NARRATIVE SKILLS AS A PREDICTOR OF SUGGESTIBILITY AND MEMORY ACCURACY

A Dissertation
Presented to the Faculty of the Graduate School
of Cornell University
In Partial Fulfillment of the Requirements for the Degree of
Doctor of Philosophy

by
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Narrative skills have been identified as an important contributor to memory development in young children. In the present research, I examine the relationship between children’s narrative skills and suggestibility as well as memory accuracy. Across two studies, a total of 112 preschool-aged children engaged in a staged event with a classroom visitor and were subsequently questioned suggestively. Results from Study 1 indicated that children’s ability to provide a high quality narrative of the event was related to resistance to suggestive questions, appearing to supersede age as a predictor. Study 2 further examined the role of children’s general language abilities (measured through a teacher report) and general narrative skills (measured through an autobiographical memory narrative). These results replicated the findings that children’s ability to produce a high quality narrative of a previously experienced past event independently predicts resistance to suggestion independent of language skill. However, the quality of children’s autobiographical memory narratives predicted increased suggestibility. In addition, in both studies high quality narratives were related to reporting more spontaneous errors. Findings are considered in light of narrative’s role in memory development and underlying mechanisms which may explain children’s suggestibility.
BIOGRAPHICAL SKETCH

Sarah Kulkofsky received her B.A. *magna cum laude* from Colgate University in 2002 majoring in political science and psychology, receiving high honors distinction in psychology. She joined the graduate field in the Department of Human Development at Cornell University in the fall of 2002. She received her M.A. in developmental psychology from Cornell University in 2004. Her research interests include examining memory development in social, cultural, and functional contexts, the socio-cognitive factors influencing memory accuracy and inaccuracy, narrative skills and memory sharing, and eyewitness reliability in children and adults. She will be joining the faculty in the Human Development and Family Studies department at Texas Tech University beginning in the fall of 2007.
To my parents.
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I would also like to thank the members of the research team who made this project possible. First, thank you goes to Jessica Zoe Klemfuss who served as a junior collaborator on this project. In addition, I thank my research assistants: Maura Donovon, Marina Eisner, Barton Emery, Christina Han, Karyn Hartz, Oren Johnson, Jamie Kalman, Alex Kaplan, Danielle, Liebling, Bethany Ojalet, Ameila Poquette, Christy Ricaurte, Ana Rivera, Cindy Sheih, Ari Silberman, Samantha Solomon, and Christopher Tems. I am also grateful to Stacey Doan, Heather Gilmore, Pilyoung Kim, Jessie Koh, and Yi Shao for their helpful comments on earlier versions of this manuscript.

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CHAPTER 1
INTRODUCTION

Since the 1970s, the number of young children who have come in contact with the criminal justice, mental health, family court, and social service systems has grown exponentially raising concerns about children’s abilities to provide complete and accurate reports of past events. A large literature has documented both developmental trends in children’s event memory and the types of interviewing conditions that threaten the accuracy of children’s reports. In particular, children’s suggestibility - their tendency to report false information provided by another individual - has become an important area of research (see Bruck & Ceci, 1999; Ceci & Bruck, 1995 for reviews). One consistent finding in this literature is that younger children are more suggestible than older children and adults. However, within any given age group, a great deal of variability exists in children’s vulnerability to suggestive techniques (e.g., Ceci, Kulkofsky, Klemfuss, Sweeney, & Bruck, 2007; Ceci, Papierno, & Kulkofsky, in press; Chae & Ceci, 2005). Despite a large amount of work in this area, little progress has been made in identifying factors that may explain this variability (see Bruck & Melnyk, 2004 for review). In the present research I investigate the relationship between a new individual difference variable, narrative skill, and children’s suggestibility. In particular, this work examines the contribution of the narrative quality of children’s memory reports to children’s suggestibility as well as to their commission of spontaneous errors.

Narrative Skills and Personal Memory Development

Narrative skill development is often emphasized within the literature on children’s developing memory capabilities, especially with regards to the emergence of autobiographical memory (e.g., Fivush & Reese, 1992; Hudson, 1990; Nelson, 2003; Nelson & Fivush, 2004). Well-developed narratives include more than just a
recounting of a list of past events; rather, high quality narratives cohesively place the event in temporal and physical context as well as provide evaluative information that conveys the meaning and significance of the event (Bruner, 1991; Haden, Haine, & Fivush, 1997; Nelson & Fivush, 2004). Researchers who stress the importance of narrative skills in memory development propose that through sharing memories in conversations with caregivers, children learn to talk about past personal experiences in socially valued ways while at the same time acquiring a coherent form that aids in the retention and retrieval of past events (Hudson, 1990; Nelson & Fivush, 2004).

Importantly, the development of narrative skills is proposed to signal two related processes, one fundamentally social and one fundamentally cognitive. On the social side, as children develop narrative skills they learn how to share memories about the past; that is, the development of narrative skills influences how children talk about their past experiences in social settings. On the cognitive side, children’s developing narrative skills impact what is remembered; that is, the development of narrative skills influences how children think about past experiences. These social and cognitive processes have implications for children’s suggestibility. On the one hand, the social processes associated with narrative skills may cause these skills to be related to increases in suggestibility, while on the other hand, the cognitive processes associated with narrative skills may cause these skills to be related to decreases in suggestibility.

**Social Processes**

From the social perspective, narrative skills enable children’s ability to engage in memory sharing with a social partner, as well as representing their knowledge of what makes a “good story.” Some research with adults suggests that stories told in social settings may be less accurate. For example, Dudukovic, Marsh, and Tversky (2004) found that when adults were asked to provide an amusing account of a
previously read story, their recall was less accurate and more exaggerated compared to adults who were asked to provide a “precise” account. Similarly, Marsh and Tversky (2004) found that adults often report distorting the past in everyday conversations with social partners.

From a developmental perspective, parents who adopt a more narrative-enhancing style when speaking to their children may place less emphasis on the accuracy of their children’s report and more emphasis on promoting social connectedness (Fivush & Reese, 1992). Children may then learn that telling a good story promotes social interaction before they learn that stories told about previously experienced events should generally be accurate portrayals of the past (Neisser, 1988). Children also may be exposed to narratives more often in fictional contexts, such as books, television, movies, and fantasy play, than in the context of talking about previously experienced events (Alexander, Miller, & Hengst, 2001; Sperry & Sperry, 1996), thus, giving children greater practice and exposure to the narrative form without practicing narrative accuracy.

Finally, narrative skills may be related to a number of personality traits, such as sociability, shyness, and creativity, which may also be related to suggestibility. Children who are more sociable and less shy may be more likely to engage in memory sharing activities thus producing higher quality narratives. At the same time, there is some research to suggest that children’s shyness and sociability may be related to suggestibility or memory inaccuracy (Gilstrap & Papierno, 2004; Roebers & Schneider, 2001). Children who are more creative and have a more difficult time distinguishing fantasy from reality may have an easier time producing highly detailed narrative accounts (Clarke-Stewart et al., 2004), and at the same time, there is some evidence that creativity may be associated with suggestibility (Bruck & Melnyk, 2004).
To summarize, young children who are able to provide high quality narratives may be more apt to embellish their memory reports in order to provide a more elaborate memory narrative not to mention a better story. This may be especially true if the memory-sharing partner asks for specific information that the child does not recall. In addition, parents who promote developing narrative skills in their children may be placing less emphasis on the accuracy of their children’s responses. Further, young children may have repeated practice using narratives to talk about events that are fictional in nature. Finally, children’s ability to produce high quality narratives may be associated with other characteristics which have been shown to be associated with suggestibility such as sociability or creativity. For these reasons, children’s ability to produce a high quality narrative may be associated with increased suggestibility.

**Cognitive Processes**

The cognitive perspective on narrative skills provides a contrasting viewpoint. Narrative structure provides an organizational framework that links events together through linguistic and temporal markers while providing increased elaborative information; in turn narrative skills may create “stronger” memory traces. As defined by Pezdek and Roe (1995), “stronger” memory traces are those in which “the original information is retained in an elaborated form in which many of the semantic and formal features are preserved in a richly associated network of representations,” (p. 117). As I have argued elsewhere, this may be especially true of memories stored in elaborate and cohesive narratives (Kulkofsky, Wang, & Ceci, in press). Supporting this view, a number of studies have found that information that is presented in a narrative form is recalled better than information not presented in narratives for example, in unrelated lists of words or sentences (A. L. Brown, 1975; Mandler, 1984; Monaco & Harris, 1978). In addition, children who are better able to produce
elaborate and cohesive narratives, or children who have experienced narrative skills training, are able to provide more information about previously experienced events (D. Brown & Pipe, 2003; Kleinknecht & Beike, 2004; Kulkofsky et al., in press; Saywitz & Snyder, 1996; Saywitz, Snyder, & Lamphear, 1996).

The fact that memories represented in well-developed narratives may be stronger memory traces has implications for suggestibility. A number of theorists have proposed that the strength of the memory trace of the original event influences children’s suggestibility (Brainerd, Kingma, & Howe, 1985; Ceci, Toglia, & Ross, 1988; Enders, Poggenpohl, & Erben, 1999; Marche, 1999; Pezdek & Roe, 1995; Principe, 2004). Specifically, it is assumed that weaker memory traces are more susceptible to distortion than relatively stronger traces. For example, Principe (2004) manipulated trace strength by presenting a list of items only once, or until children reached a criterion level of accuracy in recalling the list. Children were then interviewed repeatedly in a highly suggestive manner. Children who saw the list only once (and presumably had a weaker trace of the original event) were more likely to spontaneously report the suggested items compared to children who saw the list multiple times. Thus, if better narratives represent stronger memory traces, we may expect narrative skills to be associated with resistance to suggestion.

In addition to being related to the strength of the memory trace, narrative skills are related to children’s developing linguistic skills more broadly. The ability to produce narratives requires complex linguistic forms, including the ability to communicate time and temporal sequences, internal states such as thoughts and emotions, and plans and future actions (Nelson & Fivush, 2004). Furthermore, Walkenfeld (2000, cited in Nelson & Fivush, 2004) showed that children’s receptive language skills, measured through the Test of Early Language Development (Hresko, Reid, & Hamill, 1991) predicted a measure of children’s narrative cohesion (one
measure of narrative quality) in a recall task. Particularly relevant to the present study, a number of studies have found relationships between children’s language abilities and suggestibility, with children who have better language skills showing greater resistance to suggestive questioning (Bruck & Melnyk, 2004; Clarke-Stewart, Malloy, & Allhusen, 2004).

To summarize, children’s ability to construct a high quality narrative of a previously experienced event provides an organizational structure which may aid in the long term retention and retrieval of event information. As such, these events are remembered better and may be less susceptible to suggestive influences. Furthermore, children’s narrative skills may be related to general language abilities which have been shown to be associated with reduced suggestibility. For these reasons, then, greater narrative skills may be associated with reduced suggestibility.

**Research on Narrative and Suggestibility**

As outlined above, there are two competing hypotheses with regards to the relationship between narrative skills and suggestibility. However, to date, no studies have explicitly examined the relationship between children’s ability to produce a high quality narrative about a previously experienced event and their suggestibility for that same event. However there are two relevant studies related to the issue which provide preliminary information regarding the relationship between preschool children’s narrative skills and suggestibility.

In one study, Clarke-Stewart, Malloy, and Allhusen (2004) examined a host of individual difference variables to predict suggestibility. Children were asked to watch a short emotion-evoking video and then retell the story from the video to a researcher. Children were given a “story complexity score” that was derived from the number of objective elements included in the account, which Clarke-Stewart et al. used as a measure of narrative skills. They found that children’s scores on this task were
positively related to their suggestibility regarding a different event. In other words, children who told more complex stories in one context were more suggestible in a different context.

Although this study provides evidence that children’s story-telling abilities may be related to their suggestibility, it does not speak to the degree to which children’s ability to create a narrative of a particular event influences later suggestibility when recalling that same event. Since the trace strength hypothesis is based on the representation of a particular event in memory, these results are therefore uninformative about the way in which narrative skills may provide a more structured memory representation and thus a “stronger” memory trace. Furthermore, Clarke-Stewart et al. (2004) utilized only a single measure of narrative quality, namely narrative volume, and thus cannot speak to how other aspects of narrative quality might relate to suggestibility or accuracy.

In another recent study, I and my colleagues (Kulkofsky et al., in press) investigated the relationship between narrative skills and children’s memory accuracy. Preschool children participated in a staged pizza-making game with a research assistant in their schools and were interviewed either one week or one month later. The event in this study included a number of aschematic elements (e.g., the pizza was baked in a “refrigerator” and the research assistant used chopsticks to cut the pizza), designed to increase the difficulty of recall. The children’s interviews were coded for multiple measures of narrative quality (narrative volume, complexity of the child’s statement, and linguistic markers for narrative cohesion) as well as for accuracy. In this case, accuracy was measured by children’s spontaneous errors, not by interviewers providing false information (i.e., suggestibility). We found that the quality of children’s narratives was positively related to recalling more information overall. As the quality of their narratives increased, children reported more accurate
details and inaccurate details. Importantly, as narrative quality increased a greater proportion of the information provided was inaccurate.

Although suggestibility was not considered in our previous research, the results are pertinent to the topic of children’s suggestibility for several reasons. First, because children with higher quality narratives reported more accurate details than children with poorer quality narratives, their narrative skills may have provided for a more elaborate memory representation that aided retention and recall. In this way, children may be less suggestible due to increased memory trace strength. On the other hand, because children with more advanced narrative skills also produced more errors they may have been more willing to confabulate details in order to embellish their accounts. These children, then, may be more likely to incorporate suggestions provided by an interviewer to further embellish and enhance their narratives.

**The Present Research**

Given the conflicting evidence in the literature, direct examination of the quality of the relationship between children’s free-recall narratives and their suggestibility is warranted. The present two studies provide for a direct test of this relationship. In particular, the present studies test whether children’s abilities to produce a high quality narrative about a previously experienced event is related to their susceptibility or resistance to misleading questions about that event.

In both studies, children experienced a visit to their preschool classroom from “Miss Baker” who taught them how to bake cookies. Following Miss Baker’s visit, children were first given the opportunity to produce a free narrative about her visit, and were subsequently suggestively interviewed. Children’s free narratives were coded for multiple measures of narrative quality including volume, complexity, descriptive texture, and narrative cohesion. The goal of both studies was to test the competing hypotheses based on the social and cognitive processes associated with
narrative skill development that narrative quality may be associated with either increased or decreased suggestibility. In addition to examining the relationship between narrative skills and suggestibility, I sought to replicate our previous findings (Kulkofsky et al., in press) that narrative skills would be related to greater inaccuracy with a more realistic event in order to rule out the possibility that the previous results were driven by the fantastical nature of the event. I hypothesized that regardless of the relationship between narrative skills and suggestibility, children who produce higher quality narratives would produce more spontaneous (i.e., not interviewer-driven) errors.
CHAPTER 2
STUDY 1

In Study 1, I examined the relationship between narrative quality and suggestibility after a series of repeated suggestive interviews. I also examined three individual differences: temperament (sociability and shyness), creativity, and fantasy-proneness which may serve as possible mediators between narrative skills and suggestibility. In addition, multiple “types” of suggestibility were measured (e.g., assenting, shifting, or spontaneously producing false items), to examine whether narrative skills may be related to a specific type of suggestibility (see Bruck & Melnyk, 2004).

Method

Participants

Forty-six children (25 female) recruited from local nursery schools and day care centers participated. Their ages ranged from 33 to 66 months ($M = 52.83$ months, $SD = 8.24$ months). The children were predominantly Caucasian ($n = 34$), with a few children of Asian ($n = 5$) and multiethnic ($n = 1$) background participating (the parents of six children failed to report ethnic background). Nine were only children, 9 were first-borns, and 28 were later-borns. The children were predominately from middle- and upper-middle class families and 89% of mothers had at least a college degree. An additional 17 children were dropped from the initial sample for failure to complete the interview protocol. Reasons for failure to complete the interview protocol included: absence when Miss Baker visited the classroom ($n = 5$), extended absences during interviewing period ($n = 4$), refusal to be interviewed by the experimenter ($n = 5$), or a lack of sufficient proficiency with English as determined by the teacher or interviewer ($n = 3$). There were no differences between those who completed the protocol and those who did not regarding child’s age, gender, ethnicity, birth order, or mother’s
education. An additional five children were also excluded from the sample due to interviewer error. Written consent was obtained from each child’s parent or legal guardian prior to the beginning of the study.

**Procedure**

Trained researchers served as the interviewers in each school. One researcher conducted the fantasy-proneness interviews and four repeated suggestive interviews, and a second interviewer conducted the final Test Interviews. Prior to the research sessions, the interviewers visited the children’s classrooms on two to three occasions to establish familiarity. At the conclusion of the study children were fully debriefed. The staged event and the interviews were conducted in the children’s schools. All interviews were audio recorded and transcribed verbatim for further coding. Figure 1 represents an overview of the procedure.

*Staged Event.* Children were visited in their classrooms by a novel visitor “Miss Baker” who engaged them in a cookie baking activity. Miss Baker was a young adult female, unknown to the children in the classroom, who visited them during a group activity time. She was dressed as a baker complete with an apron and chef’s hat. She explained to the children that she was going to be making cookies for her best friend’s birthday and wanted to show the children how she made her special cookies. She proceeded to explain the process of cookie baking, first by showing and labeling the various tools used to bake cookies, and then by explaining each of the ingredients that are used in baking cookies and what they do. Children were given the opportunity to help Miss Baker by adding M&M™ candies to the cookie dough. At the conclusion of the demonstration Miss Baker added salt from a salt-shaker that was rigged so that the lid would fall off. She lamented that she added too much salt and that the cookies were ruined. Children were then given a snack (usually Goldfish Crackers) and stickers by Miss Baker.
Figure 1. Schematic representation of interviews. The top panel represents Study 1, and the bottom panel Study 2. In study 2, the same interviewer conducted all interviews.
Repeated Interviews. Beginning one week after Miss Baker’s visit, children were repeatedly interviewed about the event on four different occasions spaced approximately one week apart. At the beginning of each interview, children were first given an open-ended prompt in which they were asked to describe everything they could remember about when Miss Baker came to visit. The interviewer continued to use neutral prompts such as “What else happened?” and “Tell me more” until the child indicated either verbally or through gesture that he or she could provide no more information.

Following the open-ended prompt the interviewer began with a series of leading and misleading questions which included three true items and five false items (see Table 1 for a list of questions). Questions were presented in a standard fixed order starting with the true items and then continuing to the false items. This order was utilized so that children would begin to develop the expectation that the interviewer was generally correct when presenting the leading items. Each element was presented by saying, “I heard that Miss Baker….Did she do that?” If the child failed to assent, the interviewer continued with a series of increasingly suggestive prompts. First a peer pressure prompt was used (“The other kids told me that Miss Baker….Are you sure Miss Baker didn’t….?”); if the child again failed to assent this was followed by an encouragement to “think real hard.” Finally, if the child still failed to assent he or she was encouraged to pretend that Miss Baker had done the suggested item. The full interview lasted approximately 5 to 10 minutes.

The exact interview protocol was then repeated for three more weeks for a total of four suggestive interviews. The repeated interview design allowed for the possibility for children to incorporate the suggested information into their free recall reports. The number of interviews was chosen to avoid the possibility of children incorporating the suggested items at ceiling levels (see Ceci & Bruck, 1995).
Table 1. *List of leading and misleading items.*

<table>
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<th>True Items:</th>
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<tr>
<td>1. Miss Baker wore a hat.</td>
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<td>2. Miss Baker had a special pan.</td>
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<tr>
<td>3. Miss Baker brought a snack.</td>
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<tr>
<td>4. Miss Baker brought two kinds of sugar for the cookies.</td>
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<tr>
<td>5. Miss Baker didn’t have any eggs so she used baking powder and water instead.</td>
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<th>False Items:</th>
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<tr>
<td>1. Miss Baker wore a yellow apron.</td>
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<tr>
<td>2. Miss Baker brought gummy bears for the cookies.</td>
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<tr>
<td>3. Miss Baker thought it would be fun to add too much salt, so she did it on purpose.</td>
</tr>
<tr>
<td>4. Miss Baker put a sticker on the child’s knee.</td>
</tr>
<tr>
<td>5. Miss Baker let the children eat the cookie dough.</td>
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1These items were presented in Study 2 only.

**Test Interview.** On the fifth week following Miss Baker’s visit, children were interviewed by a new interviewer. The inclusion of the new interviewer was designed to reduce children’s response biases; that is, to reduce the likelihood that they may assent to the suggested items simply because they have built an expectation that this is what the interviewer wants to hear (Ceci, Loftus, Leichtman, & Bruck, 1994). This interviewer explained that she had heard Miss Baker had visited the children’s classroom and that the child had been talking to other people about Miss Baker. The interviewer then provided the same open-ended prompt as in previous interviews. Next, children were asked about each of the five misleading items. In this interview, if children failed to assent they were not encouraged with increasingly suggestive prompts, but rather the interviewer moved on to the next question. If the child had mentioned the suggested item in the free recall portion of the Test Interview this item was not asked.

**Coding**

*Narrative Quality.* Children’s Time 1 open-ended responses were coded for
narrative quality. These interviews represented the quality of the child’s narrative about the event before the interviewer could have tainted their memories and before they had the opportunity to practice talking about the event with the interviewer (which would be the case for all later interviews). Following previous research (Kulkofsky et al., in press), children’s narratives were coded for volume, complexity, descriptive texture, and cohesion.

*Volume* provides a measure of the length of the child’s statement and was indexed by the number of propositions, which were defined as subject-predicate combinations (Han, Leichtman, & Wang, 1998).

*Complexity* represents the degree of detail provided in each statement the child made. It was indexed by words per proposition (Han et al., 1998; Sperry & Sperry, 1996).

*Descriptive Texture* represents the amount of descriptive detail provided in the narrative. It was indexed by the number of descriptive words such as adjectives and adverbs and intensifiers (Han et al., 1998).

*Cohesion* represents the temporal cohesion of the children’s narrative (Buckner & Fivush, 1998; Fivush, Haden, & Adam, 1995; Peterson & McCabe, 1991). It was indexed by uses of simple temporal markers of chronological time (e.g., first, then, next, before); complex markers of conditional states (e.g., if-then statements, until), causal relations (e.g., because, so, in order to), and optional states (e.g., sometimes, usually, probably); and words or phrases that provided temporal context (e.g., last week, yesterday, tomorrow).

For each child, a single narrative quality score was calculated by first computing the standardized z-score for each measure and then summing the z-scores together.¹

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¹ Analyses of each narrative quality variable individually revealed the same pattern of results across all
Suggestibility. Children’s suggestibility was coded at both the initial Time 1 Interview as well as the Test Interview. At the initial interview, children’s assents were coded (Assents Time 1). Children were coded as shifting whenever they initially denied that an event had occurred but then later assented (Shifts Time 1). At the Test Interview, the number of suggested items children spontaneously mentioned during the free recall portion was counted (Free Recall Test) as well as the number of items children assented to (Assents Test). This lead to a total of four suggestibility measures: Assents Time 1, Shifts Time 1, Free Recall Test, and Assents Tests.²

Errors. The number of spontaneous errors produced by children during their Time 1 open-ended responses was summed.

Reliability. Two independent coders coded 20% of the data to assess reliability. The mean percentage agreement was 84% (range = 100% for assigning children’s suggestibility responses to 73% for number of errors). Disagreements were generally oversights and were resolved through discussion. The remainder of the data was coded by a single coder.

Other Child Measures

Temperament. Children’s teachers completed the Emotionality, Activity, and Sociability Temperament Survey for children (EAS, Buss & Plomin, 1984). Teachers rate children on 20 items on a 5-point scale. In the present analyses, we were interested in teachers’ ratings on the sociability (e.g., “When with other children, this child seems to be having a good time”) and shyness (e.g., “Child tends to be shy”) subscales. Children’s scores could range from 5 to 25 for each subscale.

Creativity. Children’s teachers completed a checklist of items adapted from the Checklist of Behavioral Indicators of Creative Strength (Torrance, 1977). The

² The correct leading items were largely included to serve as filler items and are not the concern of the present analyses.
checklist includes 21 items such as, “Speech is colorful and picturesque,” “Loves to draw, paint, sculpt, etc.,” and “Produces solutions for conflicts where there seems to be no logical solution.” Teachers rated children on a 3-point scale with 0 = never observed, 1 = observed occasionally in this child, 2 = observed often in this child. Children’s scores could range from 0 to 42.

**Fantasy-Proneness.** Children’s fantasy proneness was assessed through their understanding of the fantasy-reality distinction. Children completed a fantasy-reality categorization task adapted from Sharon and Woolley (2004) prior to the visit from Miss Baker. Children were shown two trays of different colors. The experimenter explained that one tray was for “real things” and one was for “pretend things.” Placement of the real and pretend trays and their colors were counter-balanced. Children were shown pictures of 13 real and pretend entities (cat, knight, dinosaur, Abraham Lincoln, Superman, dragon, girl, Santa Claus, dog, fairy, Easter Bunny, monster, and clown). They were first asked to identify the entity, and if the child said he or she did not know the experimenter identified and described the picture for the child (e.g., “This is a dragon. Dragons breathe fire”). The first trial was a practice trial (cat) and children were corrected if they made an error. For subsequent trials no feedback was provided. Children received a score for the total number of items they correctly classified. Scores could range from 0 to 12.

**Results and Discussion**

Preliminary analyses found no main effects or interactions with child gender, birth order, ethnicity, maternal education, or testing site on any of the variables of interest. Therefore, these variables are not considered further.

**Descriptive Analyses**

Figure 2 displays children’s responses to each of the five suggested items at test. Shifts were rare and accounted for only 7% of all responses and 13% of all
assents. For this reason, we report assents at Time 1 as function of assents and shifts combined. Assent rates ranged from 30% for placing a sticker on the child’s knee to 83% for adding too much salt on purpose. The mean number of assents was 2.70 (SD = 1.46).

Figure 2. Responses to misleading items in Study 1 at Time 1.

Figure 3 displays children’s responses for each of the five suggested items at the Test Interview. Rates for agreeing to the suggested item (either by freely recalling the item or by assenting) ranged from 56% for letting the children eat the cookie dough to 89% for adding too much salt on purpose. The particularly high assent rate for the purposeful act may reflect children’s difficulty with verbally labeling intentional acts (Baird & Moses, 2001; Piaget, 1932/1997; Smith, 1978). The mean number of items free recalled was 1.22 (SD = 1.19) and the mean number of items assented to was 2.46 (SD = 1.39). The mean number of items either freely recalled or assented to during Test was 3.63 (SD = 1.53). Thus over time children began to incorporate the suggested items into their reports, either by freely recalling them or more readily assenting to them.
Table 2 displays the means and standard deviations for each of the individual difference variables, including each of the 4 components of the narrative quality variable.

Table 2. Means, standard deviations, and ranges for individual difference measures.

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<th>Measure</th>
<th>M</th>
<th>SD</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Narrative</strong></td>
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<td></td>
<td></td>
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<tr>
<td>Volume</td>
<td>6.11</td>
<td>4.37</td>
<td>0-19</td>
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<tr>
<td>Complexity</td>
<td>5.86</td>
<td>2.20</td>
<td>0-10.32</td>
</tr>
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<td>Descriptive Texture</td>
<td>3.74</td>
<td>2.82</td>
<td>0-12</td>
</tr>
<tr>
<td>Cohesion</td>
<td>1.59</td>
<td>2.11</td>
<td>0-8</td>
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<td>3.49</td>
<td>-6.13 – 9.51</td>
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<td>Shyness</td>
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<td>7-21</td>
</tr>
<tr>
<td>Sociability</td>
<td>18.54</td>
<td>2.41</td>
<td>11-22</td>
</tr>
<tr>
<td>Creativity</td>
<td>26.02</td>
<td>10.41</td>
<td>4-40</td>
</tr>
<tr>
<td>Total Fantasy-Reality Score</td>
<td>6.87</td>
<td>1.65</td>
<td>2-10</td>
</tr>
</tbody>
</table>
Children made few spontaneous errors during their free narratives. The mean number of spontaneous errors was .30 ($SD = .63$) with the maximum number of spontaneous errors for any individual child being 2.

**Relations between Suggestibility Accuracy, and Individual Difference Measures**

Table 3 presents the Pearson correlations between each of the individual difference measures and suggestibility and accuracy as well as child age measured in months. Children’s assents at Time 1 were significantly negatively associated with narrative quality score and age. Children with lower narrative quality scores and younger children assented to more of the false items.

Assenting at Test was significantly related to age, narrative quality, and assenting at the Time 1 interview. Younger children, children with poorer quality narratives, and children who assented to more items at Time 1, assented to more of the items at the Test Interview. Children’s free recall of the suggested items was significantly related to spontaneous errors, with children who produced more spontaneous errors being more likely to freely recall the suggested items at Test. There was also a marginally significant negative relationship between assenting at Test and freely recalling items at Test, which is likely the result of these two measures being mutually exclusive (items that were freely recalled were not asked about in the direct questions).

Children’s spontaneous errors were significantly related to age, with older children providing more spontaneous errors than younger children. Marginally significant correlations emerged between spontaneous error and narrative and creativity, with children who produced higher quality narratives and higher creativity scores producing more spontaneous errors.

Children’s narrative quality scores were positively related to age, with older children producing better narratives. Although I had hypothesized that narrative
Table 3. Pearson correlation coefficients for all measures in Study 1 including age

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<th>7.</th>
<th>8.</th>
<th>9.</th>
<th>10.</th>
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<tr>
<td><strong>Suggestibility/Accuracy Measures</strong></td>
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<td></td>
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<tr>
<td>1. Assents Time 1</td>
<td>.40++</td>
<td>.23</td>
<td>.13</td>
<td>-.15</td>
<td>-.36+</td>
<td>-.18</td>
<td>.15</td>
<td>.06</td>
<td>-.03</td>
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<tr>
<td>2. Assents Test</td>
<td>--</td>
<td>-.28+</td>
<td>-.09</td>
<td>-.35++</td>
<td>-.49+++</td>
<td>-.01</td>
<td>-.02</td>
<td>.10</td>
<td>.14</td>
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<td>--</td>
<td>.34+</td>
<td>.27+</td>
<td>-.04</td>
<td>.14</td>
<td>.25+</td>
<td>.08</td>
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<tr>
<td>5. Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.45**</td>
<td>-.10</td>
<td>.04</td>
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<td>6. Narrative Quality Score</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>-.01</td>
<td>.07</td>
<td>.05</td>
<td>.08</td>
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<td>7. Shyness</td>
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<td></td>
<td></td>
<td>-.66+++</td>
<td>-.56+++</td>
<td>-.11</td>
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<td>8. Sociability</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.54**</td>
<td>.01</td>
<td></td>
<td></td>
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<tr>
<td>9. Creativity</td>
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<td></td>
<td></td>
<td></td>
<td>.17</td>
<td></td>
<td></td>
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<tr>
<td>10. Fantasy-Reality Score</td>
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</tr>
</tbody>
</table>

*p < .10; **p < .05; +++p < .01, ++++p < .001
quality scores may be related to the other child measures, none of these measures were significantly related to narrative quality. Indeed, although some of these measures were related to age or each other, they were not related to any measure of children’s memory responses.

**Narrative as an Independent Predictor of Suggestibility**

The main question of this study was whether the quality of children’s narratives predicted suggestibility. The results of the correlational analyses suggest that the quality of children’s narratives protected them from suggestive influences by reducing the number of items they assented to at the Test Interview. However, narrative quality also related to child age. It is possible then, that narrative quality was related to assents at Test simply because of this relationship with age. That is, as noted in the introduction, a large body of research suggests that younger children are more susceptible to suggestion than older children and adults, and thus children’s narrative skills may only protect from suggestion insofar as they covary with age.

To test this possibility, a hierarchical linear regression predicting assenting at Test was conducted. At step 1, age and assenting at Time 1 were entered as predictors of suggestibility. At step 2, narrative quality was added to the model. The goal of this analysis was to ascertain a) whether narrative quality scores remained a significant predictor when controlling for age and assenting at the original interview and b) whether adding narrative to the model adds additional predictive ability to the model.

The results of the hierarchical linear regression are displayed in Table 4. The first model, excluding narrative, was significant, $F(2, 43) = 6.96, p < .01$. Both age and assenting at the first interview remained significant independent predictors of assenting at Test. When narrative was added to the model, the model remained significant, $F(3, 42) = 6.60, p < .01$. Importantly, narrative quality scores proved to be a significant independent predictor of children’s assents, however age no longer
independently predicted assenting, and assenting at Time 1 was reduced to a marginally significant predictor of assenting at Test. In addition, the change in $R^2$ by adding narrative quality scores to the model, was also significant, $\Delta R^2 = .06$ $F(1, 42) = 4.70, p < .05$. These results suggest that first, narrative skills are a unique predictor to children’s suggestibility, and second, that narrative skills may actually mediate the relationship between children’s suggestibility and age.

Table 4. *Hierarchical linear regression predicting assents at Test from assents at Time 1, age, and narrative.*

<table>
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<th>$t$</th>
<th>$R^2$</th>
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</thead>
<tbody>
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<td></td>
<td>.24**</td>
</tr>
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<td>Assent Time 1</td>
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<td>2.63*</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>-.30</td>
<td>2.21*</td>
<td></td>
</tr>
<tr>
<td>Model 2:</td>
<td></td>
<td></td>
<td>.32**</td>
</tr>
<tr>
<td>Assents Time 1</td>
<td>.26</td>
<td>1.88*</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>-.16</td>
<td>1.14</td>
<td></td>
</tr>
<tr>
<td>Narrative</td>
<td>-.33</td>
<td>2.17*</td>
<td></td>
</tr>
</tbody>
</table>

$^+ p < .10, ^* p < .05, ^{**} p < .01$

Summary and Conclusions

Taken together, these results suggest that narrative skills protect children from assenting to misleading questions; this relationship emerged both at the initial interview and following repeated suggestive interviews. These relationships are not mediated by age, or by any other measured individual difference. These findings are consistent with the memory trace strength hypothesis, and further support the hypothesis that narrative forms represent stronger, more elaborated, memory traces.
The other child measures (temperament, creativity, and fantasy-proneness) appeared to have little relationship to suggestibility. Although some past work has suggested that shyness and sociability may be related to suggestibility these findings are far from being unequivocal, and a number of other studies have found no relationships between suggestibility and these measures (see Bruck & Melnyk, 2004 for review). With regard to creativity and fantasy-proneness, again the results of previous research appear to be somewhat equivocal, with stronger findings associating creativity to false reports of imagined events rather than to responses to misleading questions (Bruck & Melnyk, 2004). Although I did not find a relationship between creativity or fantasy-proneness and children’s spontaneous recall of false items, I also counted the number of false items children were able to provide additional information about at Test either once they assented or after they freely recalled the item. This measure was significantly related to children’s teacher-rated creativity scores ($r = .39$, $p < .01$), and was unrelated to any other measure.

In addition, narrative skills showed a marginally significant relationship with spontaneous errors. The fact that this relationship did not reach traditional levels of statistical significance may reflect the fact that overall errors were rare in this sample. Still, children who produced higher quality narratives were producing more errors, in line with past work (Kulkofsky et al., in press). Interestingly, creativity was also marginally related to spontaneous errors. Given the low correlation between narrative quality and creativity scores, it is unlikely creativity may explain the relationship between narrative quality and errors and vice versa. As suggested in past research (Kulkofsky et al., in press), because narrative quality scores include measures of verbosity it may be indicative of poor monitoring abilities; thus children may be more likely to produce spontaneous errors because they are not monitoring the accuracy of their output. Children who are more creative, may be better able to produce
information that can “fill in the blanks” in their memories in order to produce more elaborate, entertaining, or complete stories.

Although these results provide compelling evidence that narrative skills are an important individual difference variable predicting reduced assenting to misleading questions, the mechanism driving this relationship is not clear from the present data. Although the findings are consistent with the memory trace strength hypothesis, another possibility is that general language skills may be driving this effect. As noted in the general introduction, past work has shown that language skills also serve as a protective factor against misleading questions (Bruck & Melnyk, 2004; Clarke-Stewart et al., 2004). Presumably, children with more advanced language skills may be better able to comprehend interview questions and respond appropriately, contributing to reduced suggestibility. From the present data we cannot rule out this explanation. In addition, the memory trace strength hypothesis would appear to suggest that it is the narrative of the specific event that is important, not children’s general narrative abilities. In the present study we do not know whether it is the specific narrative or general narrative abilities that are driving this effect.
CHAPTER 3

STUDY 2

The results of Study 1 indicated that children’s narrative skills serve as a protective factor against suggestive questioning. The protective quality of narrative skills may reflect the fact that these children have a stronger, more elaborate memory trace of the original event, and are consequently more resistant to suggestion. Conversely, narrative skills may be a marker for general language ability. Therefore, in Study 2 a measure of children’s language skills was utilized.

In addition to children’s general language ability, children’s general narrative skills were measured through the production of an unrelated past narrative. This measure assesses whether children’s narrative skills broadly protect them from suggestive questioning, or if it is the narrative about the specific event that is important. If the memory trace strength explanation for the positive benefits of narrative is correct, then narratives about the specific event should be most important. Given Clarke-Stewart et al.’s (2004) finding that narrative volume measured in a different event predicted increased suggestibility, it was expected that the present findings would be applicable only to narratives related to the specific event the child is being questioned about.

Because narrative predicted reduced suggestibility at the first interview and the relationships between narrative and suggestibility did not appear to change as a function of repeated suggestive interviews in Study 1 (i.e., narratives predicted assenting at both Time 1 and Test, and did not predict spontaneous mentions of suggested items), in Study 2, children were only exposed to a single suggestive interview, thus there were no repeated or test interviews.
Method

Participants

Sixty-six children (42 female) recruited from local nursery schools and day care centers participated. Roughly 41 percent \((n = 27)\) were recruited from public (cost-free) pre-K programs, with the remainder recruited from private centers and programs. Their ages ranged from 36 to 72 months \((M = 48.80 \text{ months}, SD = 7.75 \text{ months})\). The children were predominantly Caucasian \((n = 48)\), with a few children of Asian \((n = 1)\), African-American \((n = 5)\), and multiethnic \((n = 6)\) background participating (the parents of six children failed to report ethnic background). Five were only children, 16 were first-borns, and 38 were later-borns (the parents of seven children did not report their birth order). The children were predominately from middle- and upper-middle class families; however, because children were also recruited from public pre-K programs a greater proportion of mothers did not have a college degree (28%) compared to Study 1. An additional 15 children were initially included in the sample, but were dropped for failure to complete the protocol. Reasons for failure to complete the interview protocol included: absence when Miss Baker visited the classroom \((n = 7)\), refusal to be interviewed by the experimenter \((n = 1)\), lack of sufficient proficiency with English as determined by the teacher or interviewer \((n = 3)\), or speech problems which required intervention from a speech pathologist \((n = 4)\). Children who failed to complete the protocol were more likely to be only children and more likely to be Asian than children in the complete sample. Five children were also dropped due to interviewer error. Written consent was obtained from each child’s parent or legal guardian prior to the beginning of the study.

Procedure

As in Study 1 trained researchers conducted the interviews. A single researcher conducted all interviews (Autobiographical Memory and Suggestive). Prior to the
research sessions, the interviewer visited the children’s classrooms on two to three occasions to establish familiarity. At the conclusion of the study children were fully debriefed. The staged event and the interviews were conducted in the children’s schools. Figure 1 presents the overview of the design of Study 2.

*Staged Event.* The staged event was identical to Study 1.

*Suggestive Interview.* The suggestive interview followed a similar format to the repeated interviews in Study 1. Because of concerns that the blocking of misleading items may have caused them to become too salient, thus causing children to notice the suggestive nature of the interview, two additional correct leading items were added to the interview (see Table 1) and questions were arranged in a standard order in which correct leading and misleading items were intermixed. Children completed only one suggestive interview. (There were no repeated interviews or Test Interview.)

*Autobiographical Memory Interview.* In order to test children’s general narrative skills, children completed an autobiographical memory interview adapted from Han, Leichtman, and Wang (1998) prior to the visit from Miss Baker. Children were asked to provide narratives of recently experienced past events, according to a list of five questions. These questions included everyday (e.g., “What did you do before bed last night?”) and one-time only events (“What did you do on your last birthday?”). See Appendix A for a list of the five specific questions. Children were prompted neutrally for each question until the child indicated either verbally or through gesture that he or she could remember nothing else.

**Coding**

*Narrative Quality.* Both children’s free responses to the open-ended prompt during the suggestive interview as well as children’s autobiographical memory narratives were coded for narrative quality using the same measures as in Study 1. As in Study 1 children received a single *Narrative Quality* score for both interviews.
Suggestibility. Suggestibility was coded in the same manner as the Time 1 interviews in Study 1. Each child received an Assents score as well as a Shifts score.

Errors. As in Study 1, children’s free narratives about Miss Baker were coded for the incidence of spontaneous errors.

Reliability. Two independent coders coded 20% of the data to assess reliability. The mean percentage agreement was 83% (range = 90% for number of words to 75% for number of descriptive elements). Disagreements were generally oversights and were resolved through discussion. The remainder of the data was coded by a single coder.

Language Measure

Children’s teachers completed the Adaptive Language Inventory (ALI, Feagans & Farrans, 1997) for each child. The ALI consists of 18 items tapping comprehension (e.g., “Works well with instructional materials when placed on his/her own with little or no help from you”), production (e.g., “Relates and communicates personal experiences in a logical way”), rephrasing (e.g., “Responds to questions asked of him/her in a thoughtful way”), spontaneity of speech (e.g., “Talks spontaneously and easily to peers”), listening skills (e.g., “Is a good listener in conversations with peers”), and fluency (e.g., “Is easily understood when he/she is talking to peers”). Teachers rate children on each item using a 5-point scale ranging from 1 = Well Below Average to 5 = Well Above Average. Children received a total score which was derived as their average score across all items (theoretical range 1-5). Previous work has shown that scores on the ALI are related to resistance to suggestive questioning (Clarke-Stewart et al., 2004).

Results and Discussion

Preliminary analyses found no main effects or interactions with child gender, birth order, ethnicity, maternal education, or testing site for the variables of interest;
therefore these variables are not considered further. Due to failure of the recording equipment, one child did not have an autobiographical narrative memory score, and thus was dropped from analyses including this measure.

**Descriptive Analyses**

Figure 4 displays children responses to each of the five suggested items. As evidenced in Figure 3, shifting was more common in Study 2, accounting for 13% of all responses and 21% of all assents. For this reason, we report results separately for assenting and shifting, in addition to looking at combined scores (referred to as total assents). Overall, assenting and shifting were more common in Study 2 compared to Study 1. Total assent rates ranged from 45% for allowing the children to eat the cookie dough to 82% for adding too much salt on purpose. The mean number of assents was 2.39 ($SD = 1.41$) and the mean number of shifts was .65 ($SD = .89$), with the mean number of total assents as 3.05 ($SD = 1.49$). The increase in assenting, and particularly in shifting, may reflect the slight procedural changes to Study 2 making the misleading items less salient and thus children less “on guard” against them.

![Figure 4. Responses to the misleading items in Study 2.](image-url)
Table 5 displays the means and standard deviations for narrative quality scores for both the staged Miss Baker event (*Event Narrative*) and the autobiographical narrative task (*Autobiographical Narrative*), as well as for children’s ALI scores. Because the autobiographical narratives required children to talk about multiple events, these narratives were longer and included more descriptive and cohesive elements than the event narratives. There was also a greater degree of variability in children’s autobiographical narratives. The average score on the ALI was close to the theoretical average of 3.

Table 5. *Means, standard deviations, and ranges for narrative variables and language measure*

<table>
<thead>
<tr>
<th>Measure</th>
<th>$M$</th>
<th>$SD$</th>
<th>Range</th>
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<tbody>
<tr>
<td><strong>Event Narrative</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Volume</td>
<td>6.06</td>
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<tr>
<td>Complexity</td>
<td>4.71</td>
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<td>0-8.43</td>
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<td>Descriptive Texture</td>
<td>2.59</td>
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<tr>
<td>Cohesion</td>
<td>1.12</td>
<td>1.85</td>
<td>0-7</td>
</tr>
<tr>
<td><strong>Narrative Quality Score</strong></td>
<td>0.00</td>
<td>3.35</td>
<td>-4.84-8.96</td>
</tr>
<tr>
<td><strong>Autobiographical Narrative</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Volume</td>
<td>35.81</td>
<td>27.59</td>
<td>2-116</td>
</tr>
<tr>
<td>Complexity</td>
<td>4.72</td>
<td>1.126</td>
<td>2-7.81</td>
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<td>Descriptive Texture</td>
<td>5.88</td>
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<tr>
<td>Cohesion</td>
<td>7.52</td>
<td>9.52</td>
<td>0-39</td>
</tr>
<tr>
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<td>3.41</td>
<td>-5.24-10.51</td>
</tr>
<tr>
<td>ALI Score</td>
<td>3.17</td>
<td>0.54</td>
<td>1.94-5.00</td>
</tr>
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</table>

Like Study 1, children made few spontaneous errors during their free narratives. The mean number of spontaneous errors was $.41 (SD = .72) with the maximum number of spontaneous errors for any individual child being 3.
Relations between Suggestibility, Accuracy, Narrative, and Language

Table 6 presents the Pearson correlations between the narrative and language measures, suggestibility and accuracy, and child age measured in months. Children’s assents were significantly negatively associated with event narrative and ALI score. Children who produced poorer event narratives and who scored lower on the ALI were more likely to assent. There was a modest, negative relationship with age, however this relationship did not reach traditional levels of statistical significance (p = .11, two-tailed). Children’s shifts were significantly associated with autobiographical narrative scores, with children producing higher quality autobiographical narratives shifting more. Shifts were also marginally negatively associated with assents, which is likely the result of these two measures being mutually exclusive. Total assent rates were significantly related only to ALI scores. Although neither autobiographical narratives nor event narratives were significantly related to total assents, it is interesting to note that the correlations were in an opposite direction.

Children’s spontaneous errors were significantly associated with children’s event narratives, with children who provided higher quality event narratives producing more spontaneous errors. Unlike Study 1, there was no relationship between errors and age, suggesting perhaps that the relationship uncovered in Study 1 was tenuous at best.

Children’s event narratives were significantly positively related to children’s autobiographical narratives, suggesting that there is some stability in children’s ability to produce narrative accounts of past events. Both event narratives and autobiographical narratives were associated with ALI scores, indicating that children who produced higher quality narratives in both contexts were rated by their teachers as having more advanced language abilities. Unlike Study 1, narrative quality scores were not related to age.
Table 6. Pearson correlation coefficients between all measures in Study 2 including age

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<td>1. Assents</td>
<td>-.22$^+$</td>
<td>.82$^{***}$</td>
<td>- .19</td>
<td>-.28$^*$</td>
<td>-.06</td>
<td>-.27$^*$</td>
<td>-.20</td>
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<td>2. Shifts</td>
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<td>.04</td>
<td>.12</td>
<td>.25$^*$</td>
<td>-.12</td>
<td>.06</td>
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<td>--</td>
<td></td>
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<td>-.19</td>
<td>.10</td>
<td>-.33$^{**}$</td>
<td>-.20</td>
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<td>4. Spontaneous Errors</td>
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<td>.28$^*$</td>
<td>.08</td>
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Narrative and Language Measures

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<tbody>
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<td></td>
</tr>
<tr>
<td>5. Event Narrative</td>
<td>--</td>
<td>.58$^{***}$</td>
<td>.28$^*$</td>
</tr>
<tr>
<td>6. Autobiographical Narrative</td>
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<td>.28$^*$</td>
</tr>
<tr>
<td>7. ALI</td>
<td></td>
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</tbody>
</table>

8. Age  --

$^+$ $p < .10$, $^* p < .05$, $^{**} p < .001$

Note. Total Assents refers to assents and shifts combined.
Narrative as an Independent Predictor of Suggestibility

The main question of Study 2 was to examine whether the quality of children’s narratives predict resistance to suggestion above what children’s general language abilities predict. In addition, I wanted to test whether children’s event narratives in particular predict resistance to suggestions above children’s general narrative skills. Separate analyses were conducted for assenting, shifting, and total assents.

As in Study 1, hierarchical linear regression analyses were conducted. At step 1, age and ALI scores were entered. At step 2, autobiographical narrative was added to the model; this assessed whether general narrative skills predict suggestibility when controlling for language abilities and age. At step 3, event narrative was added to the model; this measured whether producing a particularly high quality narrative about a specific event was related to suggestibility for that event, when controlling for general language and narrative skills.

The results of the hierarchical linear regression are displayed in Table 7. Looking first at assents, the first model, including both ALI and age was significant $F(2, 62) = 3.17, p < .05$. ALI scores were a marginally significant predictor of assenting ($p = .05$). At step 2, when autobiographical narrative was added to the model, the model was no longer significant, although ALI scores remained a marginally significant predictor ($p = .06$). At step 3, when event narrative was added to the model, the model was again significant, $F(4, 60) = 3.00, p < .05$. Event narrative proved to be the only independent significant predictor of children’s assents, although ALI score remained as a marginally significant predictor ($p = .09$). In addition, adding event narrative to the model, significantly increased $R^2$, $\Delta R^2 = .06, F(1, 60) = 4.11, p < .05$. For shifts, no model proved to be significant, although autobiographical narrative remained a significant independent predictor of shifting, with children who produced higher quality autobiographical narratives making more shifts.
Table 7. Hierarchical linear regression predicting assets and shifts from age, ALI score, autobiographical narrative and event narrative

<table>
<thead>
<tr>
<th>Variable</th>
<th>Assets</th>
<th></th>
<th></th>
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<tr>
<td></td>
<td>$\beta$</td>
<td>$t$</td>
<td>$R^2$</td>
<td>$\beta$</td>
<td>$t$</td>
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<td></td>
<td></td>
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<tr>
<td>Age</td>
<td>-.15</td>
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<td>.09*</td>
<td>.07</td>
<td>.57</td>
<td>.02</td>
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<tr>
<td>ALI</td>
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<td></td>
<td>-.13</td>
<td>1.03</td>
<td></td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>-.15</td>
<td>1.18</td>
<td>.09</td>
<td>.08</td>
<td>.64</td>
<td>.11*</td>
</tr>
<tr>
<td>ALI</td>
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<td>1.92*</td>
<td></td>
<td>-.22</td>
<td>1.72*</td>
<td></td>
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<tr>
<td>Autobiographical Narrative</td>
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<td>.15</td>
<td></td>
<td>.31</td>
<td>2.44*</td>
<td></td>
</tr>
<tr>
<td>Model 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>-.11</td>
<td>.37</td>
<td>.15*</td>
<td>.08</td>
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<td>.11</td>
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<tr>
<td>ALI</td>
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<td></td>
<td>-.22</td>
<td>1.68*</td>
<td></td>
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<tr>
<td>Autobiographical Narrative</td>
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<td>1.23</td>
<td></td>
<td>.32</td>
<td>2.07*</td>
<td></td>
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<tr>
<td>Event Narrative</td>
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<td>2.03*</td>
<td></td>
<td>-.01</td>
<td>.08</td>
<td>-.29</td>
</tr>
</tbody>
</table>

$^{+}p < .10$, $^{*}p < .05$, $^{**}p < .01$
The results are most striking for total assents. At step 1 the model was significant, $F(2, 62) = 3.94, p < .05$, and ALI scores were a significant negative predictor of assenting. The model was also significant at step 2, when autobiographical narrative was added, $F(3, 61) = 3.98, p < .05$. Again ALI score was a significant negative predictor of suggestibility, although autobiographical narrative was not a significant independent predictor. Finally, in step 3, with event narrative added, the model was significant, $F(4, 60) = 3.86, p < .01$. ALI score and event narrative was both significant negative predictors of assenting, while autobiographical narrative was a positive predictor of assenting. Adding event narrative to the model resulted in a significant increase in $R^2$, $\Delta R^2 = .06$, $F(1, 60) = 4.06, p < .05$.

**Summary and Conclusions**

Children’s narrative skills appear to be related to suggestibility, independent of children’s general language skills. Importantly, it appears that children’s narratives about the event they are being questioned about and their general ability to produce a narrative about past events are differentially related to their suggestibility. Although these two measures are correlated with each other, indicating some degree of stability in narrative skills across event contexts, children who can produce a high quality narrative of a past event are less likely to assent to misleading information about that event, while controlling for general language and narrative skills. However, children who are able to produce high quality narratives about other past events appear to be more likely to assent to misleading information, and particularly more likely to shift from denying to assenting.

The findings that high quality event narratives are negatively associated with assents to misleading information replicate the results of Study 1, providing additional evidence that memory trace strength may play an important role in children’s ability to resist suggestion. These results suggest that memories that are represented as elaborate
narratives are more easily retained and retrieved and are thus more resistant to distortion.

In contrast, the findings that children’s general narrative abilities, measured in the autobiographical narrative, are associated with increased suggestibility is consistent with previous research (Clarke-Stewart et al., 2004). Given that narrative skills appear to develop through conversations with caregivers and other adults (Fivush, Reese, & Haden, 2006; Hudson, 1990; Reese & Farrant, 2003), this finding may reflect a tendency by children with more advanced narrative skills to treat memory sharing as a socially mediated activity, whereby both partners are actively involved in constructing a story of past events. This interpretation is bolstered by the association between autobiographical narratives and shifting. Shifting from denial to assent may reflect children’s desire to integrate the interviewers’ story with their own account. Anecdotally, this appeared to often happen with shifts. For example, when one child who initially denied being allowed to eat the cookie dough was told that other children had reported that Miss Baker let them eat the cookie dough, she replied “Well, she did let the other kids but not me.” Another child initially denied that Miss Baker had put a sticker on her knee by saying, “She put the sticker on our hands,” but when pressured further claimed “Oh yeah, she put some on our knees and some on our hands.” Another child who initially denied that Miss Baker put a sticker on her knee later claimed, “Well she did, but I took it off.” These examples appear to reflect children’s desire to integrate their own accounts with the accounts of their social partner.

Again, as in Study 1, I replicated the finding that children who produced higher quality narratives also made more spontaneous errors. Spontaneous errors appeared to be slightly more common in Study 2, and the relationship between errors and narrative did reach traditional levels of statistical significance. The relationship between
spontaneous errors and autobiographical narratives, although positive, was non-significant. This suggests that the relationship is not a function of children’s general narrative ability, but rather is specific to the narrative in which the errors occur.
CHAPTER 4
GENERAL DISCUSSION

The goal of the present research was to investigate the impact of young children’s narrative skills on their suggestibility and memory accuracy. In particular, this study tested the two competing hypotheses that narrative skills may be associated with either increased suggestibility or decreased suggestibility. The results of the present two studies provide evidence for both hypotheses. In both Studies 1 and 2, children’s likelihood of assenting to misleading questions about an event was decreased when children provided a high quality narrative of that event. In Study 2, however, children’s rates of assent to suggested items, and particularly their rates of shifting from denial to assenting, were positively related to children’s ability to provide a high quality narrative about other past events. These results suggest that narrative skills may be an important individual difference factor for predicting suggestibility. A secondary goal of the present research was to replicate a previous finding that higher quality narratives were associated with producing more spontaneous errors. Although spontaneous errors were relatively rare, in both studies increases in narrative quality were associated with a greater number of errors.

Mechanisms for Suggestibility

Although the present findings on their face may seem contradictory, they may actually reflect multiple mechanisms for suggestibility. Elsewhere, authors have suggested that both cognitive and social factors may influence children’s responses to suggestive questions (Bruck, Ceci, & Melnyk, 1997; Bruck & Melnyk, 2004). Here, narrative skills may reflect both of these types of mechanisms; thus, depending on how narrative skills are measured the relationship with suggestibility differs.

These findings support the hypothesis that stronger memory traces are more resistant to suggestion (Brainerd et al., 1985; Ceci et al., 1988; Enders et al., 1999;
Marche, 1999; Pezdek & Roe, 1995; Principe, 2004), in that memories represented in narrative forms may reflect stronger memory traces and these memories were associated with lower assent rates to misleading questions. Importantly, this factor is context specific, although influenced by children’s general linguistic skills, it is the production of the narrative about the specific event that appears to be important for protecting against suggestibility. These findings mirror other work showing that children’s general memory abilities do not predict suggestibility (Bruck & Melnyk, 2004; Clarke-Stewart et al., 2004; Eisen, Goodman, Qin, & Davis, 2002).

The present results do not address the causal relationship between narrative production and memory trace strength. It may be that children who have “stronger” memories are more likely to produce elaborate narratives. Conversely, it could be that the act of producing an elaborate narrative cements the memory trace, making it stronger and thus more resistant to suggestion. This second hypothesis is favored by research showing that how memories are shared influences later retellings (Dudukovic et al., 2004; Marsh, Tversky, & Hutson, 2005) and that training children to produce a more elaborate narrative increases the amount of information they can recall (D. Brown & Pipe, 2003; Saywitz & Snyder, 1996; Saywitz et al., 1996). It may be possible that training children to provide higher quality narratives may reduce their suggestibility.

The results also support the hypothesis that children may be sensitive to social aspects of the interviewing context, and may agree with misinformation for reasons other than because of genuine memory errors. That autobiographical narratives were specifically associated with shifting from denial to assent further supports this assertion. When the interviewer expressed that her viewpoint was different from the child’s it was those children who displayed greater narrative skills in their autobiographical narratives who were more likely to shift. This interpretation suggests
that narrative skills may serve as a marker for other child characteristics such as theory of mind or pragmatic understanding of conversational rules which might mediate this effect. Future research utilizing these individual difference measures is warranted.

**Explaining Age Differences in Suggestibility**

As noted in the introduction, age has long been considered the best predictor of suggestibility, yet the mechanisms that underlie these developmental trends have largely been unexplained (Ceci et al., 2007; Ceci et al., in press; Siegler, 2004). Children’s narrative skills appear to be not only a reliable individual difference factor - which considering the paucity of reliable individual difference factors to date is a feat in itself - they also appear to possibly explain age-related changes in suggestibility. In Study 1, the effects of age on assenting appear to be mediated by narrative skills. When narrative skills were added to the model, age no longer significantly predicted suggestibility. In Study 2, age was not significantly related to either narrative skills or suggestibility, possibly due to age differences between the two studies (children in Study 1 were significantly older on average), violating requirements for mediation (see Baron & Kenny, 1986). Still, adding children’s event narratives to the model did reduce the regression coefficient for age by more than half.

This leads to the exciting possibility that the development of narrative skills may partially explain developmental differences in suggestibility. Narrative skills develop across the preschool years and into childhood (Fivush et al., 1995; Haden et al., 1997; Hudson & Shapiro, 1991; Van Abbema & Bauer, 2005). Very young preschoolers have great difficulty producing an elaborate and completely unscaffolded account of past events. Furthermore, as children reach adolescence their narratives become further elaborated and integrated with a developing life narrative (Habermas & Bluck, 2000). Thus the developmental pattern seen for narrative skills appears to mirror developmental patterns in autobiographical memory, with the youngest
children being most suggestible and adolescents reaching levels of suggestibility similar to adults. Future research employing developmental designs with greater age ranges should be employed to further validate this conclusion.

**Does the “Type” of Suggestibility Matter?**

Although we tested multiple types of suggestibility in Study 1, the relationship between narrative skills and suggestibility appear to be limited primarily to a specific type of suggestibility, namely children’s assents and shifts to misleading questions. This is generally referred to as *interrogative suggestibility* (Gudjonsson & Clark, 1986; Scullin & Ceci, 2001; Scullin, Kanaya, & Ceci, 2002). Although it is a forensically relevant measure of suggestibility, interrogative suggestibility is not the only way suggestibility may be measured. The present study also examined misinformation effects or the degree to which children incorporate false information into later reports about a target event (Bruck & Melnyk, 2004). The findings showed misinformation effects were unrelated to children’s narrative skills in that there was no relationship between children’s free recall of the suggested items and narrative quality score. Further, the present results do not speak to another type of suggestibility, false event creation, whereby an entirely false narrative of an event that never occurred is elicited through suggestive techniques (Bruck & Melnyk, 2004). Given that there is no original memory trace to reduce suggestibility in false event creation, and further that children who produce higher quality narratives about other events were more prone to assenting and shifting, it is likely that children’s narrative skills may be positively related to false event creation. Indeed, research has shown that false narratives tend to be more elaborate and detailed than true narratives (Bruck, Ceci, & Hembrooke, 2002; Powell, Jones, & Campbell, 2003; Principe & Ceci, 2002). Future research is warranted to test this hypothesis. Regardless, these findings suggest that mechanisms underlying varying types of suggestibility may differ and thus different individual
difference variables may explain these different types of suggestibility.

**Narrative and Accuracy**

The present results also showed that even when reporting a realistic, non-fantastical event, children who produced higher quality narratives made more spontaneous errors. The results further suggest that it is not simply children’s general verbosity that is driving this effect as autobiographical narratives were unrelated to error production. Given that these children were also more resistant to suggestion, it is not likely that these errors reflect genuinely poor memory. It is possible that the children who produce better narratives are striving to produce a complete and elaborate account of a past event and thus may be monitoring the accuracy of their output less or possibly confabulating details in order to fill gaps in their memory. Future work is needed to clearly explain the mechanism driving this effect.

**Conclusions**

Narrative skill appears to be an important individual difference variable in predicting children’s suggestibility and memory accuracy. Children who produce better narratives about a previously experienced past event are more resistant to assenting to misleading questions about that event, yet are, at the same time more prone to producing their own spontaneous errors about the event. Thus, it appears that narrative skills are in some ways a double-edged sword; they are on the one hand a protective factor for reducing assents while on the other a possible detriment to the accuracy of children’s responses. Identifying the mechanism which drives the narrative-accuracy trade-off may help to develop further techniques to improve children’s resistance to suggestion while at the same time decreasing their error rates. These results also further highlight the important role that the development of narrative skills serves in children’s developing memory capabilities. The stories that children tell about past events tell us a great deal about their memories. They indicate
the strength of the underlying memory representation, the accuracy of the content provided, and the child’s awareness that remembering is a socially constructed process.
APPENDIX

List of Autobiographical Memory Questions

1. Can you tell me what you did before bedtime last night? Tell me everything you did after dinner until you went to sleep last night.

2. Now can you tell me everything you did when you woke up this morning? Tell me everything you did from the time you woke up until you came to school.

3. Now, I’d like you to tell me one thing you did recently that was really special and fun.

4. How did you spend your last birthday?

5. You know, some kids can remember things that happened to them when they were very little. Can you tell me the first thing that ever happened to you, that you can remember, in your whole life?
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