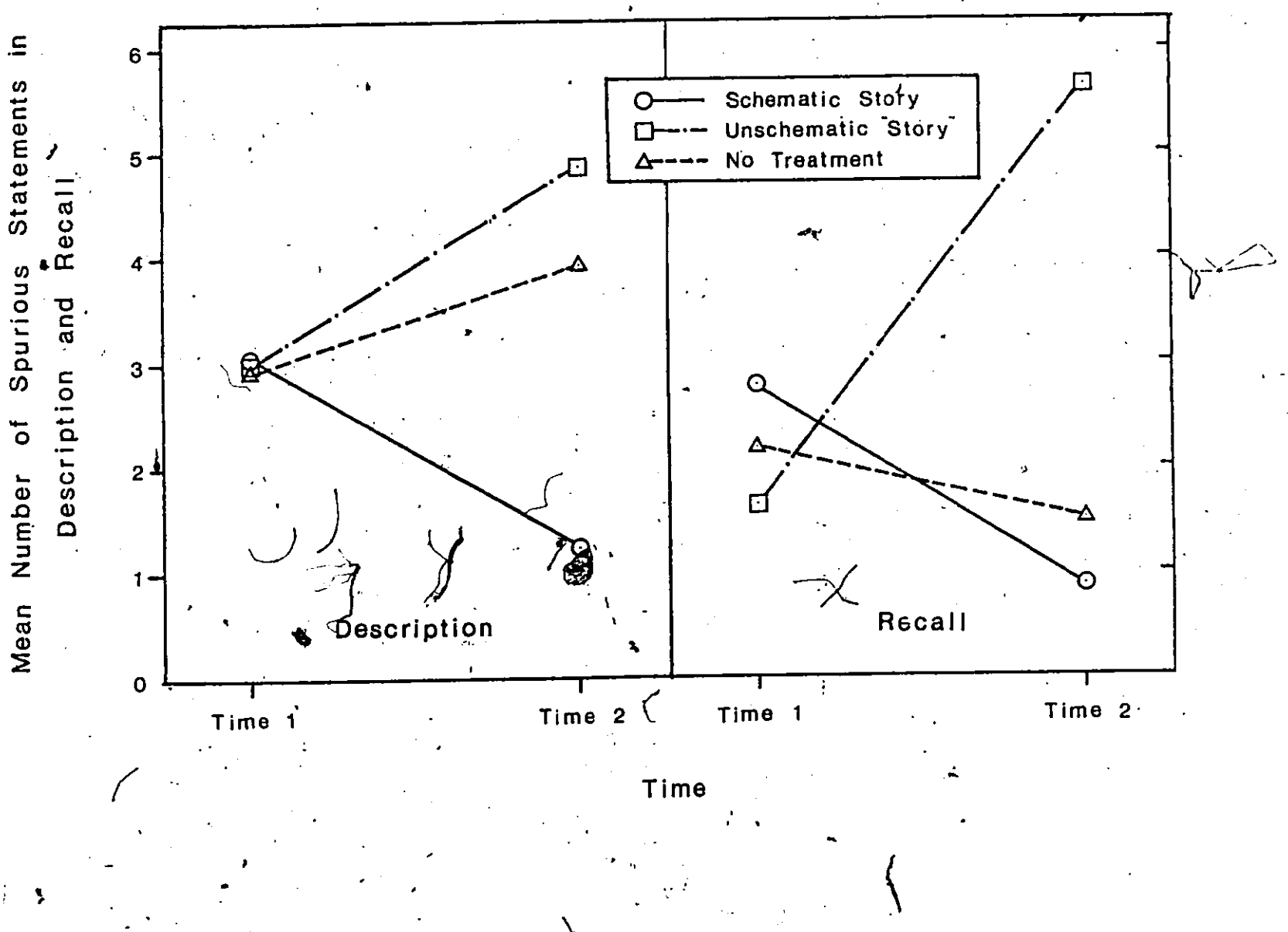
An examination of the children's spurious statements in recall shows that, as in description, the interaction between time and experimental group is significant, $F(2,30) = 8.78$ (see Figure 10). At the time of the first testing, the combined experimental group and no-treatment group do not differ from the unschematic "story" group, $F(1,30)<1$. This pattern of results changes as a function of treatment. Children in the unschematic "story" group make many more spurious

Table 10

Mean Number of Spurious Statements in Description and Recall and Standard Deviations (in Parentheses)

		Description		Recall	
Treatment Group	Time	Normal Story	Scrambled Story	Normal Story	Scrambled Story
Schematic Story	Time 1	1.8 (1.6)	4.3 (1.9)	2.4 (4.3)	3.1 (4.2)
	Time 2	1.2 (1.6)	1.3 (1.5)	0.8 (1.2)	0.9 (1.3)
Unschematic "Story"	Time 1	2.0 (1.5)	4.0 (3.5)	1.3 (1.2)	2.0 (2.6)
	Time 2	4.4 (4.5)	5.4 (4.0)	5.9 (7.0)	5.4 (4.4)
No Treatment	Time 1	2.0 (1.7)	3.8 (2.6)	1.7 (1.6)	2.6 (2.4)
	Time 2	3.5 (4.3)	4.3 (3.4)	2.0 (2.0)	1.0 (0.8)

Figure 10. Spurious statements in description and recall as a function of experimental group and testing time


Mean Number of Spurious Statements in Description and Recall
0
1
2
3
4
5
6
Schematic Story
Unschematic Story
No Treatment
Description
Recall
Time 1
Time 2
Time 1
Time 2
Time

statements than children in the other groups at the time of the second testing, $F(1,30) = 19.64$.

Story Statements

The number of core story statements in the description and recall protocols of children in the three experimental groups is shown in Table 11. In description, children in all groups make more core story statements about normal stories ($\bar{X} = 2.8$, $\sigma = 2.6$) than they do about scrambled stories ($\bar{X} = 1.7$, $\sigma = 2.0$), $F(1,30) = 16.4$. The Time X Experimental Group interaction is reliable, $F(2,30) = 5.05$ (see Figure 11), as are the main effects of treatment group, $F(2,30) = 15.87$, and time, $F(1,30) = 9.56$. Children in the schematic story treatment group make more core story statements at the time of the second testing than children in the combined control groups, $F(1,30) = 31.84$. There is not a comparable difference at the time of the first testing, $F(1,30) = 2.28$, p = n.s.

As in description, differences in recall between the schematic story treatment group and the two control groups after treatment largely account for the reliable interaction between time and experimental group, $F(2,30) = 3.7$. As Figure 11 shows, although the groups do not differ at the time of the first testing, $F(1,30) = 3.3$, children in the schematic story group make significantly more core story statements in recall after treatment than children in the combined control groups, $F(1,30) = 29.11$. The main effects of group, $F(2,30) = 13.23$, and time,

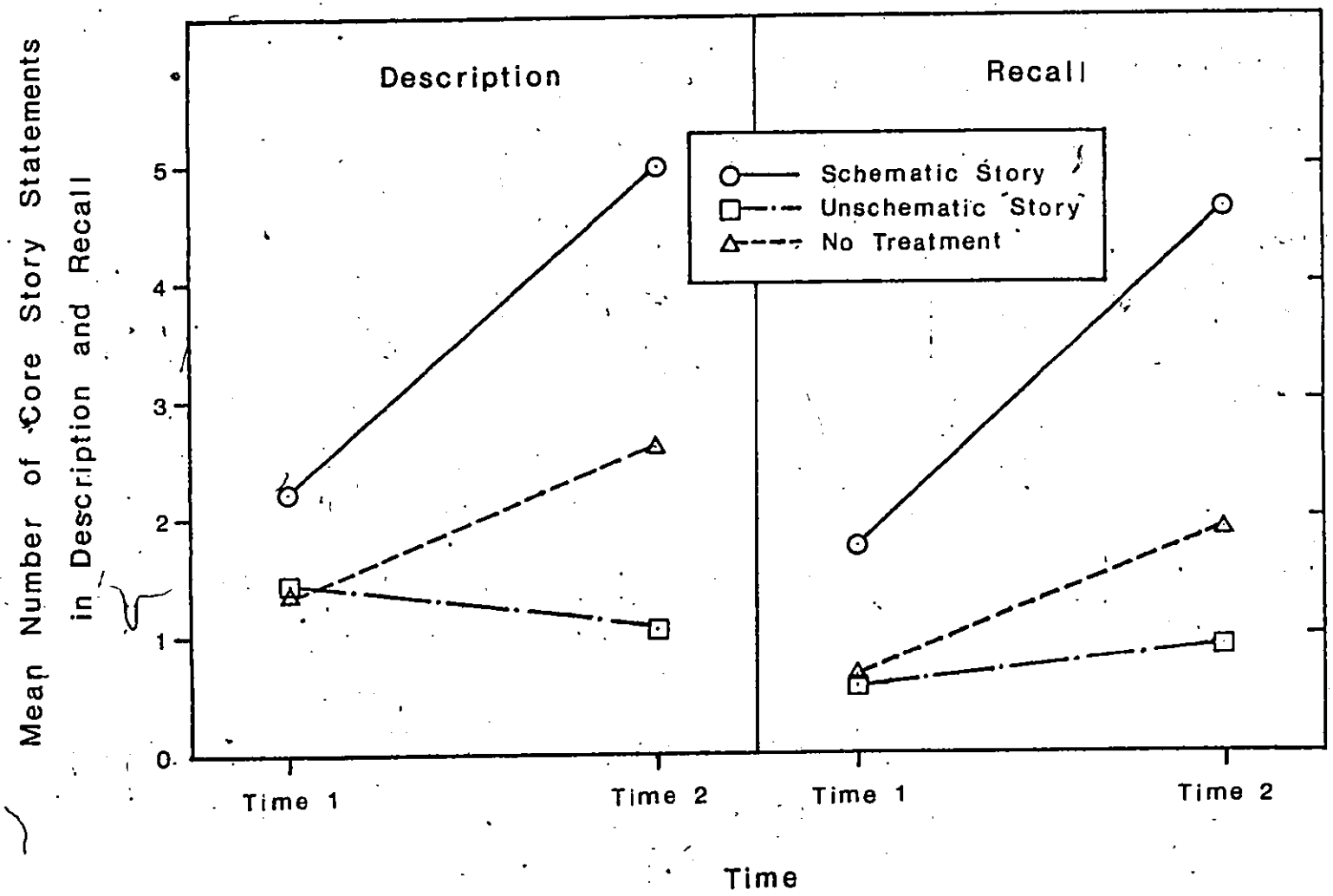
Table 11

Core Story Statements in Description and Recall

- Means Reported and Standard Deviations (in Parentheses)

		Description		Recall	
Treatment Group	Time	Normal Story	Scrambled Story	Normal Story	Scrambled Story
Schematic Story	Time 1	2.5 (1.8)	1.9 (2.2)	1.5 (1.3)	1.9 (3.9)
	Time 2	5.6 (2.1)	4.4 (2.6)	5.1 (2.5)	4.3 (3.4)
Unschematic "Story"	Time 1	2.2 (2.7)	0.6 (0.7)	0.4 (0.9)	0.7 (0.8)
	Time 2	1.5 (2.4)	0.6 (0.9)	1.3 (2.7)	0.4 (0.7)
No Treatment	Time 1	1.4 (1.4)	1.3 (1.3)	0.5 (0.5)	.82 (1.5)
	Time 2	3.7 (2.6)	1.4 (0.8)	2.2 (2.5)	1.5 (1.9)

Figure 11. Core story statements in description and recall as a function of experimental group and testing time


Description
Recall
Schematic Story
Unschematic Story
No Treatment
Mean Number of Core Story Statements in Description and Recall
0
1
2
3
4
5
Time 1
Time 2
Time 1
Time 2
Time

$F(1,30) = 13.26$, are substantial and consistent with the interaction data.

The transcripts were scored for the occurrence of extra and spurious story statements. However, the frequency of these responses was too low to merit statistical analysis.

Narrative Conventions

Table 12 lists the number of narrative conventions that children in the three treatment groups used at the time of the first and second testings in description and recall. In description, the Story Condition X Time interaction is significant, $F(1,30) = 7.18$. At the time of the first testing, children use fewer narrative conventions in describing normal ($\bar{X} = 2.09$, $\sigma = 3.79$) stories than they do for scrambled stories ($\bar{X} = 3.33$, $\sigma = 4.9$). At the time of the second testing, the difference between the number of narrative conventions used in describing normal stories ($\bar{X} = 4.48$, $\sigma = 6.03$) and scrambled stories ($\bar{X} = 5.0$, $\sigma = 4.99$) is minimal. The main effect of story condition is reliable, $F(1,30) = 7.25$, and consistent with the interaction data.

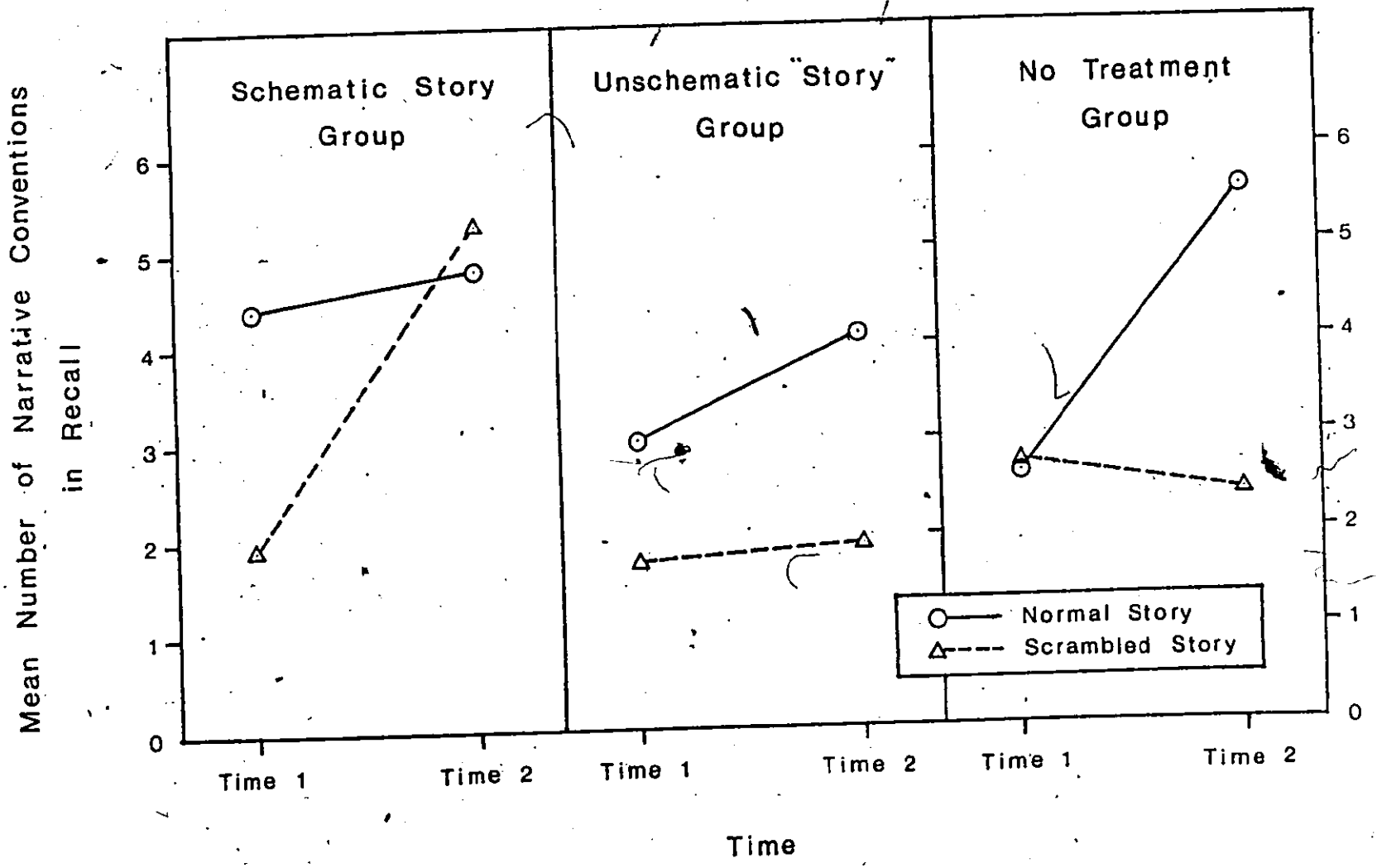
In recall, the interaction between treatment group, story condition and time is significant, $F(2,30) = 4.36$, as is the main effect of story condition, $F(1,30) = 4.4$. As Figure 12 shows, children in the schematic story group, in contrast to children in the combined control groups, use more narrative conventions in recalling scrambled stories during the second testing than they did during the first testing, $F(1,30) = 8.83$. Children in the no-treatment control groups show a

Table 12

Mean Number of Narrative Conventions in Description and Recall, and Standard Deviations (in Parentheses)

		Description		Recall	
Treatment Group	Time	Normal Story	Scrambled Story	Normal Story	Scrambled Story
Schematic Story	Time 1	2.6 (4.4)	4.4 (6.3)	4.4 (6.3)	1.9 (4.0)
	Time 2	5.0 (7.3)	5.4 (5.1)	4.8 (5.4)	5.3 (6.9)
Unschematic "Story"	Time 1	2.1 (4.1)	3.0 (5.1)	3.0 (5.1)	1.7 (1.6)
	Time 2	3.5 (6.3)	4.1 (5.0)	4.1 (5.0)	1.9 (3.0)
No Treatment	Time 1	1.5 (2.8)	2.6 (2.9)	2.6 (2.9)	2.7 (3.5)
	Time 2	4.9 (4.7)	5.5 (5.2)	5.5 (5.2)	2.4 (2.2)

Figure 12. Narrative conventions in recall as a function of experimental group, testing time and story order


Schematic Story Group
Unschematic "Story" Group
No Treatment Group
Mean Number of Narrative Conventions in Recall
0
1
2
3
4
5
6
Time 1
Time 2
Time 1
Time 2
Time 1
Time 2
Time
Normal Story
Scrambled Story

similar increase over time in the number of narrative conventions they use to describe normal stories, $F(1,30) = 5.68$.

Retention

In the previous analyses, it is clear that children's statements in the description phase of the experimental procedure are highly correlated with their statements in recall. However, a sharpening effect should be observed in recall: Core statements that are central to the gist of the story should be recalled frequently while extra and spurious responses should be forgotten. An examination of the number of statements of each response type that were made in both description and recall should capture any sharpening effect. If a statement made once in description occurred twice in recall, it was counted as two retained responses because it was repeated twice. Table 13 shows the number of statements that were retained in recall as a function of experimental group, story condition and time.

In an analysis of the retention of core statements, the interaction between treatment group and time is reliable, $F(2,30) = 10.22$ (see Figure 13). Orthogonal contrasts between treatment means show that there is no difference between the schematic story group and the combined control groups at the time of the first testing, $F(1,30) = 3.55$, p = n.s., while there is a marked difference at the time of the second testing, $F(1,30) = 44.54$. During the second testing session, children in the schematic story group retain a mean of 11 statements ($\sigma = 5.08$) while children in the unschematic "story" and no-treatment groups respectively retain a mean of 3.18 ($\sigma = 3.44$) and

Table 13

Mean Number of Retained Core Statements and Standard Deviations (in Parentheses)

TREATMENT GROUP	TIME	NORMAL STORY	SCRAMBLED STORY
Schematic Story	Time 1	4.5 (2.1)	4.9 (3.6)
	Time 2	11.2 (4.2)	10.8 (6.0)
Unschematic "Story"	Time 1	2.3 (1.8)	2.9 (2.2)
	Time 2	3.6 (4.5)	2.7 (2.1)
No Treatment	Time 1	3.4 (2.1)	2.5 (1.6)
	Time 2	5.6 (3.1)	4.6 (2.9)

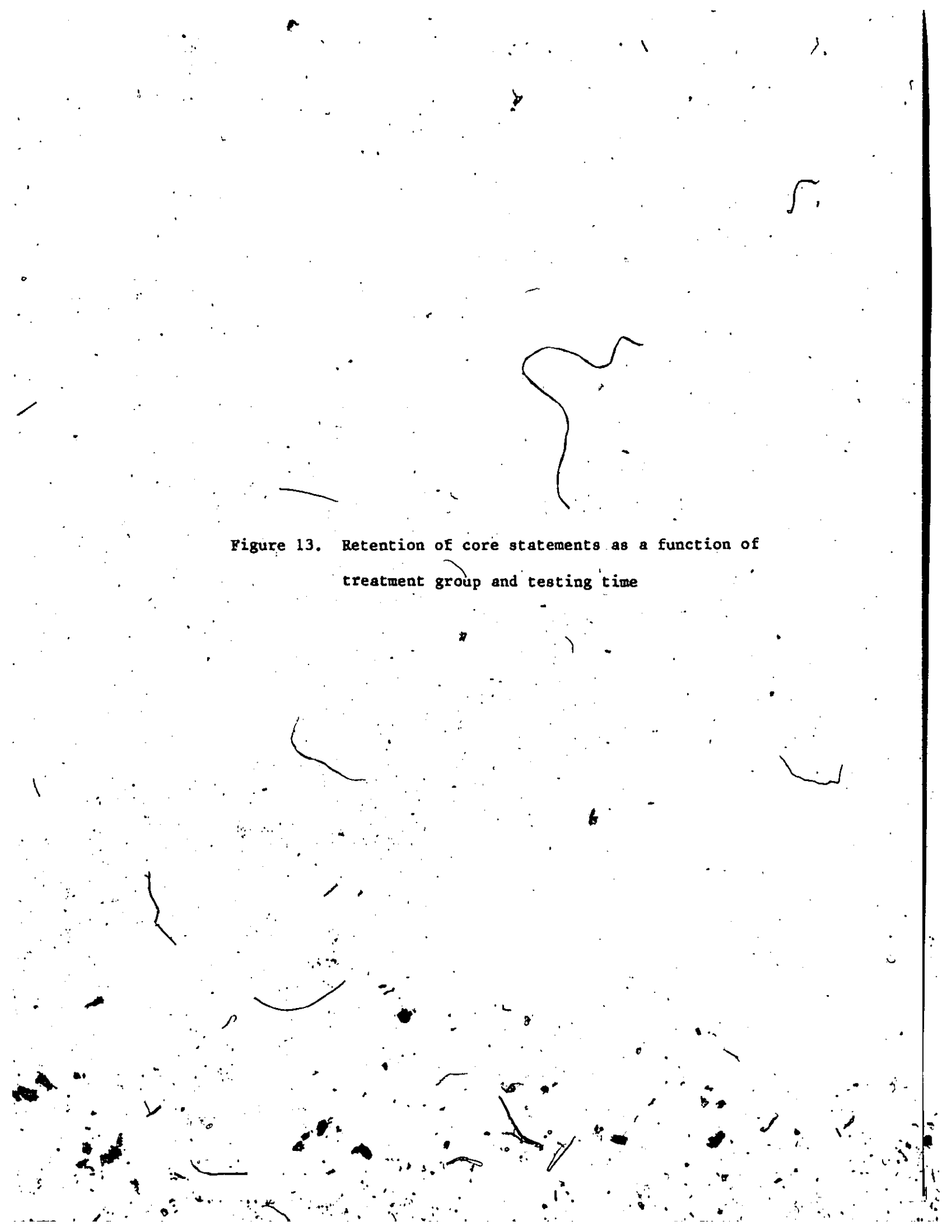
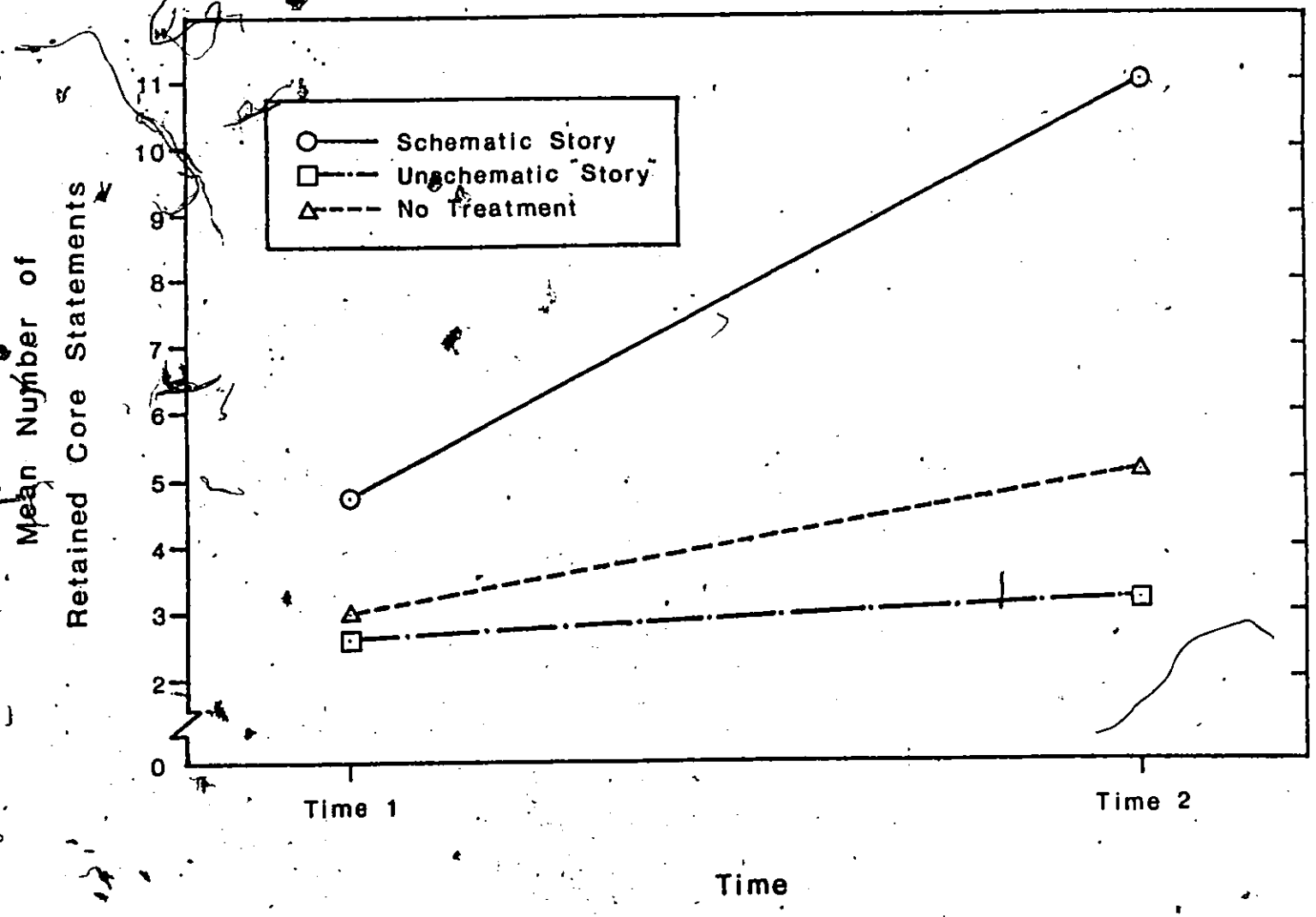


Figure 13. Retention of core statements as a function of treatment group and testing time


Schematic Story
Unschematic Story
No Treatment
Mean Number of Retained Core Statements
0
2
3
4
5
6
7
8
9
10
11
Time 1
Time 2
Time

5.14(σ = 2.98) core statements. The main effects of group, $F(2,30) = 13.8$, and time, $F(1,30) = 31.98$, are substantial and consistent with the interaction data.

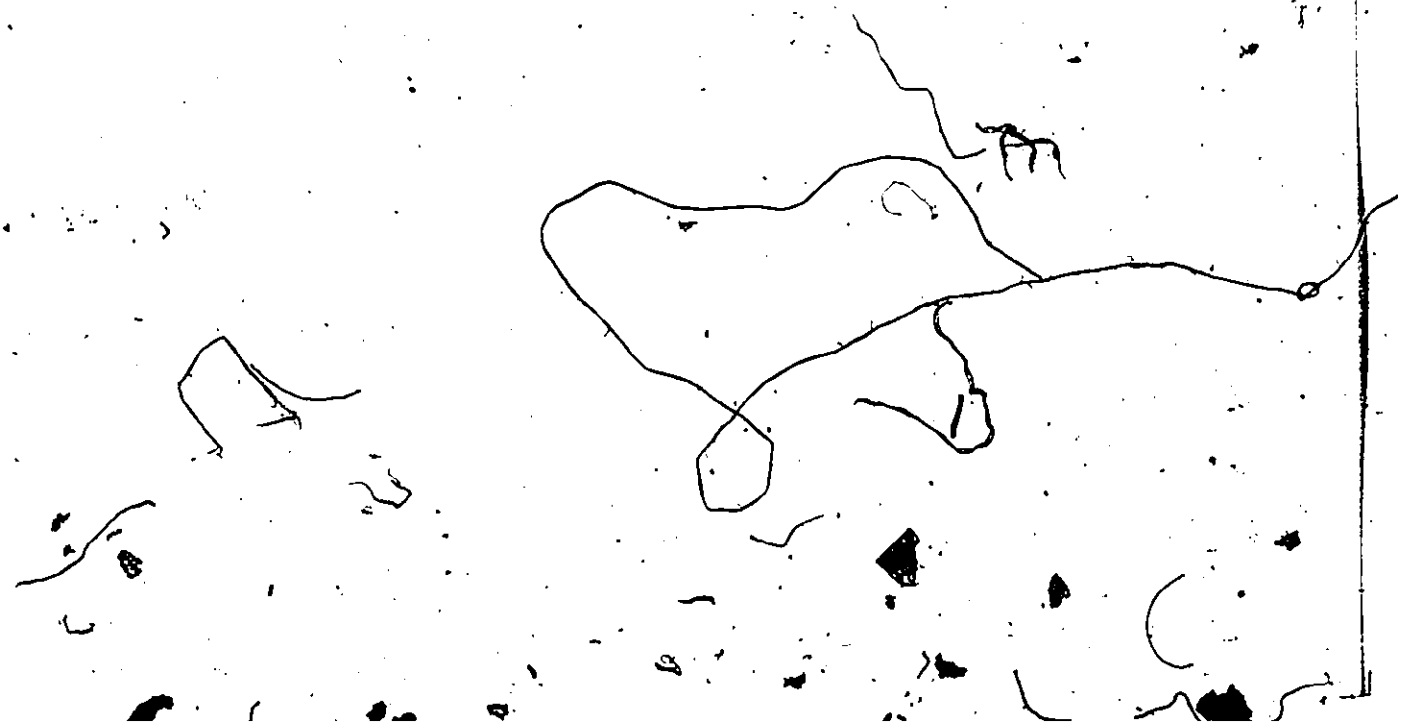
There were no reliable differences in the analysis of the retention of extra statements. Children in all treatment groups at both testing times retained too few spurious statements to merit analysis.

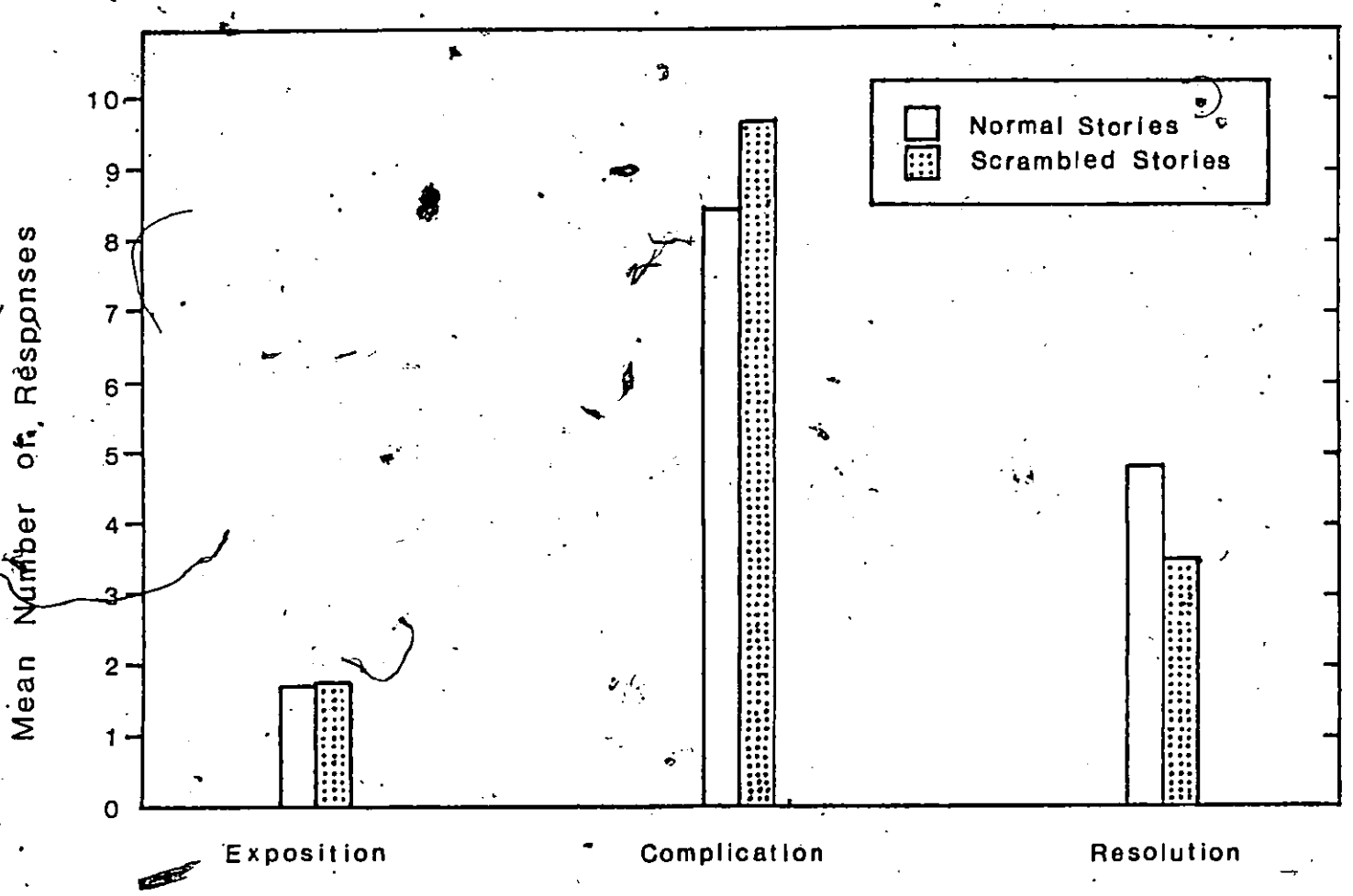
Narrative Category or Macrostructure Analysis

As noted in Experiments I and II, each picture in the stories used in the study functions either as part of the exposition, complication or resolution of the narrative. In this study, as in the earlier ones, by far the most responses occur in the complication category (see Figure 14). Fewer responses occur in the resolution category and still fewer in the exposition category. Again, these data partially reflect the way the stories were constructed. There are 29 complication pictures, 12 resolution pictures and 7 exposition pictures across the 4 stories. Moreover, complication pictures are more action-oriented than the relatively static exposition and resolution pictures of the stories, and even children who recall very little about a story generally remember several pictures involving action.

As before, the average number of responses per picture for each narrative category was calculated for each child's recall of the normal and scrambled stories. This provides an index of the importance of each narrative category that is not contaminated by the number of pictures in each category. There should be group differences at the time of the second testing in the average number of responses per narrative category

Figure 14. Mean number of responses in each narrative category for recall of stories.




Mean Number of Responses
0
1
2
3
4
5
6
7
8
9
10
Normal Stories
Scrambled Stories
Exposition
Complication
Resolution

if the children in the schematic story group have acquired knowledge about the story schema and if they are using that knowledge to guide recall. Given the picture rearrangement data, it is reasonable to expect that any such differences will be greatest when the children are recalling scrambled stories.

A 3x2x3 split-plot analysis of variance, with experimental group as the between-subjects factor, and testing time and narrative category (i.e., exposition, complication and resolution) as the within-subjects factors, was conducted on the average number of responses per narrative category for both the recall of normal stories and of scrambled stories. Table 14 presents the relevant means for each group. In recalling normal stories, the main effects of narrative category, $\underline{F}(2,60) = 9.04$, time, $\underline{F}(1,30) = 16.45$, and group, $\underline{F}(2,30) = 3.5$ are reliable. Moreover, the Experimental Group X Time interaction illustrated in Figure 15 is reliable, $\underline{F}(2,30) = 8.26$. Although children in the schematic story group do not differ from the control groups at the time of the first testing, $\underline{F}(1,30)<1$, the former children make more statements about pictures in all narrative categories than do the latter during the second test session, $\underline{F}(1,30) = 20.0$. The time and group effects are consistent with the interaction. Children in all groups make more resolution ($\overline{X} = 1.62$, $\sigma = 1.3$) statements per picture than complication ($\overline{X} = 1.1$, $\sigma = .7$) and exposition ($\overline{X} = .91$, $\sigma = 1.26$) statements when they are recalling normal stories. Orthogonal linear contrasts show that children in the combined control groups do not differ from the

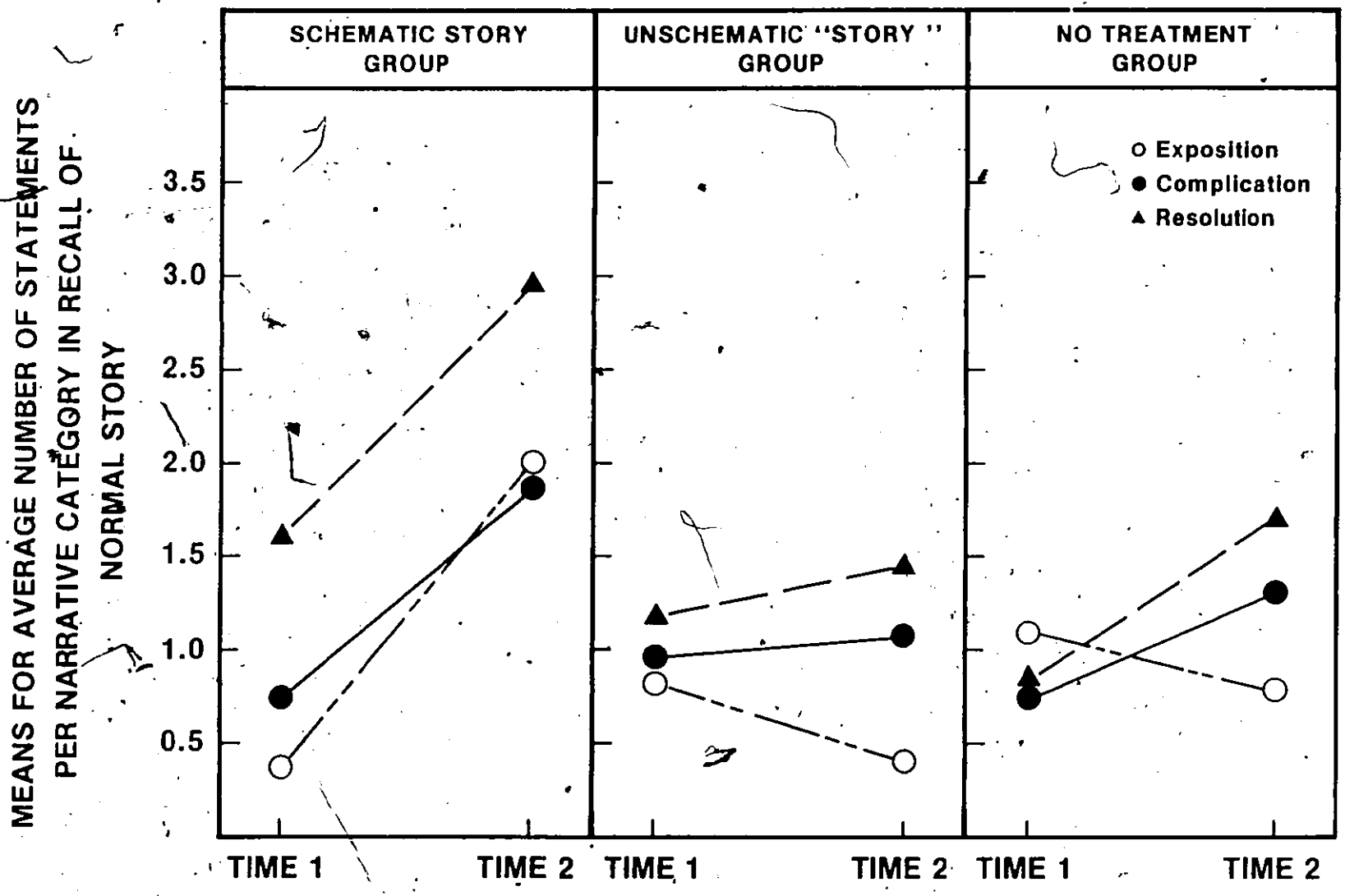
Table 14

Average Number of Statements Per Narrative Category in Recall of Normal and Scrambled Stories

(Standard Deviations in Parentheses)

	GROUP	Schematic Story		Unschematic "Story"		No Treatment	
	TIME	Time 1	Time 2	Time 1	Time 2	Time 1	Time 2
STORY ORDER	Normal Story						
	Exposition	0.36(0.78)	2.00(1.77)	0.82(1.01)	0.41(0.49)	1.09(1.48)	0.77(1.06)
	Complication	0.75(0.40)	1.83(0.74)	0.95(0.89)	1.09(0.68)	0.70(0.39)	1.30(0.63)
	Resolution	1.59(0.90)	2.94(2.33)	1.19(0.67)	1.46(1.04)	0.88(0.65)	1.68(0.90)
	Scrambled Story						
	Exposition	0.54(0.93)	1.23(1.10)	0.91(1.02)	0.59(0.83)	1.41(2.31)	1.04(1.31)
	Complication	1.14(0.59)	1.69(0.83)	0.87(0.67)	1.19(0.63)	1.06(0.68)	0.86(0.40)
	Resolution	0.83(0.71)	3.70(3.36)	1.05(1.05)	0.48(0.61)	1.04(1.11)	2.09(1.45)

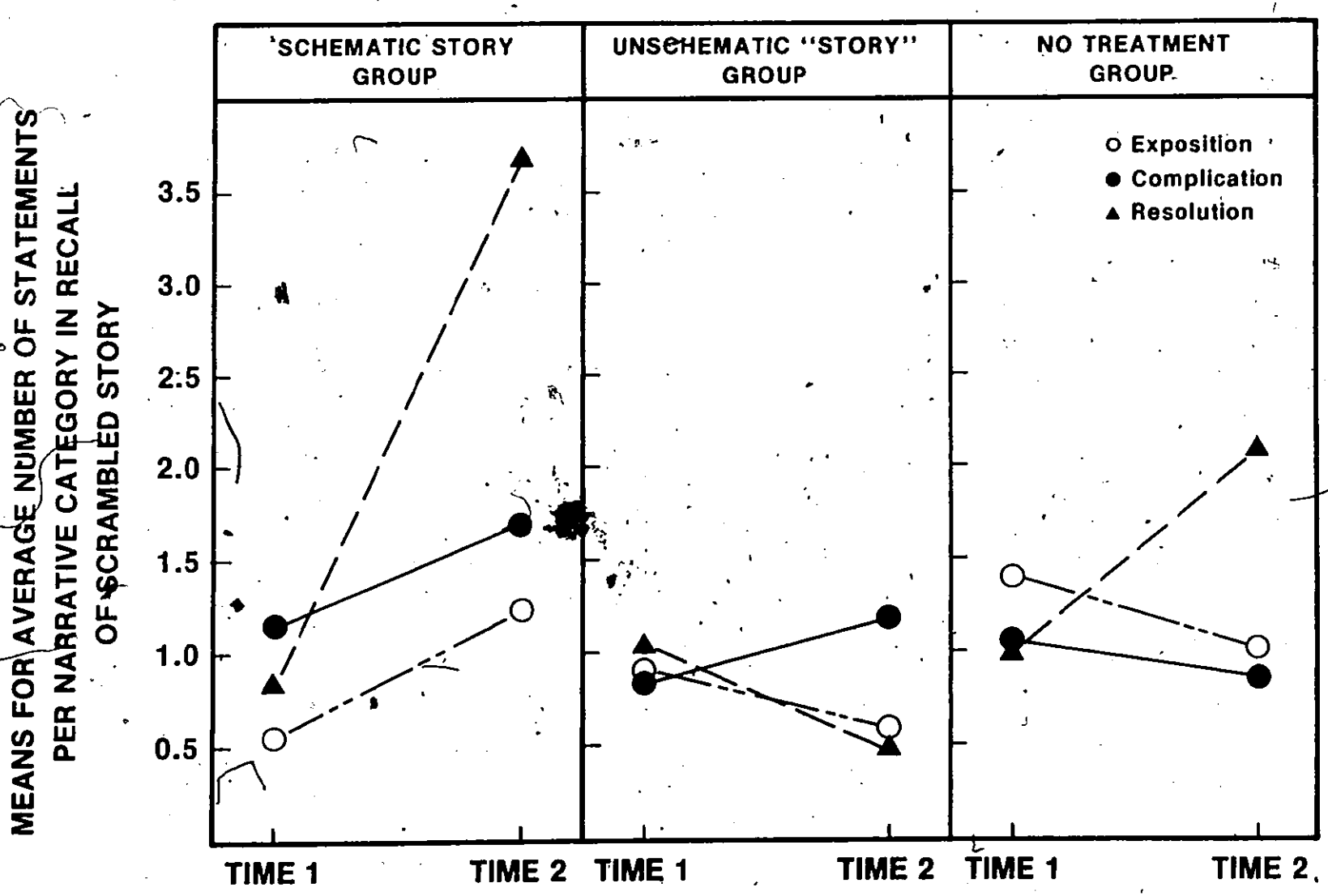
Figure 15. Average number of statements per narrative category in recall of normal story as a function of group and testing time


SCHEMATIC STORY GROUP
UNSCHEMATIC "STORY" GROUP
NO TREATMENT GROUP
MEANS FOR AVERAGE NUMBER OF STATEMENTS PER NARRATIVE CATEGORY IN RECALL OF NORMAL STORY
3.5
3.0
2.5
2.0
1.5
1.0
0.5
Exposition
Complication
Resolution
TIME 1
TIME 2
TIME 1
TIME 2
TIME 1
TIME 2

schematic story group in the average number of statements they make in all narrative categories at the time of the first testing, $F(1,60)<1$. However, during the second test session, children in the schematic story group make more exposition statements, $F(1,60) = 12.72$, and more resolution statements, $F(1,60) = 12.12$, than children in the combined control groups. There is not a comparable difference in the number of complication statements, $F(1,60) = 2.6$.

In the analysis of the children's recall of scrambled stories, the Experimental Group X Time X Narrative Category interaction is reliable, $F(4,60) = 3.03$. The Experimental Group X Time, $F(2,30) = 6.44$, and the Time X Narrative Category, $F(2,60) = 4.38$, interactions also are significant as are the main effects of time, $F(1,30) = 5.78$, and narrative category, $F(2,60) = 3.68$. At the time of the first testing, children in the schematic story group do not differ from children in the combined control groups when the average number of statements they make in the three narrative categories is compared, $F(1,60)<1$. However, as Figure 16 shows, children in the schematic story group recall more about resolution pictures at the time of the second testing. Children in the no-treatment group also say more about resolution pictures during the second testing, although they do not stress resolution pictures to the extent that the schematic story group does, $F(1,60) = 7.68$. In contrast to the children in the schematic story group, $F(1,60) = 30.66$, and to those in the no-treatment group, $F(1,60) = 7.7$, children in the unschematic story group actually place less emphasis on resolution pictures than on complication and exposition

Figure 16. Average number of statements per narrative category in recall of scrambled story as a function of experimental group and testing time


'SCHEMATIC STORY GROUP
UNSCHEMATIC "STORY" GROUP
NO TREATMENT GROUP
MEANS FOR AVERAGE NUMBER OF STATEMENTS PER NARRATIVE CATEGORY IN RECALL OF SCRAMBLED STORY
3.5
3.0
2.5
2.0
1.5
1.0
0.5
Exposition
Complication
Resolution
TIME 1
TIME 2
TIME 1
TIME 2
TIME 1
TIME 2

pictures during the second testing. Further linear contrasts, that are not orthogonal to those cited above, show that schematic story group does not differ from the combined control groups in their use of exposition and complication statements at the time of the second testing ($F's<1$).

Recall Order

The order in which children recall the stories varies greatly. However, in an attempt to demonstrate that the preceding data from the narrative category analyses are not a consequence of group differences in simple primacy and recency effects, the order of recall was considered. The fact that the majority of the children do not discuss some pictures in recall precludes use of simple rank-order correlations. Figure 17 shows the number of children in each group who recalled each of the 12 pictures in a normal story at the time of the first and second testings. Figure 18 presents the comparable data for scrambled stories. If primacy and recency effects account for recall order, "U" shaped histograms would be seen. If primacy governed recall, an "L" shaped figure would be expected, and if recency effects explained the order of recall, a "J" shaped figure would occur. In Figures 17 and 18, none of these shapes predominates.

Given this information on the order in which children recall the stories, the differences between groups in the number of exposition and resolution statements they make cannot be attributed to group differences in primacy and recency effects. Thus, it seems reasonable to conclude that the group differences in the analyses of narrative

Figure 17. Number of children in each group recalling each picture in the normal story as a function of time

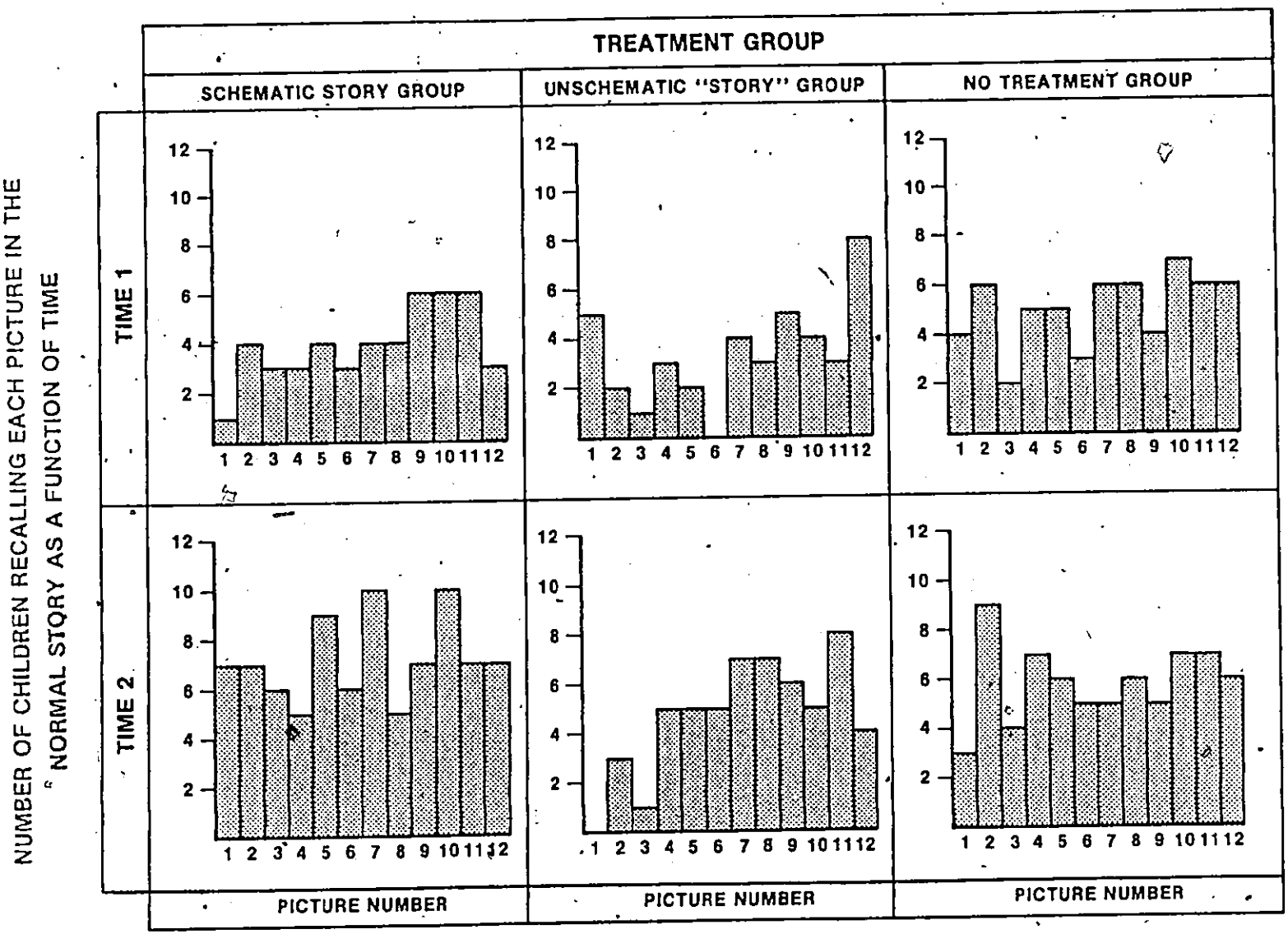
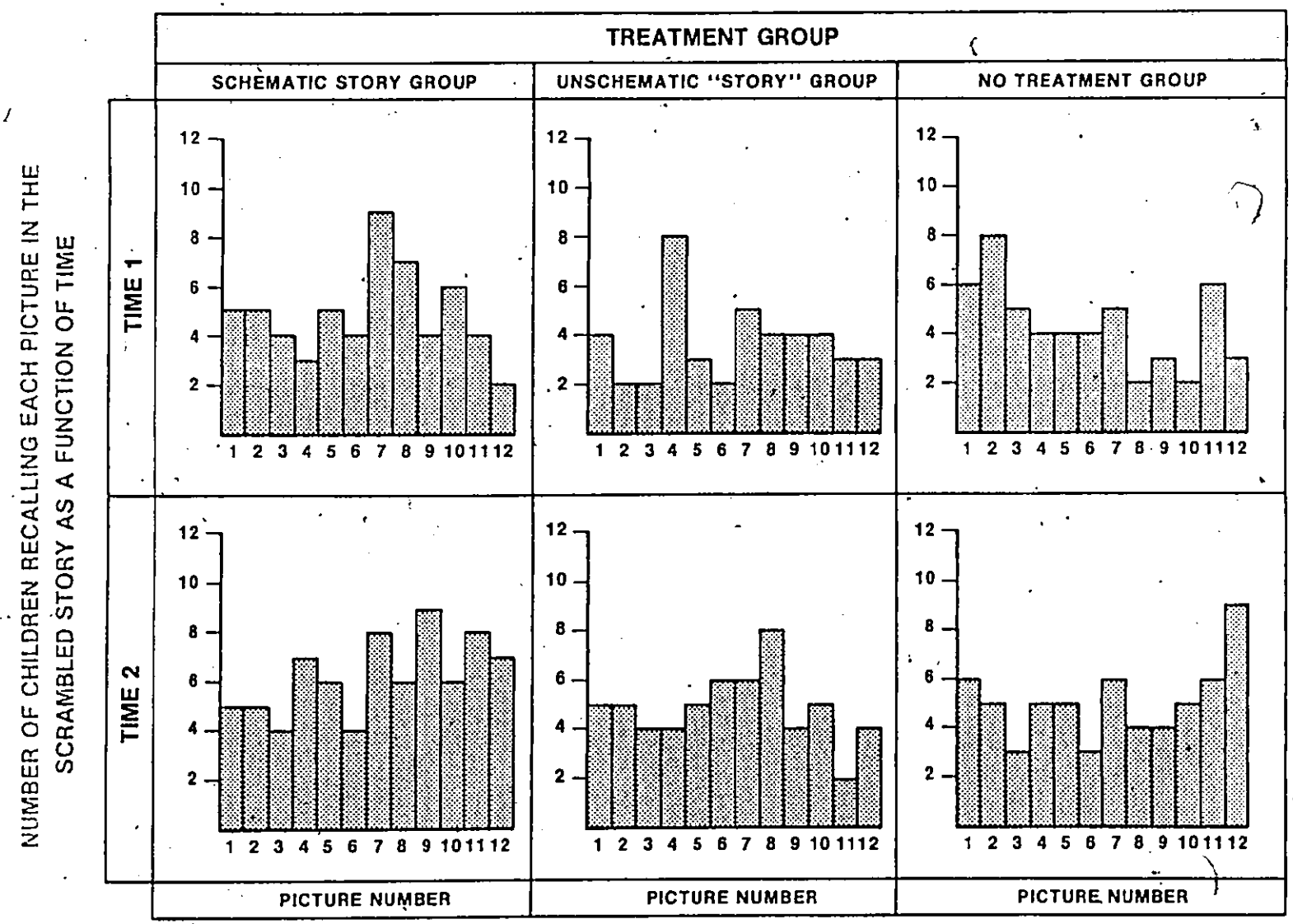

TREATMENT GROUP
SCHEMATIC STORY GROUP
UNSCHEMATIC "STORY" GROUP
NO TREATMENT GROUP
TIME 1
TIME 2
NUMBER OF CHILDREN RECALLING EACH PICTURE IN THE NORMAL STORY AS A FUNCTION OF TIME
PICTURE NUMBER
PICTURE NUMBER
PICTURE NUMBER

Figure 18. Number of children in each group recalling each picture in the scrambled story as a function of time


TREATMENT GROUP
SCHEMATIC STORY GROUP
UNSCHEMATIC "STORY" GROUP
NO TREATMENT GROUP
TIME 1
TIME 2
NUMBER OF CHILDREN RECALLING EACH PICTURE IN THE SCRAMBLED STORY AS A FUNCTION OF TIME
PICTURE NUMBER
PICTURE NUMBER
PICTURE NUMBER

categories can be attributed to differences in the way children understand the pictures in the stories.

Discussion

The data from Experiment III provide strong support for the experimental hypotheses, and permit several conclusions. Clearly, the children in the schematic story group made great improvements over time in their ability to understand and remember normal stories. Moreover, comparable gains in the ability to rearrange scrambled stories and to describe and recall them were noted. Children in the unschematic "story" group and the no-treatment group did not demonstrate the same changes over time as the analyses of response types, story statements, narrative conventions, retention, picture rearrangements and the effects of the narrative category show. On the basis of this differential in group changes over time, it is clear that experience with stories has a direct positive effect on performance on the experimental tests. The group differences that appear at the time of the second testing, especially those found with the scrambled stories, support several conclusions:

(1) Children acquire knowledge about the story schema by repeatedly listening to schematic stories.

(2) Children who have acquired such knowledge about the story schema use it for several purposes: (a) to guide comprehension and recall of stories, and (b) to guide their reconstruction of scrambled stories.

The PPVT data support the additional conclusion that the extra experience with an adult that membership in a treated group provides leads to gains in verbal ability that are not story specific.

After treatment, the children in the schematic story group described and remembered normal stories and rearranged, described and recalled scrambled stories in a qualitatively different way than the other children in the study. These qualitative differences are apparent, for example, in the analyses of core and spurious statements, core story statements and retention. The orthogonal contrasts that examine the nature of the interaction between group and time make it clear that children in the schematic story group describe and recall the stories in a manner that is more adult-like after the treatment period has elapsed. There were no such differences prior to treatment. As the data on the number of responses indicate, treatment group did not have any effect on the amount described or recalled. However, it did affect the content of the statements children made in description and recall. After treatment, the description and recall protocols of the children in the schematic story group included many more core statements than those of the other children. Thus, children who were given experience with well-formed stories began to describe and recall them in the same way as adults. They emphasized those aspects of the story that adults think are central to the gist of the story. At the same time, they made few far-fetched or false statements about the stories. During the post-treatment testing, children in the schematic story group were more

likely than the other children to include story statements in their description and recall protocols. Rather than simply responding to a picture by itself, these children responded to its role in the story and used story statements to infer the connections between story pictures.

After hearing and looking at picture stories daily for a 5 week period, children in the schematic story group also were more successful than the other children at imposing a schematic structure on the scrambled story pictures. While they were not at ceiling on the task, their rearrangments, like those of the middle-class 4-year olds in Experiment I, also were not at a chance level and represented a definite improvement over their performance during the initial test. Interestingly, these children used more narrative conventions than the other children when recalling the stories they rearranged. Perhaps they were mustering all available resources to convince the adult listener that they had rearranged the scrambled pictures into an interesting story. In fact, their success on the task led them to emphasize static resolution pictures more than the other children did. Thus, these children seem to have acquired story-specific knowledge that guided their comprehension and recall, and led them to stress the resolution pictures that are an essential component of the narrative structure.

The guiding role that the story schema played in the schematic story group's comprehension and recall of the stories at the time of the second testing can be inferred from several analyses. As the data on narrative categories, core statements, core story statements and retention of core statements indicate, these children comprehended the

gist of the schematic stories. They emphasized important elements rather than trivial details. They also were unlikely to use far-fetched or false statements. They understood the relationships between pictures, and stressed them during description and recall. In addition, they seemed to recognize the important functions that static pictures played in a schematic story. Moreover, the children repeated the same core statements made in description at the time of recall. These core propositions correspond to macropropositions in the Kintsch and van Dijk (1978) model. If they are encoded, they should have a high probability of recall. Extra and spurious propositions correspond to micropropositions and should be difficult to recall. In fact, both predictions are confirmed. As the children in the schematic story group included many core propositions in their description protocols, it is reasonable to assume they encoded them at that time. Given that children in the unschematic "story" and no-treatment groups were less likely to include core propositions in their story descriptions, it also is reasonable to assume they encoded fewer of them. Thus, the observed group differences in the number of core statements that were made both at the time of encoding and in recall conform to the expectations of the Kintsch and van Dijk (1978) model. Similarly, the fact that comparatively few of the extra statements and virtually no spurious statements mentioned in description were retained also is consistent with the model. Furthermore, group differences in the retention of extra statements would not be expected and they were not observed.

In considering differences in the children's understanding and remembering of scrambled versus normal stories, it should be noted that the stories were scrambled for all children at the time of the first testing as their picture rearrangements were random. During the second testing, the stories that children in the schematic story group described and recalled had been reordered with some success. This was not the case, however, for the children in the other groups. Thus, the effect of story order should vary between groups at the time of the second testing.

In a fully scrambled story, causal and temporal relationships are obscured and the function of pictures in the narrative is destroyed. In Experiment I, the lower-class 4-year olds said less and made fewer core statements and core story statements but included more spurious ones when describing scrambled, as opposed to normal, stories. However, relative to the 4-year-old middle-class children, the difference in performance with scrambled versus normal stories for lower-class 4-year olds was minimal. The 6-year-old lower-class children in Experiment II showed a decrement in performance with scrambled stories that was similar to that observed in the 4-year-old middle-class children. In contrast, the 6-year-old middle-class children, who were quite successful in reordering the pictures, performed similarly with normal and "scrambled" stories. On the basis of these results from the initial studies, what pattern of results would be expected in this study?

In the first testing session, all the 4-year-old lower-class children were expected to perform like the 4-year-old lower-class

children in Experiment I: Hence, performance should be slightly better with normal stories in which the story schema is present, and consequently, a main effect of story order was expected on some measures. If the schematic story treatment was effective and <u>if</u> the children in that group had described and recalled a scrambled story <u>rather than</u> a reordered story during the second testing, then an interaction between treatment group and time and story order would have been expected. More specifically, the children in the schematic story group would have been expected to show a larger decrement in performance during the second testing with scrambled stories than they did in the first testing. Moreover, that decrement would have been larger than that observed in the control groups during both testings. Implicit in this prediction is the expectation that one consequence of an effective treatment program would be the ability to use the schema in a normal story to guide comprehension and recall. Thus, removing the schema (i.e., presenting a scrambled story) would have a detrimental effect on performance, and the triple interaction would be expected.

In the present study, however, the triple interaction was <u>not</u> expected if children in the schematic story group had some success in rearranging the pictures during the second session. In reordering the pictures, the schematic story group children are imposing a story schema on the pictures and thus reducing the difference between normal and scrambled stories. If performance on the reordering task was at ceiling (but it is not), a triple interaction again would be expected with only children in the two control groups showing a decrement in

performance as a result of the scrambling procedure at the time of the second testing. Given that the picture rearrangements were not at ceiling levels, some effect due to the scrambled manipulation was expected in the schematic story group as well as in the control groups.

With one exception, these predictions were confirmed. In description, fewer core statements and core story statements and more spurious statements were made about scrambled stories. At the time of the first testing, children also said less and used more narrative conventions when describing scrambled stories. In the analysis of narrative conventions in recall, however, the interaction between treatment group and time and story order was observed. This result is not a major violation of the predictions. In fact, like the 4-year olds in the schematic story group in this study, the 6-year olds in Experiment II, as well as the 6-year olds in the Poulsen et al. study employed "the empty trappings (Poulsen et al., 1979, p. 399)" of a schematic story when describing and recalling scrambled stories more frequently than with normal stories. This frequent use of the linguistic markers of a story is reminiscent of Bartlett's subjects' protocols. Bartlett (1932, p. 140) himself noted that "the common 'once upon a time' (appears)" frequently when adults serially reproduce a story. Certainly, this is consistent with Bartlett's notion about effort after meaning.

Two interesting changes, one expected and the other not, were noted in the children in the unschematic "story" group. The predicted finding concerns their gains on the PPVT. The data are consistent with

the intervention literature (e.g., Smith & Syddall, 1978) which shows that additional experience interacting with an adult often is associated with gains on a variety of tests, especially in lower-class children. The fact that these children who had additional verbal input with an adult relative to the no-treatment group made a mean gain of 8 raw points or 13.6 normed points on a verbal test is not surprising. During the course of treatment, the experimenter (the present author) began to label the two unschematic "story" groups as the "I-know!-groups." In the first several sessions, children in these groups asked few questions and said little. Within a week, however, after the experimenter showed the children each picture and read the accompanying text, the children began to wave their hands and say "I know!" Responding to this school-induced hand-waving and "I know!" behaviour, the experimenter would allow the children to make their comments about the picture in question before she would show the next picture and read the text. Interestingly, the "I know!" behaviour was not seen in the schematic story group. The plots of the stories seemed to hold the interest of the children hearing them, while the "I-know!-groups" had to find a way of making the unschematic "story" sessions interesting.

The unanticipated change in the unschematic "story" group was the increase in the number of spurious comments the children made in recall. Though unexpected, this difference is not surprising in the light of both the nature of the treatment and the "I-know!" behaviour. The comments the children made during unschematic "story" sessions seldom were addressed directly to the picture. If a pig was in the

picture, for example, the child might have talked about seeing one. When an ugly troll appeared, another child would talk about Thundarr the Barbarian. The "I know!" comments were not unlike following someone's stream of consciousness. Certainly, they did not seem to be attempts to logically complete actions or problems introduced by a picture and its accompanying text. In some cases, what seems to be occurring in recall is that the children, being unable to recall much of the actual story, choose to fabricate content, rather than tell the adult listener they can't remember the story. For example, one child begins to talk about how "a cow came and a dog and a sheep and a pig." Another tells the adult that "the frog turned into (an) ice dog" while "Thundarr Ooglanarian (sic) came to save the baby." Still another child has the boy "call Godzilla." A final example of what a child included in his recall of a black and white picture story is that the boy had "...a lot of hats, blue and green, purple, orange, yellow, blue, green, eight hats!" When compared to the unconnected events in the "stories" the experimenter read to the children, the children's spurious comments in recall perhaps are not that different. What is clear is that the children enjoyed telling the adult listener "stories" just as the experimenter had told them "stories" in the treatment sessions. In fact, from the point of view of developing communication skills, the unschematic story treatment probably was not ineffective. In school and other authoritarian situations, lower-class children often have been found to be reluctant to talk; if forced to do so, they use a special speech code, a school code, that is characterized by short utterances,

simple syntax and an apparent lack of fluency not found in their speech in more relaxed situations (e.g., Cazden, 1970; Houston, 1969, 1970, Labov, 1970). Certainly, this was not a problem with children in the unschematic "story" group. At the same time, however, the data clearly show that the treatment did not lead to any story-specific gains.

The recall procedure adopted in this study and in Experiments I and II seems to be very effective. In contrast to many studies (e.g., Hall et al., 1977; Mandler & Johnson, 1977), not a single child refused to recall a story to the adult listener. Poulsen et al. (1979) had only one child refuse to recall anything from a story and attributed the high frequency and level of recall they obtained to the fact that children recalled not only the pictures, but also their descriptions of the pictures. From a levels of processing perspective (Craik & Lockhart, 1972), the children processed the pictures thoroughly by having to describe them and thus, recall was high. The presence of the adult listener, however, seems to make an additional contribution. In fact the 4-year-old lower-class children from all groups in the present study recalled more core propositions and core story statements than the 4-year-old middle-class children in the Poulsen et al. study! The available data suggest that the presence of the naturalistic recall situation encourages effective communication, and thus, facilitates recall.

The theoretical implications of the present study are significant. The data provide clear support for the hypothesis that experience with schematic stories is a critical factor in the

acquisition of knowledge about the story schema. Clearly, it is story-specific experiences rather than adult-child interactions that account for the changes over time in the schematic story group. Otherwise, comparable changes should have been observed in the unschematic "story" group. The data also show that the children in the schematic story group improved in their ability to focus on the salient aspects of a story and to ignore its trivial details when comprehending, encoding and recalling it. This finding suggests that experience with stories affected attentional processes in such a way that the children could selectively channel their attention to the most important elements of the story. Although the present thesis does not permit an evaluation of the aforementioned prototype versus exemplar accounts of learning the story schema, it has identified a population in which these theoretical questions could be addressed empirically. It also will be possible to investigate which variables lead to developmental changes in the story schema in this population.

The educational implications of this study are intermeshed with the theoretical ones and are perhaps of even greater significance. The fact that children of parents with low incomes, little education, and unskilled or no jobs are less successful in school than children of parents with high incomes, university educations, and professional or managerial jobs is well-known (e.g., Bereiter & Engelman, 1966; Caldwell, 1971; Hunt, 1969; Kiessman, 1962; Zigler et al., 1982). The reasons for this difference, however, have continued to elude investigation. As so much of the curriculum in the primary grades is

centered around the story, a delay in the development of knowledge about the story schema and in the ability to use it to guide story comprehension and recall is likely to constitute a major disadvantage for the child entering school. Certainly, the ability to focus attention on the important ideas in a story when comprehending it is worthwhile, especially in school. Given the schools' emphasis on recall procedures, it also is advantageous to encode and remember the gist of a story. In addition, the ability to use the story schema to guide story construction undoubtedly influences the perceived merit of written compositions. Thus, there is reason to hypothesize that acquiring knowledge about the story schema would have a direct, positive effect on school achievement in the early grades. The results of the present study indicate that very young, lower-class children can be "taught" to recognize a schematic story and to understand and remember its gist simply by listening to stories. I hope that future research will determine if a treatment program of this nature leads to the predicted improvement in the school performance of the so-called disadvantaged child.

CONCLUSIONS, IMPLICATIONS, AND FUTURE RESEARCH

The general concern of this thesis was to explore the processes of acquiring knowledge about the story schema and learning to use that knowledge. At a global level, the thesis examined the effect that experience with stories had on both knowledge of the story schema and the ability to use that schema. In Experiments I and II, two populations who were known to differ in their experience with stories in the preschool years were tested on their knowledge and use of the story schema. In Experiment III, children who lacked extensive experience with stories were given additional experience with stories, and the effects of that experience on their knowledge and use of the story schema were evaluated. Thus, Experiments I and II, and Experiment III, represented two distinct methods of addressing the following question: Does experience with stories lead to the acquisition of knowledge about the story schema and the ability to use that knowledge to guide the comprehension and recall of stories? The relevance of the experimental data to this question will be discussed below. In addition, the theoretical and educational implications of the research will be considered. Finally, some potentially fruitful issues for future investigation will be identified.

Social class differences in North American preschool children's experience with stories that favour middle-class children have been documented repeatedly in the past 50 years (e.g., Burks, 1928; Heath, 1982a, 1982b; Milner, 1951; Saterfiel et al., Note 5; Skodak & Skeels,

1949). If experience with stories is critical for the acquisition of knowledge about the story schema and its use in the cognitive processing of stories, then there should be social class differences in preschool children's knowledge about and use of the story schema. Experiment I tested this prediction. Experiment II both extended and qualified the findings of the first study by examining developmental changes in the observed social class differences. Given that Experiment I identified a population that lacked knowledge about the story schema and the ability to use it, it was possible to investigate how experience with stories affected this population. Experiment III was designed to meet that objective. The findings of the final experiment corroborated those of the initial studies and the data from these studies converge on the following conclusion: Knowledge about the story schema is acquired through experience with stories and is necessary for efficient cognitive processing of stories.

The results of Experiments I and II indicate that both knowledge about the story schema and the ability to use it are limited in lower-class children relative to their middle-class age-peers. When 4 year-old middle-class children describe and recall a sequence of pictures, the organization of those pictures has a marked effect on the contents of their protocols. If the pictures form a story, these middle-class children describe and recall the aspects of the pictures that are important for the story. They link pictures by inferences, describing and recalling not only what they see in the picture, but also the picture's role in the story. In contrast, it makes little difference to

lower-class 4-year olds that the pictures are organized to tell a story. The lower-class children have difficulty identifying the aspects of the pictures that are important in the story, and instead, emphasize far-fetched and/or false interpretations of the pictures. They seldom understand relationships between pictures. The 6-year-old lower-class children's description and recall protocols for pictures that tell a story are comparable to those of the 4-year-old middle-class children. In description and recall, the 6-year-old middle-class children's performance is most like that of the adults who provided the normative data. The analyses of the children's description and recall protocols for normal stories indicate there are class differences in the comprehension and recall of normal stories, and suggest that there are class differences in knowledge about the story schema and the ability to use it.

The findings with scrambled picture stories both confirm and extend those obtained with normal stories. In the rearrangement task, there are pronounced social class differences in the ability to reorder scrambled pictures into a story. Lower-class 4- and 6-year-old children have no success in this task and produce random rearrangements of the pictures. Middle-class 6-year olds provide direct evidence of their knowledge about the story schema: They reorder the pictures into a sequence that tells a story and is closely matched to the original story. The middle-class 4-year olds do not seem to know as much about the schematic structure of stories. They have some success in the task, but their rearrangements are not as similar to the original stories as

are those of the middle-class 6-year olds. When the children's description and recall protocols for the rearranged pictures were compared to those obtained with normal stories, an interesting pattern of results emerged. For the 4-year-old lower-class children, it makes little difference whether a sequence of pictures tells a story. The availability of the story schema does not aid story comprehension and recall in these children. However, the organization of the picture sequence has a profound effect on lower-class 6-year olds' comprehension and recall protocols. If the pictures do not tell a story, these children have difficulty identifying important aspects of the pictures and are unable to link them by inference. The 4-year-old middle-class children's rearranged "stories" are not as well formed as the normal stories, although they are more similar to a normal story than those of the lower-class children. In describing and recalling the rearranged pictures, there is a decrement in the middle-class 4-year olds' performance relative to normal stories. That decrement is comparable to that observed in the 6-year-old lower-class children, although it is not as pronounced. Both 4-year-old middle-class and 6-year-old lower-class chidren are able to use the schematic structure of a normal story to advantage when describing and recalling stories. However, in the rearrangement task, only the 4-year-old middle-class children provide evidence of knowing enough about the story schema to use it in reordering the pictures. Thus, it seems likely that the story schema plays a greater role in guiding middle-class 4-year olds' comprehension and recall of stories than it does for lower-class 6-year olds. The

children in the latter group relative to the former probably rely more heavily on their knowledge about causal and temporal relationships in understanding and remembering the normal stories. The class differences in recall as a function of narrative category support this view.

If pictures tell a story, middle-class children favour resolution pictures and say least about complication pictures in recall. Lower-class children, in contrast, favour exposition pictures and say least about resolution pictures. These findings indicate that the schematic structure of a story has different effects on the middle-class and lower-class children. When these data are considered in conjunction with the data on normal versus scrambled stories, they suggest that the lower-class children use their general knowledge to comprehend and recall stories. Middle-class children, on the other hand, use both their general knowledge and their story-specific knowledge to understand and remember stories. Moreover, the middle-class 6-year olds have more story-specific knowledge than the 4-year olds from the same background.

Social class differences in experience with stories during the preschool years clearly are associated with the predicted class differences in knowledge and use of the story schema. The class differences in knowledge and use of the schematic structure of stories, identified for the first time in this thesis, have significant theoretical implications for the study of the processes of acquiring knowledge about the story schema and the ability to use it. In fact, Experiment III makes these implications obvious, as it is the first

direct study of the effects that experience with stories has on knowledge of the story schema and on the comprehension and recall of schematic stories. In Experiments I and II, populations that differed in their knowledge and use of the story schema were identified, and the nature of the differences between these populations was specified. Given that these populations were known to differ in their experience with stories in the preschool years, the first two studies provided correlational evidence that experience with stories was a critical factor in the acquisition and use of knowledge about the story schema. However, the data did not permit the conclusion that experience with stories was causally responsible for the lower-class children's deficit. Experiment III was designed to determine if there was a causal relationship between experience with stories and the lower-class children's performance on the experimental tests.

The findings of Experiment III indicate that experience with stories has a direct, positive effect on children's performance on the experimental tests. Children in the schematic story group did not differ from the other children prior to treatment. However, experience with stories led to the marked changes apparent in the post-treatment data. Lower-class 4-year-old children who receive experience with schematic stories behave like their middle-class age-peers in Experiment I. In describing and recalling normal picture stories, they emphasize elements of the pictures that are central to the story. They understand relationships between pictures that are important for the story. They appreciate the significance of static exposition and resolution pictures

in a story. When asked to impose a story schema on a scrambled sequence of pictures, the children's performance on the task is comparable to that noted in their middle-class age-peers. Although they are not at ceiling on the task, their rearrangements are not random but rather are related to original story sequence. In recalling the scrambled stories, they emphasize resolution pictures as do the 4- and 6-year-old middle-class children. The data are clear enough and consistent enough to support the conclusion that children in the schematic story group acquired knowledge about the schematic structure of stories and used it in the rearrangement, description and recall tasks.

I hope that future investigations will lead to a more complete specification of the process of acquiring and learning a story schema. Using the techniques employed in research on concept formation and classification learning, it should be possible to choose between the prototype-formation and analogy-with-exemplars accounts of schema formation. One topic for investigation that may be useful in choosing between these accounts is the effects of repeatedly presenting children with the same story (Brooks, Note 2). In contrast to the analogical approach, the prototype view of schema formation would maintain that this should not be useful, as a prototype is formed on the basis of numerous exemplars, and becomes more adequate as additional exemplars are encountered. Given that middle-class preschool children frequently listen to their favourite stories many times and learn to pseudo-read them (e.g., Heath, 1982a; Holdaway, 1979; Schickendanz, 1978; Scollon & Scollon, 1981), there is reason to hypothesize that repetition of

stories may aid schema formation. The methodology adopted in Experiment III could be applied in a study of this hypothesis.

A peculiar type of recycling of propositions occurs in the recall protocols of Experiment III, and perhaps merits future investigation. As the analysis of retention indicates, children repeat certain statements in recall that they made in description. This is most likely to occur with core statements. In scoring the retained statements, it became clear that some retained core statements are repeated several times in recall. The repetitions do not follow each other immediately, but rather are separated by several other statements. It is interesting to speculate about the function of these repeated statements. One hypothesis about the repeated, retained statements, is that they are cognitive cues guiding recall. More specifically, a retained statement is made in recall, several others follow, and then the child is unable to retrieve any additional statements. Consequently, the child goes back to an important statement that was retained, a macroproposition, and repeats it again to cue memory. In fact, 26% of the retained core statements (121 of 467) are repeated in recall in Experiment III. Given that the statements were made and recalled later, it is certainly reasonable to assume that they were encoded. Is it possible that the behaviour predicted by the encoding specificity principle (Tulving & Thomson, 1973) occurs "out loud" in young children?

Does the repetition of retained statements bear any relationship to the recycling that occurs in the aforementioned Kintsch and van Dijk

(1978) model of text comprehension? The model postulates that important propositions, macropropositions, receive multiple encodings. Consequently, the finding (Kintsch et al., 1975) that important propositions are better recalled is attributed to this processing difference. However, the model does not assume any recycling in recall. Why are retained statements recycled in recall in this study? One speculation is that very young children, who are inexperienced with this type of recall, retrieve propositions in chunks comparable to those postulated to exist in the comprehension process. Initially, a retained statement may be recalled and followed by several additional statements. Then, long term memory is searched again for the next chunk of the story with the retained statement serving as the cue for retrieval. An additional chunk of statements is recalled, but prefaced with a repetition of the retained statement that cued retrieval of the new chunk. Future investigations may clarify the factors involved in the repetition of retained statements.

Many of the educational implications of the present research are immediately apparent. As noted above, there is reason to hypothesize that a delay in the acquisition and use of knowledge about the story schema may be a major factor underlying lower-class children's comparatively poor achievement in the story-laden primary grades. For example, the ability to identify, extract and remember important ideas from a story, is an essential component of efficient information processing, and undoubtedly important for success in school. Similarly, school achievement probably is positively affected by the ability to use

the story schema to guide story construction. For reasons of this nature, it seems likely that middle-class children are better prepared for the primary grades than are their lower-class age-peers. Notwithstanding the above, it is probable that social class differences in knowledge of the story schema and the cognitive processing of stories seldom are detected as the social class composition of neighbourhood-based primary schools usually is homogeneous. Once lower-class children are in school, they generally have additional experience with stories. Thus, it is not unreasonable to assume that, in time, they acquire the requisite knowledge for understanding, remembering and constructing stories. However, it is possible that the lower-class children's delay in acquiring this knowledge makes "catching up" to their middle-class peers virtually impossible. This pessimistic speculation receives some support from Bloom (1964, p. 89) who noted that "...marked changes in the environment in the early years can produce greater changes in intelligence than will equally marked changes in the environment at later periods of development." Bloom identified the preschool years (i.e., 0 to 5) as the most rapid period in the development of intelligence and a number of intervention studies (cf. Hutchison, 1981, pp. 10-32) provide additional support for this hypothesis.

In fact, there is reason to hypothesize that learning the story schema has a direct positive effect on IQ scores, which, if nothing else, are positively related to school success (e.g., Wechsler, 1974). The Wechsler Intelligence Scale for Children (Wechsler, 1974), for example, includes a picture arrangement subtest on the performance scale

that requires the child to rearrange sets of scrambled pictures into story sequences. Children's scores on this subtest undoubtedly reflect their familiarity with the schematic structure of simple stories. However, the effect of the story schema on measured intelligence may be more general and influence a broad spectrum of related cognitive skills. Schematic structures facilitate comprehension of incoming material and identification of central ideas, in addition to providing a framework for organizing detail. Given that schematic structures result in a qualitatively different way of processing information, it seems possible that this method of processing information may have transfer effects on other related cognitive activities that are subsumed under the definition of intelligence. In fact, Saltz and Johnson (1974), and Saltz, Dixon and Johnson (1977), found that training lower-class preschool children to enact classic children's stories had a significant positive effect on IQ scores. Their work at least suggests that the relationship between measured intelligence and acquisition of the story schema in lower-class children merits examination.

Social class differences in the time of acquisition of knowledge about the story schema and its use may contribute to the well-established educational lag of lower-class children in another less obvious way. Learning to read may be more difficult for children who do not have any knowledge about the structure of simple stories. Schemata certainly aid middle-class adults in grasping the meaning for word strings (e.g., Anderson, 1977; Anderson & Ortony, 1975; Bransford & Johnston, 1972; Bransford, Nitsch, & Franks, 1977; Pichert & Anderson,

1977), and, thus there is reason to hypothesize that the story schema aids beginning readers in their efforts to comprehend and encode simple stories. Moreover, children lacking experience with stories probably have no familiarity with orthographic conventions such as reading each line of print from left to right, moving from the top to the bottom of the page, and reading the left hand page before the right. Knowledge of any of these orthographic principles, which is found in preschool children with extensive experience with stories (Holdaway, 1979), undoubtedly aids the beginning reader. Furthermore, children without a background of pleasant experiences with stories may have difficulty motivating themselves through the initial tedium involved in the processes of learning to read and write. Such children are unlikely to have positive expectations about the printed word, especially if reading and writing are not valued activities in the home. The slow, word-by-word reading of these beginners is unlikely to suggest that interesting meanings, comparable to those of spoken language, will be found in books. Similarly, in learning to write individual words such as "dog" and "cat," it probably is difficult to imagine that the interesting ideas expressed in speech also can be communicated by the written word. In fact, these postulated motivational problems stem from the lower-class child's orientation to an oral rather than a literate culture (Heath, 1980, 1982a, 1982b).

In many situations, the oral and literate traditions are of equal merit. However, school is not one of those situations. Consequently, experience with stories may affect the acquisition of

literacy, and thus, school achievement, in a most pervasive manner. Olson (1977a, 1977b), Scollon and Scollon (1981) and Heath (1982a, 1982b) have noted that literacy is both the medium and goal of schooling in western society. The Scollons and Heath, working as ethnographers in both Canada and the United States, and Holdaway (1979), an educator in New Zealand, have suggested that middle-class parents begin to orient their children toward literacy within the first year of life. By 2 years of age, "incipient literacy (Scollon & Scollon, 1981, p. 61)" is noted in the middle-class child (Heath, 1982a, 1982b; Holdaway, 1979; Scollon & Scollon, 1981). This orientation toward learning from books is well-established by the end of the preschool years (Heath, 1980, 1982a, 1982b; Holdaway, 1979; Scollon & Scollon, 1981). The bedtime story ritual is considered to be the most important event in contributing to the middle-class preschoolers orientation toward literacy (Heath, 1982a; Holdaway, 1979; Scollon & Scollon, 1981). In this ritual the middle-class child learns ways of learning facts and values from books and talking about that learning (Heath, 1982a, 1982b; Holdaway, 1979; Ninio & Bruner, 1978; Scollon & Scollon, 1981). As Experiment III shows, through this ritual the child also acquires knowledge about the schematic structure of stories and the ability to use it to guide the cognitive processing of stories. Moreover, in other contexts, the child learns to connect knowledge learned from books to other situations. Thus, in learning to read in school, the middle-class child has little more to do than learn to decode words. In contrast, the lower-class child who lacks experience with stories, must acquire knowledge about

the story schema and its use. That child also has to learn to learn from books, to talk about that learning, to connect it to other situations, and finally, to decode words. This may make "catching up" to the middle-class child a formidable task.

The present thesis has demonstrated that experience with stories makes a profound difference to children's comprehension and recall of stories, and to their reordering of scrambled story sequences. The hypothesis that experience with stories has an equally profound effect on school achievement awaits investigation. The methods used in Experiment III can be extended to address that question. There is an unusual urgency about this question as the answers may have particularly important implications for the education of the lower-class child. The potential human significance of the answers to that question requires that such an investigation be undertaken without unnecessary delay.

Reference Notes

1. Brooks, Lee On the insufficiency of analysis. Unpublished manuscript, McMaster University, 1982.
2. Brooks, Lee Personal communication. September 1981.
3. Asp, S., Johnson, L. & Trabasso, T. How does the mode of presentation affect story comprehension? In N. Stein (Chair), Critical issues in the development of story comprehension skills. Symposium presented at the meeting of the American Educational Research Association, San Francisco, April 8, 1979.
4. Day, J., Stein, N., Trabasso, T., & Shirey, L. A study of inferential comprehension: The use of a story schema to remember picture sequences. Paper presented at the Biennial Meeting of the Society for Research in Child Development, San Francisco, March 1979.
5. Saterfiel, T., Cagle, J., & Grace, K. Evaluation of preschool experiences and their relationship to first grade basic skills achievement in the Greenwood Public Schools. Paper presented at the Annual Meeting of the American Educational Research Association, New York, March 1982.
6. Rutledge, D.G. Personal communication. October 1981.
7. Bates, J., Rutledge, D., & Greene, D. Negative correlation between socio-economic status and achievement in schools. Report to the Chairman and Members of the Inner City Committee of the Board of Education for the City of Toronto, January 14, 1980.

References

Abelson, R. Concepts for representing mundane reality in plans. In D. Bobrow & A. Collins (Eds.), Representation and understanding. New York: Academic Press, 1975.

Ames, L. Children's stories. Genetic Psychology Monographs, 1966, 73, 337-396.

Anderson, R.C. The notion of schemata and the educational enterprise: General discussion of the conference. In R.C. Anderson, R.J. Spiro, & W. Montague (Eds.), Schooling and the acquisition of knowledge. Hillsdale, N.J.: Erlbaum, 1977.

Anderson, R.C., & Ortony, A. On putting apples into bottles: A problem of polysemy. Cognitive Psychology, 1975, 7, 167-180.

Anderson, R., Reynolds, R., Schallert, D., & Goetz, E. Frameworks for comprehending discourse. American Educational Research Journal, 1977, 14, 367-381.

Anderson, R., Spiro, R., & Anderson, M. Schemata as scaffolding for the representation of information in connected discourse. American Educational Research Journal, 1978, 15, 433-440.

Applebaum, A., & Tuma, J. Social class and test performance: Comparative validity of the Peabody with the WISC and WISC-R for two socio-economic groups. Psychological Reports, 1971, 40, 139-145.

Applebee, A. The child's concept of story. Chicago: University of Chicago Press, 1978.

Ausubel, D. The psychology of meaningful verbal learning: An introduction to school learning. New York: Grune and Stratton, 1963.

Ausubel, D. How reversible are the cognitive and motivational effects of cultural deprivation? Implications for teaching the culturally deprived child. In A. Passow, M. Goldberg & A. Tannenbaum (Eds.), Education of the disadvantaged. New York: Holt, Rinehart & Winston, 1967.

Baggett, P. Memory for explicit and implicit information in picture stories. Journal of Verbal Learning and Verbal Behavior, 1975, 14, 538-548.

Bartlett, Sir F.C. Remembering. Cambridge: Cambridge University Press, 1932.

Baumeister, A., & Smith, S. Thematic elaboration and proximity in children's recall, organization and long term retention of pictorial materials. Journal of Experimental Child Psychology, 1979, 28, 132-148.

Bellezza, F., & Bower, G. Remembering script-based text. Poetics, 1982, 11, 1-25.

Bereiter, C., & Engelmann, S. Teaching disadvantaged children in the preschool. Englewood Cliffs, N.J.: Prentice-Hall, 1966.

Black, J., & Bower, G. Episodes as chunks in narrative memory. Journal of Verbal Learning and Verbal Behavior, 1979, 18, 309-318.

Blishen, B. The construction and use of an occupational class scale. Canadian Journal of Economics and Political Science, 1958, 24, 521-531.

Blishen, B., & McRoberts, H. A revised socioeconomic index for occupations in Canada. Canadian Review of Sociology and Anthropology, 1976, 13, 71-79.

Bloom, B. Stability and change in human characteristics. New York: Wiley, 1964.

Bobrow, D., & Norman, D. Some principles of memory schemata. In D. Bobrow & A. Collins (Eds.), Representation and understanding. New York: Academic Press, 1975.

Botvin, G., & Sutton-Smith, B. The development of structural complexity in children's fantasy narratives. Developmental Psychology, 1977, 13, 377-388.

Bower, G. Experiments on story understanding and recall. Quarterly Journal of Experimental Psychology, 1976, 28, 511-534.

Bower, G. Experiments on story comprehension and recall. Discourse Processes, 1978, 1, 211-231.

Bower, G., Black, J., & Turner, T. Scripts in memory for text. Cognitive Psychology, 1979, 11, 177-220.

Bower, G., & Clark-Meyers, G. Memory for scripts with organized vs. randomized presentations. British Journal of Psychology, 1980, 71, 369-377.

Bransford, J. Human cognition. Belmont, CA.: Wadsworth, 1979.

Bransford, J., Barclay, J., & Franks, J. Sentence memory: A constructive versus interpretive approach. Cognitive Psychology, 1972, 3, 193-209.

Bransford, J., & Johnson, M. Contextual prerequisites for understanding: Some investigations of comprehension and recall. Journal of Verbal Learning and Verbal Behavior, 1972, 11, 717-726.

Bransford, J., Nitsch, K., & Franks, J. Schooling and the facilitation of knowing. In R.C. Anderson, R.J. Spiro, & W. Montague (Eds.), Schooling and the acquisition of knowledge. Hillsdale, N.J.: Erlbaum, 1977.

Brooks, L. Non-analytic concept formation and memory for instances. In E. Rosch, & B. Lloyd (Eds.), Cognition and concepts. Hillsdale, N.J.: Erlbaum, 1978.

Brown, A. Recognition, reconstruction and recall of narrative sequences by pre-operational children. Child Development, 1975, 46, 156-166.

Brown, A. Semantic integration in children's reconstruction of narrative sequences. Cognitive Psychology, 1976, 8, 247-262.

Brown, A. Theories of memory and the problem of development: Growth, inactivity and knowledge. In F. Craik and L. Cermak (Eds.), Levels of analysis approaches to cognition. Hillsdale, N.J.: Erlbaum, 1978.

Brown, A., & Murphy, M. Reconstruction of arbitrary versus logical sequences by preschool children. Journal of Experimental Child Psychology, 1975, 20, 307-326.

Burks, B.S. The relative influence of nature and nurture upon mental development: A comparative study of foster parent-foster child resemblance and true parent-true child resemblance. 27th Yearbook of the National Society for the Study of Education, 1928, Part I, 219-316.

Byrd, M. Age differences in memory for prose passages. Doctoral Dissertation, University of Toronto, 1981.

Caldwell, B.M. Impact of interest in early cognitive stimulation. In H. Rie (Ed.), Perspectives in child psychopathology. New York: Atherton Press, 1971.

Cazden, C. The neglected situation in child language research and education. In F. Williams (Ed.), Language and poverty. Chicago: Markham, 1970.

Charniak, E. Toward a model of children's story comprehension. Doctoral dissertation, Massachussets Institute of Technology, 1972. (M.I.T. Artificial Intelligence Laboratory Memo #266).

Chiesi, H., Spilich, G., & Voss, J. Acquisition of domain-related information in relation to high and low domain knowledge. Journal of Verbal Learning and Verbal Behavior, 1979, 18, 257-273.

Chomsky, N. Syntactic structures. The Hague: Mouton, 1957.

Chomsky, N. Aspects of the theory of syntax. Cambridge, Mass.: MIT Press, 1965.

Cochran, W., & Cox, G. Experimental designs (2nd Ed.). New York: Wiley, 1957.

Colby, B. A partial grammar of Eskimo folktales. American Anthropologist, 1973, 75, 645-662.

Coleman, J.S. Equality of educational opportunity. Washington, D.C.: U.S. Government Printing Office, 1966.

Consortium on Developmental Continuity Summary Report: The persistence of preschool effects. A long-term follow-up of fourteen infant and preschool experiments. Washington, D.C.: Department of Health, Education and Welfare, 1977.

Craik, F., & Lockhart, R. Levels of processing: A framework for memory research. Journal of Verbal Learning and Verbal Behavior, 1972, 11, 671-684.

Cronbach, L. Essentials of psychological testing. New York: Harper & Row, 1949.

Daneman, M., & Carpenter, P. Individual differences in working memory and reading. Journal of Verbal Learning and Verbal Behavior, 1980, 19, 450-466.

De Groot, A. Thought and choice in chess. The Hague: Mouton, 1965.

Denburg, S. The interaction of picture and print in reading instruction. Doctoral dissertation, Ontario Institute for Studies in Education, University of Toronto, 1975.

Denhiere, G., & LeNy, J.-F. Relative importance of meaningful units in comprehension and recall of narratives by children and adults. Poetics, 1980, 9, 147-161.

Den Uyl, M., & van Oostendorp, H. The use of scripts in text comprehension. Poetics, 1980, 9, 275-294.

Deutsch, C.P. Learning in the disadvantaged. In M. Deutsch et al. (Eds.), The disadvantaged child. New York: Basic Books, 1967. (a)

Deutsch, M. Minority group and class status as related to social and personality factors in scholastic achievement. Monographs of the Society for Applied Anthropology, No. 2, 1962.

Deutsch, M. Nursery education: The influence of social programming on early development. In M. Deutsch et al. (Eds.), The disadvantaged child. New York: Basic Books, 1967. (b)

Dooling, D., & Lachman, R. Effects of comprehension on retention of prose. Journal of Experimental Psychology, 1971, 88, 216-222.

Dunn, L. Peabody Picture Vocabulary Test. Circle Pines, Minnesota: America Guidance Service, 1959.

Fletcher, C. Short-term memory processes in text comprehension. Journal of Verbal Learning and Verbal Behavior, 1981, 20, 564-574.

Fraisse, P. The psychology of time. New York: Harper and Row, 1963.

Ginsburg, H. The myth of the deprived child. Englewood Cliffs, New Jersey: Prentice-Hall Inc., 1972.

Glenn, C. The role of episodic structure and of story length in children's recall of simple stories. Journal of Verbal Learning and Verbal Behavior, 1978, 17, 229-247.

Goh, D., & Lund, J. Verbal reinforcement, socio-economic status and intelligence test performance of preschool children. Perceptual and Motor Skills, 1977, 44, 1011-1014.

Grosse, E. French structuralist views on narrative grammar. In W. Dressler (Ed.), Research in text theory (Vol. 2): Current trends in textlinguistics. Berlin: Walter de Gruyter, 1978.

Haberlandt, K. Story grammar and reading time of story constituents. Poetics, 1980, 9, 99-116.

Hall, W., Cole, M., Reder, S., & Dowley, G. Variations in young children's use of language: Some effects of setting and dialect. In R.O. Freedle (Ed.), Discourse production and comprehension. Hillsdale, N.J.: Erlbaum, 1977.

Hayes, W. Statistics for the social sciences. New York: Holt, Rinehart & Winston, 1973.

Heath, S.B. The functions and uses of literacy. Journal of Communication, 1980, 30, 123-133.

Heath, S.B. Toward an ethnohistory of writing in American education. In M. Whiteman (Ed.), Writing: The nature, development, and teaching of written communication (Vol. 1). Hillsdale, N.J.: Lawrence Erlbaum, 1981.

Heath, S.B. What no bedtime story means: Narrative skills at home and school. Language and Society, 1982, 11, 49-76. (a)

Heath, S.B. Protean shapes in literacy events: Ever-shifting oral and literate traditions. In D. Tannen (Ed.), Advances in discourse processes Vol. (9): Spoken and written language. Norwood, N.J.: Ablex, 1982. (b)

Hess, R.D. Social class and ethnic influences on socialization. In P. Mussen (Ed.), Carmichael's manual of child psychology (3rd ed., Vol. 2). New York: John Wiley, 1970.

Hildebrand, V. Introduction to early childhood education. London: Collier-Macmillan Ltd., 1971.

Holdaway, D. The foundations of literacy. Sydney: Ashton Scholastic, 1979.

Houston, S. A sociolinguistic consideration of the black English of children in Northern Florida. Language, 1969, 45, 599-607.

Houston, S. A re-examination of some assumptions about the language of the disadvantaged child. Child Development, 1970, 41, 947-963.

Hunt, J. Mc V. The challenge of incompetence and poverty. Urbana: University of Illinois Press, 1969.

Hutchison, R. Social-class differences in preschool children's speech codes and code-switching abilities. Master's thesis, University of Toronto, 1977.

Hutchison, R. The Association for Early Childhood Education, Ontario, Submission to the Minister of Education, the Honourable Dr. Bette Stephenson. Toronto: Association for Early Childhood Education, Ontario, 1981.

Johnson, M., Bransford, J., & Solomon, S. Memory for tacit implications of sentences. Journal of Experimental Psychology, 1973, 98, 203-205.

Johnson, N., & Mandler, J. A tale of two structures: Underlying and surface forms in stories. Poetics, 1980, 9, 51-86.

Kant, E. Critique of pure reason. New York: Dolphin Books, 1961. (Originally published, 1781.)

Kintsch, W. The representation of meaning in memory. Hillsdale, N.J.: Erlbaum, 1974.

Kintsch, W. Memory for prose. In C. Cofer (Ed.), The structure of human memory. San Francisco: W.H. Freeman, 1975.

Kintsch, W. On comprehending stories. In M. Just, & P. Carpenter (Eds.), Cognitive processes in comprehension. Hillsdale, N.J.: Erlbaum, 1977.

Kintsch, W. Learning from text, levels of comprehension, or: Why anyone would read a story anyway. Poetics, 1980, 9, 87-98.

Kintsch, W., McKoon, G, & Keenan, J. Memory for information inferred during reading. In W. Kintsch (Ed.), The representation of meaning in memory. Hillsdale, N.J.: Erlbaum, 1974.

Kintsch, W., Kozminsky, E., Streby, W., McKoon, G., & Keenan, J. Comprehension and recall of text as a function of content variables. Journal of Verbal Learning and Verbal Behavior, 1975, 14, 196-214.

Kintsch, W., Mandel, T., & Kozminsky, E. Summarizing scrambled stories. Memory and Cognition, 1977, 5, 547-552.

Kintsch, W., & Greene, E. The role of culture-specific schemata in the comprehension and recall of stories. Discourse Processes, 1978, 1, 1-13.

Kintsch, W., & Van Dijk, T. Toward a model of text comprehension and production. Psychological Bulletin, 1978, 1, 14-35.

Kintsch, W., & Vipond, D. Reading comprehension and readability in educational practice and psychological theory. In L. Nilsson (Ed.), Perspectives on memory research. Hillsdale, N.J.: Erlbaum, 1979.

Kirk, R. Experimental design procedures for the behavioral sciences. Belmont, CA.: Wadsworth, 1968.

Labov, W. The logic of nonstandard English. In F. Williams (Ed.), Language and poverty. Chicago: Markham, 1970.

Labov, W. Language in the inner city. Philadelphia: University of Pennsylvania Press, 1972.

Labov, W., & Waletzky, J. Narrative analysis: Oral versions of personal experience. In J. Helm (Ed.), Essays on the verbal and visual arts. Seattle: American Ethnological Society (University of Washington Press), 1967.

Landis, T. Interactions between text and prior knowledge in children's memory for prose. Child Development, 1982, 53, 811-814.

Lee, R., & De Vore, I. (Eds.) Man the hunter. Chicago: Aldine, 1968.

Lee, R., & De Vore, I. (Eds.) Kalahari hunter-gatherers. Cambridge, Mass.: Harvard University Press, 1976.

Lyman, H. Peabody Picture Vocabulary Test. In O. Buros (Ed.), The Mental Measurements Yearbook (Vol. 6). Highland Park, N.J.: Gryphon Press, 1965.

Mandler, J. A code in the node: The use of a story schema in retrieval. Discourse Processes, 1978, 1, 14-35.

Mandler, J., & Johnson, N. Remembrance of things parsed: Story structure and recall. Cognitive Psychology, 1977, 9, 111-151.

Mandler, J., & DeForest, M. Is there more than one way to recall a story? Child Development, 1979, 50, 886-889.

Mandler, J., & Johnson, N. On throwing out the baby with the bathwater: A reply to Black and Wilensky's evaluation of story grammars. Cognitive Science, 1980, 4, 305-312.

Mandler, J., Scribner, S., Cole, M., & De Forest, M. Cross-cultural invariance in story recall. Child Development, 1980, 51, 19-26.

Mayer, M. Frog, where are you? New York: Dial Press, 1969.

Mayer, M. A boy, a dog, a frog, and a friend. New York: Dial Press, 1971.

Mayer, M. Frog on his own. New York: Dial Press, 1973.

Mayer, M., & Mayer, M. One frog too many. New York: Dial Press, 1975.

McCartney, K., & Nelson, K. Children's use of scripts in story recall. Discourse Processes, 1981, 4, 59-70.

McClure, E., Mason, J., & Barnitz, J. An exploratory study of story structure and age effects on children's ability to sequence stories. Discourse Processes, 1979, 2, 213-249.

Medin, D., & Schwanenflugel, P. Linear separability in classification learning. Journal of Experimental Psychology: Human Learning and Memory, 1981, 7, 355-368.

Medin, D., & Smith, E. Strategies and classification learning. Journal of Experimental Psychology: Human Learning and Memory, 1981, 7, 241-253.

Meyer, P.L. Introductory probability and statistical applications. Reading, Mass.: Addison-Wesley, 1970.

Miller, J., & Kintsch, W. Readability and recall of short prose passages: A theoretical analysis. Journal of Experimental Psychology: Human Learning and Memory, 1980, 6, 335-354.

Milner, J. A study of the relationship between reading readiness in grade one children and patterns of parent-child interaction. Child Development, 1951, 22, 95-112.

Minsky, M. A framework for representing knowledge. In P. Winston (Ed.), The psychology of computer vision. New York: McGraw-Hill, 1975.

Nelson, K. Cognitive development and the acquisition of concepts. In R.C. Anderson, R.J. Spiro, & W. Montague (Eds.), Schooling and the acquisition of knowledge. Hillsdale, N.J.: Erlbaum, 1977.

Ninio, A., & Bruner, J. The achievement and antecedents of labelling. Journal of Child Language, 1978, 5, 1-15.

Nunnally, J. Introduction to psychological measurement. New York: McGraw Hill, 1959.

Olson, D. From utterance to text: The bias of language in speech and writing. Harvard Educational Review, 1977, 47, 257-281. (a)

Olson, D. The language of instruction: On the literate bias of schooling. In R. Anderson, R. Spiro, & W. Montague (Eds.), Schooling and the acquisition of knowledge. Hillsdale, N.J.: Erlbaum, 1977. (b)

Owens, J., Bower, G., & Black, J. The "soap opera" effect in story recall. Memory and Cognition, 1979, 7, 185-191.

Perlmutter, M., & Myers, N. Recognition memory in preschool children. Developmental Psychology, 1976, 12, 27-272.

Perlmutter, M., & Ricks, M. Recall in preschool children. Journal of Experimental Child Psychology, 1979, 27, 423-436.

Piaget, J. The language and thought of the child. New York: Harcourt, Brace, 1926.

Piaget, J. The child's conception of time. New York: Basic Books, 1969. (Originally published, 1927.)

Piaget, J. The child's conception of the world. New York: Harcourt, Brace, 1929.

Piaget, J. The child's conception of physical causality. London: Routledge & Kegan Paul, 1930.

Piaget, J. Memory and intelligence. New York: Basic Books, 1968.

Pichert, J., & Anderson, R. Taking different perspectives on a story. Journal of Educational Psychology, 1977, 69, 309-315.

Piers, E. Peabody Picture Vocabulary Test. In O. Buros (Ed.), The Mental Measurements Yearbook (Vol. 6). Highland Park, N.J.: Gryphon Press, 1965.

Pompi, K., & Lachman, R. Surrogate processes in the short-term retention of connected discourse. Journal of Experimental Psychology, 1967, 75, 143-150.

Poulsen, D., Kintsch, E., Kintsch, W., & Premack, D. Children's comprehension and memory for stories. Journal of Experimental Child Psychology, 1979, 28, 379-403.

Pratt, M., Krane, A., & Kendall, J. Triggering a schema: The rôle of italics and intonation in the interpretation of ambiguous discourse. American Educational Research Journal, 1981, 18, 303-315.

Pritcher, E., & Prelinger, E. Children tell stories. New York: International Universities Press, 1963.

Propp, V. Morphology of the folktale. Austin: Texas University Press, 1968. (Originally published, 1928.)

Reynolds, R., Taylor, M., Steffensen, M., Shirey, L., & Anderson, R. Cultural schemata and reading comprehension. Reading Research Quarterly, 1982, 17, 353-366.

Rieser, H. On the development of text grammar. In W. Dressler, (Ed.), Research in text theory (Vol. 2): Current trends in textlinguistics. Berlin: Walter de Gruyter, 1978.

Riessman, F. The culturally deprived child. New York: Harper & Row, 1962.

Rumelhart, D.E. Notes on a schema for stories. In D.G. Bobrow & A. Collins (Eds.), Representation and understanding: Studies in cognitive science. New York: Academic Press, 1975.

Rumelhart, D.E. Understanding and summarizing brief stories. In D. LaBerge & S.J. Samuels (Eds.), Basic processes in reading: Perception and comprehension. Hillsdale, N.J.: Lawrence Erlbaum Associates, 1977.

Rumelhart, D. On evaluating story grammars. Cognitive Science, 1980, 4, 313-316. (a)

Rumelhart, D. Schemata: The building blocks of cognition. In R. Spiro, B. Bruce, & W. Brewer (Eds.), Theoretical issues in reading comprehension. Hillsdale, N.J.: Erlbaum, 1980. (b)

Rumelhart, D.E., & Ortony, A. The representation of knowledge in memory. In R.C. Anderson, R.J. Spiro, & W. Montague (Eds.), Schooling and the acquisition of knowledge. Hillsdale, N.J.: Erlbaum, 1977.

Rusted, J., & Coltheart, M. Facilitation of children's prose recall by the presence of pictures. Memory and Cognition, 1979, 7, 354-359.

Sachs, J. Recognition memory for syntactic and semantic aspects of connected discourse. Perception and Psychophysics, 1967, 2, 437-444.

Saltz, E., & Johnson, J. Training for thematic-fantasy play in culturally disadvantaged children: Preliminary results. Journal of Educational Psychology, 1974, 66, 623-630.

Saltz, E., Dixon, D., & Johnson, J. Training disadvantaged preschoolers on various fantasy activities: Effects on cognitive functioning and impulse control. Child Development, 1977, 48, 367-380.

Schank, R.C. The structure of episodes in memory. In D.G. Bobrow & A. Collins (Eds.), Representation and understanding. New York: Academic Press, 1975.

Schank, R. Inference in the conceptual dependency paradigm: A personal history. In T. Simon and R. Scholes (Eds.), Language, mind, and brain. Hillsdale, N.J.: Lawrence Erlbaum, 1982. (a)

Schank, R.C. Reading and understanding: Teaching from the perspective of artificial intelligence. Hillsdale, N.J.: Lawrence Erlbaum, 1982. (b)

Schank, R.C., & Abelson, R. Scripts, plans, goals and understanding. Hillsdale, N.J.: Erlbaum, 1977.

Schickedanz, J. "Please read that story again!" Young Children, 1978, 33, 48-55.

Schweinhart, D., & Weikart, D. Young children grow up: The effects of the Perry Preschool Program. Monographs of the High/Scope Educational Research Foundation, 1980, np. 7.

Scollon, R., & Scollon, S. Narrative, literacy and face in interethnic communication. In R.O. Freedle (Ed.), Advances in discourse processes (Vol. 7). Norwood, N.J.: Ablex, 1981.

Seitz, V., Abelson, W., Levine, E., & Zigler, E. Effects of place of testing on the Peabody Picture Vocabulary Test scores of disadvantaged Head Start and non-Head Start children. Child Development, 1975, 46, 481-486.

Shatz, M., & Gelman, R. The development of communication skills: Modifications in the speech of young children as a function of listener. Monographs of the Society for Research in Child Development, 1973, 38. (5, Serial No. 152.)

Sjogren, D., & Timpson, W. Frameworks for comprehending discourse: A replication study. American Educational Research Journal, 1979, 16, 341-346.

Skodak, M., & Skeels, H.M. A final follow-up study of one hundred adopted children. Journal of Genetic Psychology, 1949, 75, 85-125.

Smilansky, S. The effects of sociodramatic play on disadvantaged preschool children. New York: Wiley, 1968.

Smith, P.K., & Syddall, S. Play and non-play tutoring in preschool children: Is it play or tutoring which matters. British Journal of Educational Psychology, 1978, 48, 315-325.

Spilich, G., Vesonder, G., Chiesi, H., & Voss, J. Text processing of domain-related information for individuals with high and low domain knowledge. Journal of Verbal Learning and Verbal Behavior, 1979, 18, 275-290.

Spiro, R. Remembering information from text: The "state of schema" approach. In R. Anderson, R. Spiro, & W. Montague (Eds.), Schooling and the acquisition of knowledge. Hillsdale, N.J.: Erlbaum, 1977.

Spiro, R. Constructive processes in prose comprehension and recall. In R. Spiro, B. Bruce, & W. Brewer (Eds.), Theoretical issues in reading comprehension. Hillsdale, N.J.: Erlbaum, 1980.

Steffensen, M., Joag-Dev, C., & Anderson, R. A cross-cultural perspective on reading comprehension. Reading Research Quarterly, 1979, 15, 10-29.

Stein, N., & Glenn, C. An analysis of story comprehension in elementary school children. In R. O. Freedle (Ed.), Advances in discourse processes (Vol. 2): New directions in discourse processing. Norwood, N.J.: Ablex, 1979.

Stein, N., & Nezworski, T. The effects of organization and instructional set on story memory. Discourse Processes, 1978, 1, 177-193.

Stein, N., & Trabasso, T. What's in a story: An approach to comprehension and instruction. In R. Glaser (Ed.), Advances in instructional psychology (Vol. 2). Hillsdale, N.J.: Lawrence Erlbaum, 1982.

Sulin, R., & Dooling, D. Intrusion of a thematic idea in retention of prose. Journal of Experimental Psychology, 1974, 103, 255-262.

Sutton-Smith, B. The folkstories of children. In M. Weigle (Ed.), Publications of the American Folklore Society (Vol. 3), Philadelphia: University of Pennsylvania Press, 1981.

Sutton-Smith, B., Botvin, G., & Mahoney, D. Developmental structures in fantasy narratives. Human Development, 1976, 19, 1-13.

Taylor, I. Introduction to psycholinguistics. New York: Holt, Rinehart & Winston, 1976.

Thorndyke, P. Cognitive structures in comprehension and memory of narrative discourse. Cognitive Psychology, 1977, 9, 77-110.

Thorndyke, P., & Yekovich, F. A critique of schema-based theories of human story memory. Poetics, 1980, 9, 23-49.

Todd, V., & Heffernan, H. The years before school. London: Collier-Macmillan, 1967.

Trabasso, T., Stein, N., & Johnson, L. Children's knowledge of events: A causal analysis of story structure. In G. Bower (Ed.), The psychology of learning and motivation (Vol. 15). New York: Academic Press, 1981.

Tulving, E., & Thomson, D. Encoding specificity and retrieval processes in episodic memory. Psychological Review, 1973, 80, 352-373.

van Dijk, T. Some aspects of text grammars. The Hague: Mouton, 1972.

van Dijk, T. Philosophy of action and theory of narrative. Poetics, 1976, 5, 287-338.

van Dijk, T. Semantic macrostructures and knowledge frames in discourse comprehension. In M. Just, & P. Carpenter (Eds.), Cognitive processes in comprehension. Hillsdale, N.J.: Erlbaum, 1977.

van Dijk, T. Recalling and summarizing complex discourse. In W. Burghardt & K. Hölker (Eds.), Research in text theory (Vol. 3): Text processing. Berlin: Walter de Gruyter, 1979.

van Dijk, T. Story comprehension: An introduction. Poetics, 1980, 9, 1-21. (a)

van Dijk, T. Macrostructures: An interdisciplinary study of global structures in discourse, interaction, and cognition. Hillsdale, N.J.: Lawrence Erlbaum, 1980. (b)

van Dijk, T., & Kintsch, W. Cognitive psychology and discourse: Recalling and summarizing stories. In W. Dressler (Ed.), Research in text theory (Vol. 2): Current trends in textlinguistics. Berlin: Walter de Gruyter, 1978.

Wechsler, D. Wechsler Intelligence Scale for Children: Manual. New York: Psychological Corporation, 1974.

Weikart, D., Bond, J., & McNeil, J. The Ypsilanti Perry Preschool Project: Preschool years and longitudinal results through fourth grade. Monographs of the High/Scope Educational Research Foundation, 1978, No. 3.

Weinberg, W., Dietz, S., Penick, E., & McAlister, W. Intelligence, reading achievement, physical size, and social class. Journal of Pediatrics, 1974, 85, 482-489.

Wimmer, H. Processing of script deviations by young children. Discourse Processes, 1979, 2, 301-310.

Winer, B.J. Statistical principles in experimental design (Rev. Ed.). New York: McGraw-Hill, 1971.

Winograd, T. A framework for understanding discourse. In M. Just & P. Carpenter (Eds.), Cognitive processes in comprehension. Hillsdale, N.J.: Erlbaum, 1977.

Wrightsman, L. Social psychology in the seventies. Monterey, CA: Brooks/Cole, 1972.

Yekovich, F., & Thorndyke, P. An evaluation of alternative functional models of narrative schemata. Journal of Verbal Learning and Verbal Behavior, 1981, 20, 454-469.

Zigler, E., Abelson, W., & Seitz, V. Motivational factors in the performance of economically disadvantaged children on the Peabody Picture Vocabulary Test. Child Development, 1973, 44, 294-303.

Zigler, E., Abelson, W., Trickett, P., & Seitz, V. Is an intervention program necessary in order to improve economically disadvantaged children's IQ scores? Child Development, 1982, 53, 340-348.

Appendix I

Bartlett's (1932) The War of the Ghosts

The War of the Ghosts

One night two young men from Egulac went down to the river to hunt seals,
and while they were there it became foggy and calm.
Then they heard war cries,
and they thought, "Maybe this is a war party."
They escaped to the shore
and hid behind a log.
Now canoes came up,
and they heard the noise of paddles
and saw one canoe coming up to them.
There were five men in the canoe,
and they said, "What do you think? We wish to take you along.
We are going up the river to make war on the people."
One of the young men said, "I have no arrows."
"Arrows are in the canoe," they said.
"I will not go along.
I might be killed.
My relatives do not know where I have gone.
But you," he said, turning to the other, "may go with them."
So one of the young men went,
but the other returned home.
And the warriors went on up the river to a town on the other side of Kalama.
The people came down to the water,
and they began to fight,
and many were killed.
But presently the young man heard one of the warriors say, "Quick, let us go home: that Indian has been hit."
Now he thought, "Oh, they are ghosts."
He did not feel sick,
but they said he had been shot.
So the canoes went back to Egulac,
and the young man went ashore to his house and made a fire.
And he told everybody and said, "Behold, I accompanied the ghosts, and we went to a fight.
Many of our fellows were killed,
and many of those who attacked us were killed.
And they said I was hit
and I did not feel sick."
He told it all,
and then he became quiet.
When the sun rose he fell down.
Something black came out of his mouth.
His face became contorted.
The people jumped up and cried.
He was dead.

Appendix II

Transcription and Scoring Manual

TRANSCRIPTION AND SCORING MANUAL

I Transcriptions

A. End of interaction

The interaction is terminated when

(a) A speaker says he/she has finished and/or wants to do something else, OR

(b) A speaker finishes talking about the story and begins to talk about something else.

B. Transcriptions

The conventions listed below should be followed when transcribing a tape.

1. Filled pauses (i.e., um, uh, er) are deleted unless a rising intonation indicates the sound was used to question a previous utterance. E.g., ~~um, um, um~~. He gets in. Uh?

2. False starts, as determined by the words I mean or no, pausal cues and/or and at the end of an utterance, are deleted. E.g., ~~he's, he's~~, the man goes; the man goes, ~~and~~.

3. Exact word and utterance repetitions are included unless they are a form of stuttering and serve no emphatic purpose. E.g., Look at me! Look at me! The man go, goes.

4. Routines including songs, nursery rhymes, nonsense counting, reciting the alphabet or days of the week are not deleted.

5. Sound effects (e.g., beep-beep, boom-boom) are not deleted.

6. Exclamations (e.g., wowee, ah ha), yes/no utterances and their synonyms (e.g., okay, alright), greetings (e.g., hi, goodbye), attentionals (e.g., Hey! Lookit!) and imperatives (e.g., Look!) are included.

7. Blank spaces are used to indicate unintelligible word(s).

8. Single parentheses are used to indicate doubtful transcriptions. E.g., He (push) the turtle.

9. Overregularizations and neologisms are transcribed as spoken. E.g., He comed to the park. He shumped the turtle.

C. Utterance Boundaries

Utterance boundaries are determined by listening to the tape recordings. An utterance is what sounds like an utterance to a native English speaking transcriber who uses rising and falling intonation patterns characteristic of the language to assess the boundaries. Punctuation, including periods, question marks and exclamations, is based on the same intonation cues as well as the contextual information. Run-on sentences are divided by the rules of English grammar. E.g., The frog is in the jar/ and he goes to sleep/ and the frog climbs out.

D. Unspecified Referents and Non-Verbal Communications

1. When the experimenter or listener asks the child to clarify a referent and the child responds with a single word rather than a complete utterance, the implied utterance is supplied in double parentheses.
E.g., He drank it.
The frog. ((drank it))

2. When the experimenter asks the child to clarify a referent and the child points to the referent, the experimenter will supply the label. Words supplied in that manner are enclosed in double parentheses in the transcriptions.
E.g., He drank the bottle. ((The frog - child pointed.))

3. When the child uses gestures to communicate to the experimenter or listener, the experimenter or listener labels the gesture performed. Such gestural labelling is indicated in the transcripts by the use of double parentheses. E.g., ((Child points finger just as boy in story points finger.))

4. When the child gives a yes or no answer to the experimenter or listener, the implied utterance is supplied in double parentheses. E.g., No ((It was not the turtle.))

II. Scoring of Transcripts

A. Response Class Scoring

Each statement is broken into simple sentences. The simple sentences are then assigned to one of three response types: core statements, extra statements, and spurious statements.

1. The core statements are determined from the results of the adult sample. Each statement given in response to a picture by more than 50% of the adults is designated as a core statement.

2. Statements that are correct descriptions of a picture but that were not given by at least 50% of the adult sample are classified as extra statements. Extra statements include inessential detail.

3. Wrong responses are designated as spurious statements. These statements included possible but far-fetched interpretations of a picture from the standpoint of an adult as well as false responses.

4. The conventions listed below should be followed when classifying response classes:

(i) When a child clarifies a referent used in an earlier statement (see I, D, 1) OR when a child points to a referent (see I, D, 2), only the earlier statement is scored. This clarification is not scored.

(ii) When a child communicated by gestures as described in I, D, 3, the communication is scored.

(iii) When a child gives a yes/no answer as described in I, D, 4, the response is not scored.

(iv) Repetitions requested by the experimenter or listener (e.g., Pardon me?) are not scored.

(v) When a child says "I don't know", "I don't remember", or words to that effect, the response is not scored.

B. Story Statements and Narrative Conventions

(i) Story statements cannot be derived from any one picture, but rather depend on an understanding of the story. Only a few pictures in a story are likely to elicit story statements. Story statements are categorized as either core, extra or spurious responses.

(ii) Certain narrative conventions are scored. Narrative conventions are not responses to the picture itself nor do

they necessarily indicate an understanding of the story. The use of narrative conventions indicates a familiarity with the conventions of story telling. The following conventions are scored:

(a) Conventions concerning settings. E.g., "Once upon a time", "one day".

(b) Conventions concerning resolutions. E.g., "And he lived there from then on", "And they lived happily ever after", "And they never fought again".

(c) Conventions concerning temporal connections including "And when", "again", "finally", "suddenly", "meanwhile", "and then", etc.

Appendix III

Stories Used in Experiment III

Barbaresi, N. The three little pigs. New York: Golden Press, 1981. (Original author unknown.) 19 pages

Brown, M. The runaway bunny. New York: Harper & Row, 1977. (Originally published, 1942.) 17 pages

Burton, V. Katy and the big snow. New York: Houghton Mifflin, 1971. (Originally published, 1943.) 22 pages

Carle, E. The honeybee and the robber. New York: Philomel Books, 1981. 12 pages

Cauley, L. Goldilocks and the three bears. New York: Putnam, 1981. (Original author unknown.) 22 pages

Dalgliesh, A. The little wooden farmer. New York: Macmillan, 1971. (Originally published, 1930.) 13 pages

de Paola, T. Watch out for the chicken feet in your soup. Englewood Cliffs, N.J.: Prentice-Hall, 1974. 23 pages

Flack, M. Angus and the ducks. New York: Doubleday, 1930. 20 pages

Flack, M. Ask Mr. Bear. New York: Macmillan, 1971. (Originally published, 1932.) 18 pages

Gag, W. Millions of cats. New York: Coward, McCann & Geoghegan, 1977. (Originally published, 1928.) 21 pages

Galdone, P. The three billy goats Gruff. New York: Houghton Mifflin, 1973. (Original author unknown.) 15 pages

Gross, R. The Bremen-town musicians. New York: Scholastic, 1974. (Original authors, the Brothers Grimm.) 24 pages

Hogrogian, N. One fine day. New York: Macmillan, 1971. 13 pages

Keats, E. The snowy day. Harmondsworth, Eng.: Penguin Books, 1981. (Originally published, 1962.) 18 pages

Lionni, L. Frederick. New York: Knopf, 1973. (Originally published, 1967.) 14 pages

Lionni, L. Swimmy. New York: Knopf, 1973. (Originally published, 1963.) 14 pages

Lewis, B. The house that Jack built. New York: Four Winds Press, 1981. (Original author unknown, originally published, 1755.) 16 pages

Mayer, M. There's a nightmare in my closet. New York: Dial Press, 1968. 19 pages

Piper, W. The little engine that could. New York: Scholastic Books, 1979. (Originally published, 1930.) 24 pages

Scott, A. Sam. New York: McGraw-Hill, 1967. 15 pages

Southgate, V. The gingerbread boy. New York: Elsevier-Dutton, 1979. (Original author unknown.) 16 pages

Wagner, J. The bunyip of Berkeley's Creek. Harmondsworth, Eng.: Penguin, 1975. 20 pages

Wagner, J. John Brown, Rose and the midnight cat. Harmondsworth, Eng.: Penguin, 1977. 23 pages

Wildsmith, B. The rich man and the shoemaker. Oxford, Eng.: Oxford University Press, 1979. (Original author, La Fontaine.) 17 pages

Zion, G. Harry the dirty dog. New York: Harper & Row, 1976. (Originally published, 1952.) 21 pages

Zolotow, C. Mr. Rabbit and the lovely present. New York: Harper & Row, 1977. (Originally published, 1962.) 12 pages