ABSTRACT


Although a great deal of research has focused on adults’ earliest memories (see Pillemer & White, 1989 for a review), limited research has examined children’s earliest memories (see Wang, 2004; Peterson, Grant, & Boland, 2005). The purpose of the current investigation is to contribute to this limited body of research and to our understanding of age-related change in earliest memory recall across the childhood years by examining the earliest memories of children in three age groups: pre-kindergarten, first grade, and third grade. In addition, this research adds to the extant literature by scaffolding children’s understanding of what it means to remember an event. Assessing participants’ ability to apply their understanding of the mental state term, remember, to scenarios about a fictional character, the present study revealed that by third grade, children have at least a nascent appreciation of the distinction between being able to remember an event and merely knowing about it. With regard to participants’ earliest memories, there were no age-related differences in age at earliest memory using child estimates of age. In contrast, parental estimates of age at earliest memory revealed an age-related difference, with third grade children recalling events that occurred earliest in time and children in pre-kindergarten recalling the most recently-occurring events. In addition, whereas participants in the two youngest age groups recalled more positively valenced memories, third graders recalled both positive and negative events with equal frequency. Together the results of this investigation suggest that younger participants’ recall of more recent events, based on parental age estimates, may reflect their more limited understanding of what it means to remember. By third grade, however, children’s more well-developed understanding may permit a more meaningful search of their autobiographical past to identify their earliest memories.
What it Means to Remember: Children’s Reports of Their Earliest Memories

by:

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Rebekah Siceloff was born in Columbia, South Carolina where she lived with her mother, father, and two brothers. She moved to Laramie, Wyoming to attend college and earned a Bachelor of Arts degree in Psychology from the University of Wyoming in 2003 and a Bachelor of Arts degree in Criminal Justice the following year. Rebekah now resides in Raleigh, North Carolina with her husband and daughter where she is pursuing her Ph.D. in Developmental Psychology at North Carolina State University.
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What it Means to Remember: Children’s Reports of their Earliest Memories

Childhood amnesia is described in the literature as a paucity of autobiographical memories from the first years of life (e.g., Nelson & Fivush, 2004). Research examining this phenomenon reveals that adults typically cannot recall events that occurred prior to about three years of age (see Pillemer & White, 1989 for a review). Importantly, the majority of previous investigations of individuals’ earliest memories has relied on adults’ recollections. This reliance on adults for understanding childhood amnesia has precluded a discussion of age-related change in the characteristics of earliest memories, including the age at which they are experienced. Recent research, however, has begun to close this gap in the literature by explicitly asking children to recall their earliest memories (Wang, 2004; Peterson, Grant, & Boland, 2005). Although these recent investigations have permitted a dialogue about childhood amnesia that extends beyond the recollections of adult participants, there is much yet be learned about children’s earliest memories.

The dearth of research that examines children’s first memories limits our understanding of the maintenance and loss of early memories across the childhood years. The purpose of the current investigation is to further our knowledge of age-related differences in children’s earliest memories. In addition, this research will add to the extant literature by scaffolding children’s understanding of what it means to remember an event, which is absent in previous investigations of children’s first memories. As discussed subsequently, young children may have difficulty comprehending the mental state term “remember” and distinguishing it from other mental state terms such as “know” (Johnson & Wellman, 1980), and this difficulty may limit their ability to engage in a task that relies on a presumed comprehension. First, however, I briefly review the proposed origins and explanations of childhood amnesia and research that has examined
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childhood amnesia using adult participants. Then, I review the investigations that provided the foundation for the proposed research (i.e., Wang, 2004; Peterson et al., 2005) as well as discuss the limitations of each.

Explanations of Childhood Amnesia

A discussion of childhood amnesia is necessarily linked to and requires an understanding of autobiographical memory. Nelson and Fivush (2004) define autobiographical memory as “declarative, explicit memory for specific points in the past, recalled from the unique perspective of the self in relation to others” (p. 488). The emergence of autobiographical memory is generally equated with the decline of childhood amnesia. Thus, it is not only important to explain why there is an absence of autobiographical memory from the early years of life, but also to consider the development of autobiographical memory (Nelson & Fivush, 2004).

Freud was the first to address childhood amnesia as a theoretical problem and not merely an infantile cognitive weakness (Nelson & Fivush, 2004). Among his explanations for the phenomenon was the proposition that memories that were particularly distressing were either repressed or reconstructed into memories that were more pedestrian and provided a secure sense of self (Nelson & Fivush, 2004). Although Freud’s explanations have been not been supported through research examining adults’ earliest memories, it is almost commonplace to begin a discussion of childhood amnesia with a reference to his attempts to explain the concept. Perhaps such allusions are telling, reminding us of the amount of time that has past since the earliest theoretical explanations were proposed and that we still lack a clear understanding of why we lose so many of our first memories.

Interestingly, until the 1980s, the explanation for childhood amnesia did not focus on loss of early memories because it was assumed that young children lacked memory—at least the type
of memory demonstrated by adults (Nelson & Fivush, 2004). Therefore, it was believed that young children could not lose what they did not possess. However, there is now ample evidence that very young children do have long-term memories and that they are able to verbally share those memories with others. In fact, children begin talking about past events with their caregivers soon after they acquire language, with toddlers as young as one year old demonstrating the ability to verbally recall past events (Peterson, 2002).

Evidence of delayed recall in toddlers supports the proposition that the development of a cognitive self, indicated by an appreciation of one’s own reflection in a mirror, is requisite for “self in memory” (Howe & Courage, 1993, 1997). In particular, Howe and Courage suggest that once children have a sense of self, they are able to attach memories to that self, and this permits autobiographical memory. However, toddlers typically demonstrate a cognitive self between 16 and 24 months of age, which is much younger than the age at earliest memory reported by adults of about three-and-one-half years (Nelson & Fivush, 2004). In addition, research does not support traditional “barrier accounts” of childhood amnesia, which suggest that after a particular point in development (i.e., after some “barrier” is overcome), there is a continuous presence of autobiographical memory (Nelson & Fivush, 2004). Instead, evidence indicates that there is a gradual emergence of autobiographical memory (e.g., Weigle & Bauer, 2000). Thus, the advent of a cognitive self concept alone cannot explain the emergence of autobiographical memory.

One recent hypothesis for childhood amnesia focuses on children’s metacognitive skills and may help to explain why the episodic memories that toddlers can recall after relatively long delays are not retained after about age three or four. Welch-Ross (1995) suggests that the development of children’s metacognitive ability to understand mental representation may promote the shift from the long-term memories of very young children to the emergence of
autobiographical memory. In particular, she proposes that two skills are essential for children to recognize that they are recalling a personally-experienced event: (1) “an understanding that knowing about an event depends upon having personal experience with that event,” and (2) “an understanding of the mental state of remembering” (Welch-Ross, 1995, p. 339). Further, she notes that these skills may affect encoding and retrieval of autobiographical memories by permitting events to be “tagged” as being personally experienced during encoding and then recognized as such during retrieval. According to her model, only those memories that children can recognize as personally experienced are able to enter the autobiographical memory system.

Research indicates that at about age three, children demonstrate an ability to understand that their knowledge of a particular event is dependent upon their personal experience with that event (Pillow, 1989; Taylor, 1988). In support of the importance of metacognitive understanding for the decline of childhood amnesia, this development coincides with the age of earliest memory generally reported by adults. Thus, although toddlers may be able to recall events after relatively long delays, they may lack the skills hypothesized to be necessary for those memories to be retained after they are three to four years of age. Given the relevance of children’s metacognitive understanding to the proposed study, I return to this issue in a subsequent section and describe more completely the development of the understanding of the mental state of remembering.

Another explanation for the emergence of autobiographical memory emphasizes the role of social interaction for acquiring memory skills (Fivush, 1994; Hudson, 1990; Nelson, 1993; Tessler & Nelson, 1994). According to the social interaction hypothesis (Hudson, 1990), children learn how to relate their memories in canonical narrative form through discussion of past events with others, which permits memories to be retained in a recoverable form. Research examining mothers’ conversational styles provides support for the view that social interaction contributes to
memory. In particular, longitudinal work has demonstrated that an elaborative conversational style—in which adults follow up on children’s comments and elicit long-detailed discussions about past events—is associated with children’s long-term, independent recall after a delay of one to two years (e.g., Fivush, 1994; Haden, Haine, & Fivush, 1997; Peterson & McCabe, 1992, 1994).

The role of social interaction, particularly maternal reminiscing, in the emergence of autobiographical memory is evident in gender and cultural differences in individuals’ earliest memories, including age at earliest memory and the extent to which these memories are emotionally laden. Research examining adults’ earliest memories has found that women typically report an earlier age of their first memory than men do (Pillemer, 1998), and European Americans tend to have an earlier age at earliest memory than Asians do (McDonald, Uesiliana, & Hayne, 2000; Mullen, 1994; Pillemer, 1998). In line with these findings, there are gender and cultural differences in maternal reminiscing styles. Regarding gender differences, research has demonstrated that mothers tend to be more elaborative with and evaluative of their daughters than their sons in conversations of past events (although this finding is not consistent across studies; see Fivush, 1998 for a review). This differential engagement may reflect parental gender role expectations as well as factors that may make girls more amenable to reminiscing, including language ability (Hyde & Linn, 1988) and their preference for social interaction over motor activity (Maccoby & Jacklin, 1989). In support of the view that maternal reminiscing may play a role in cultural differences in autobiographical memory, Asian mothers are less elaborative than American mothers are (Wang, Leichtman, & Davies, 2000). It is worth noting, however, that while there is evidence of gender and cultural differences in adults’ age at earliest memory, the
two studies that have examined the first memories of children (Wang, 2004; Peterson et al., 2005) did not find evidence of a gender difference in age at earliest memory.

Gender and cultural differences in the inclusion of emotional content in parent-child conversations about the past may also have implications for autobiographical memory. In support of this prediction, parents have been found to discuss emotions more with their preschool daughters than sons (Fivush, Brotman, Buckner, & Goodman, 2000), and women have been found to include more emotion in their memory narratives than men do (e.g., Bauer, Stennes, & Haight, 2003). However, there is little evidence that a gender difference exists in the inclusion of emotion in children’s first memory narratives (Peterson et al., 2005; Wang, 2004). Regarding cultural differences, American parents have been found to focus more attention on emotional aspects of past events than Asian parents do (Wang, 2001), and research examining children’s earliest memories has demonstrated that European American children include more emotion terms in their first memory reports than Chinese children do (Wang, 2004).

A complete review of all the proposed explanations for childhood amnesia is beyond the scope of this paper (see Peterson, 2002; Nelson & Fivush, 2004 for more complete reviews). However, it is evident that there is much yet to be understood about the origins of childhood amnesia. Research that has examined adults’ and, more recently, children’s early memories has contributed to our emerging understanding of childhood amnesia and the nature of our first memories. In the next sections, I describe the findings of research with adult participants and then discuss the only two studies, to my knowledge, in which children were explicitly asked to recall their earliest memories.
Adults’ Earliest Memories

Two methods have typically been employed in past research examining adults’ earliest memories (Nelson & Fivush, 2004). In the first of these methods, adults are explicitly asked to recall their earliest memory. Although the average age of three years for adults’ first memories emerges across many studies that use this method (Nelson & Fivush, 2004), it is often problematic for adults to date their earliest memory with precision unless it occurred near in time to a datable event (e.g., a move to a new home). One way to overcome this problem is to ask adults to recall events that have a known date. For example, Usher and Neisser (1993) asked college students to recall events with a known date including a family move, the birth of a sibling, an overnight hospitalization, and the death of a relative. These events occurred when the participants were two, three, four, or five years of age. The participants’ memory of the events was assessed by their responses to 20 questions with recall being acknowledged when correct responses were provided to two or three of the questions. The results indicated that the participants’ age at earliest memory depended on the type of event queried. Specifically, the birth of a sibling or an overnight hospitalization was recalled when the participants were as young as two years of age at the time of the event. However, neither a family move nor the death of a relative was recalled if the event occurred before the participants were three or four years old.

The results of Usher and Neisser’s (1993) research illustrate two important points about earliest memories. First, in this study, correct responses to two or three out of 20 questions about a particular event were accepted as evidence of recall. As noted by Nelson and Fivush (2004), this may indicate that early memories are merely “fragments of sensory images rather than coherent memories of a temporally extended event” (p. 503). Second, these results emphasize the important point that childhood amnesia is not an all-or-none phenomenon. The emotionality and
distinctiveness of early memories may affect whether they are retained into adulthood (Nelson & Fivush, 2004). Although childhood amnesia is often discussed in terms of a barrier that must be overcome, the phenomenon should instead be viewed as “points of light in an otherwise dimly remembered past” (503).

The proposal that early memories emerge gradually rather than suddenly becoming available after a barrier is surmounted is supported by evidence from the second method of assessing adults’ first memories. Instead of specifically asking participants to recall their earliest memory or details of specific early memories, this method requires participants to recall as many memories as possible from a particular period of life (Nelson & Fivush, 2004). Research using this method has demonstrated a “forgetting curve” for personal memories. In contrast to viewing the emergence of memories as being linear and uninterrupted, the forgetting curve indicates two points of divergence. First, compared to an extrapolation of the expected linear function, there are fewer memories before seven years of age, and second, the forgetting curve illustrates a precipitate decline in memories before the age of three (Rubin, 1986). Thus, it appears that autobiographical memory may appear at about three to four years of age and then gradually develop with few memories for each year until school age (Nelson & Fivush, 2004).

Research by Weigle and Bauer (2000) provides support for the proposed forgetting curve. They asked adults to write about their two earliest memories. Although the participants estimated that their first memory occurred when they were almost three years old, their second memories were dated as having occurred almost a full year later. This suggests that a continuous autobiographical memory is not triggered after the first memory is recalled.

To summarize, investigations of adults’ early memories have contributed to our understanding of childhood amnesia. In particular, this brief review of the literature indicates
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that: the average age of adults’ earliest memories is three years (Nelson & Fivush, 2004); characteristics of early memories may influence whether they are retained into adulthood, and early memories may be fragmentary rather than coherent representations (Usher & Neisser, 1993); and adults’ earliest two memories may be separated in time by about one full year (Weigle & Bauer, 2000). Taken together, these findings suggest that a discussion of childhood amnesia should not emphasize a barrier that must be overcome that permits a continuous autobiographical memory. Instead, the density of early memories should be considered along with an appreciation for the fragmentary nature and gradual emergence of first memories.

Children’s Earliest Memories

Given the volume of previous research examining childhood amnesia (Pillemer & White, 1989), it is surprising that there is a dearth of research that has explicitly examined the earliest memories of children. Although investigations of adults’ earliest memories have been informative, it may not possible to generalize the findings of this body of research to children. Perhaps children’s closer proximity in time to their early memories results in an earlier age at first memory than is reported by adults. If young children do recall memories from earlier in life than adults do, when do they lose those memories? To fully address these issues, it is important to explore the maintenance and loss of early memories across childhood.

Recently, two investigations by Wang (2004) and by Peterson, Grant, and Boland (2005) have bridged this gap in the literature by focusing on the earliest memories of children. Wang asked children in preschool, kindergarten, and second grade from the United States and from Beijing, China to describe several recent autobiographical experiences as well their earliest memory and to provide several self-descriptions. She was particularly interested in assessing whether differences in cultural self-construct would be reflected in these memories and in the
participants’ self-descriptions. For the purpose of this review, however, I focus on the participants’ earliest memories. Few cultural differences in earliest memories emerged, including age at the earliest memory, which, based on participants’ estimates, was 28 months. The emotional tone of the participants’ earliest memories, however, differed across culture with European American children including more emotion terms in their memory reports than Chinese children did. Several age-related differences were also evident. In particular, compared to the youngest two groups, children in the second grade provided lengthier narratives, described more social interactions and specific events (as opposed to general, scripted events), and expressed more autonomy in their narratives.

Building on Wang’s (2004) research, Peterson and her colleagues (2005) sought to further describe children’s earliest memories. Based on their own unsuccessful attempts to elicit earliest memories from four-year-old children, Peterson et al. questioned the ability of the youngest children in Wang’s study to understand the task of recalling their first memories. Therefore, they elected to not include preschoolers in their study. Further, beyond the estimates of age in years collected by Wang, Peterson and her colleagues aimed to more specifically determine their participants’ age at earliest memory. After participants were asked to recall their earliest memory and their age at the time of the event described in the memory narrative, additional specific questions (e.g., “What season of the year was it?”) were posed in an attempt to narrow the age to a few months (p. 628). For the purpose of verifying participants’ age estimates, parental estimations were also acquired following the same format used with the participants. In addition, parents were asked to confirm the veracity of their children’s earliest memories. Memories that were deemed implausible by the parents or were assumed to be based only on knowledge of an event (e.g., through pictures, family discussion) were discarded.
Peterson et al. were interested in exploring age-related differences in age at earliest memory, the type of event described, the emotionality and social orientation (i.e., group versus individual) of the memory, and the structure of the memory narrative. The participants were categorized into four age groups: six- to nine-year-olds, 10- to 13-year-olds, 14- to 16-year-olds, and 17- to 19-year-olds. The parental estimates of the child’s age at the time of the memory were, on average, 41.5 months whereas the children’s estimates were significantly older with an average age of about 45 months. The results further revealed that, based on parental estimates of age at earliest memory, participants in the youngest group had significantly earlier memories than both the 10- to 13-year-olds and 14- to 16-year-olds did; however, the youngest group did not differ from the oldest group.

To assess the type of events recalled, the earliest memories were categorized into one of four groups: events involving trauma, transitional events (e.g., birth of a sibling), play, or miscellaneous other. Across all age groups, the largest number of memories was categorized as miscellaneous other. An analysis of the emotional tone of the recalled events revealed that the majority of the events were classified as neutral. When emotion was evident in the children’s narratives, it was more likely to be negative than positive. There also appeared to be a moderately significant age-related difference in the emotional tone of children’s earliest memories. Compared to the youngest children, older children’s memories contained more expressions of emotion, and the emotional tone of their memories was more likely to be negative when emotion was present. No age-related differences were found for the social orientation of the memories; across all age groups, the vast majority of the memories had an individual orientation. Finally, no age-related differences emerged in the structure of the memory narratives. The participants’ memories were classified into one of three categories: moment-in-
time, plotted story, and repeated event. Across all age groups, the majority of memories described moment-in-time memories.

Limitations of Previous Investigations of Children’s Earliest Memories

Wang (2004) and Peterson et al. (2005) provided an essential contribution to the literature on childhood amnesia by shifting the focus from adults’ earliest memories to those of children. Specifically, in each study children were explicitly asked to recall their earliest memory and to estimate when that event occurred. Importantly, these investigations opened a dialogue about children’s first memories and provided a foundation upon which future investigations can build. Nevertheless, there are methodological limitations to each study that may obscure our emerging understanding of children’s first memories. Before discussing these limitations, however, I will first address the stark inconsistency in children’s average age at the time of their earliest memory reported in each study.

Wang (2004) and Peterson et al. (2005) reported strikingly different ages at which their participants experienced their earliest memories. As previously noted, Wang found that her participants were, on average, 28 months of age at the time of their earliest memory whereas Peterson and her colleagues revealed that their participants reported being much older with an average of 45 months at the time of their first memories. A clear difference remains even when the average estimate of 39 months reported by the six- to nine-year-old children in Peterson’s youngest group is compared to the average estimate of Wang’s participants, who were four to eight years old. This discrepancy limits our ability to make firm conclusions regarding the timing of children’s earliest memories and raises questions about why such a difference emerged across the two studies. One explanation may focus on Wang’s inclusion of children as young as three years old in her study and their first memory reports. It is possible that children this young were
unable to understand the task as it was presented, and as a result, they may have provided narratives that described very early events (e.g., from the first year of life) that were not actually remembered by the participants. Perhaps the estimated age the children assigned to these suspect “memories” lowered the average age estimate. Tempting as this explanation may be, however, Wang did not find an effect of age; even participants in the oldest age group, who were approximately eight years of age, dated their earliest memory as occurring, on average, when they were 28 months old. However, as will be discussed subsequently, whether children this young are able to understand the task of remembering their earliest memory without support of the concept “remember” is an empirical question.

An alternative explanation for the significantly younger age at earliest memory reported by Wang (2004) than by Peterson et al. (2005) focuses on the age at which children are capable of providing meaningful estimates of their age at their earliest memory. The participants in Wang’s study were asked to estimate the date of the event described as their earliest memory; no attempts were made to either help each child localize the time of the event through specific questions or to obtain parental verification of the time of the event. Little is known about children’s memory for when events occurred and their ability to temporally reconstruct the times of past events (Friedman & Lyon, 2005). One study found that not until third grade did about half of the participants correctly recall information about the time of day, month, and season in which two staged events occurred (Friedman & Lyon, 2005). Thus, the participants in Wang’s investigation of children’s earliest memories may have had difficulty temporally reconstructing when the events occurred. It should be noted, however, that the limited research that has examined the development of the ability to judge the time of past events has focused on staged events and not autobiographical memory. Therefore, although the findings are informative, there
may be reason to be cautious when applying the findings to the temporal reconstruction of autobiographical memories.

It is worth noting that Peterson and her colleagues (2005) did request parental estimates for dating the children’s earliest memories in addition to asking the participants about when their earliest memory occurred. As previously discussed, the parental estimates of the child’s age at the time of the memory were significantly younger than the children’s estimates (41.5 months and 45 months, respectively). Although the parent and child estimates were not entirely consistent, both were much older than the average age estimate reported by Wang. The difference in the age-at-earliest-memory judgments reported by Peterson et al. as compared to Wang (2004) may be a matter of the method of assessment. Whereas Wang asked children “Do you know how old you were at the time [of the earliest memory]?” (p. 6), Peterson et al. attempted to determine a more specific age by asking additional questions such as “What season of the year was it?” (p. 628). However, this additional information was solicited only after the participants were first asked to estimate their age at the time. Instead of beginning with an attempt to have the participants provide an age estimate, more accurate judgments may have been obtained if they were first asked questions that would help them to identify when their first memory occurred (e.g., asking the child, “Was anyone else there with you?” to determine whether a younger sibling was present).

Although Peterson and her colleagues (2005) did ask additional questions to help pinpoint the children’s age at earliest memory, this does not help to explain why participants in their study (and the participants’ parents) reported a later time than Wang (2004) did. Peterson et al. did not report that their follow-up questions significantly changed the initial age reported by the children; instead, the questions merely “fine tuned” the ages provided by the children.
Further, because Wang did not obtain parental judgments of the time at earliest memory, it is impossible to verify the accuracy her participants’ age estimates. Thus, further work is warranted to more completely understand children’s age at the time of their earliest memory and whether this age differs according to children’s age at the time of recall.

In addition to a limited understanding of children’s age at their earliest memory, little is known about the density of children’s first memories. Wang (2004) prompted the participants in her study to recall only one memory as their earliest memory. Failing to ask the participants to recall several early memories and then determining which one was the earliest (by helping each child date the memory and seeking parental estimates) does not permit an appreciation of age-related differences in the density of children’s earliest memories. Further, it is possible that simply thinking about the past and recalling one memory may generate the recall of additional memories. Thus by requesting only one memory from the participants in her study, Wang may have missed an opportunity to facilitate the participants’ recall of other memories and to examine age-related differences in the density of early memories.

Although Peterson and her colleagues (2005) did request more than one memory from the participants in their study, they did not report the mean number of memories recalled by each age group or whether there was an effect of age on the number of memories reported by the participants. In addition, Peterson et al. report that they did not include narratives that they deemed to be “too brief” in their analyses; however, they do not provide an explanation of their exclusionary criteria. As previously discussed, Nelson and Fivush (2004) suggest that first memories are often not coherent representations of an event but instead are “fragments of sensory images” (p. 503). Therefore, the elimination of memories that were “too brief” by
Peterson et al. may have precluded an appreciation of the density of children’s early memories and their fragmentary nature.

Another limitation of the research conducted by Wang (2004) and by Peterson et al. (2005) concerns their respective conclusions about the emotionality of children’s first memories. As previously discussed, Wang found that European American children were more likely to include emotion terms in their earliest memory narratives; however, she did not describe whether there was a difference in the valence of the memories. Although Peterson and her colleagues did examine the valence of children’s earliest memories, they found that the majority of the memories were neutral. When emotion was evident, it was more often negative than positive. These results of these studies may be interpreted as evidence that early memories are most often neutral and that the emotional tone of first memories may vary across cultures, but such conclusions should be advanced with caution. In order to determine the emotional tone of children’s earliest memories, both studies utilized coding schemes that required explicit reference to emotion in the participants’ reports of their earliest memories. Because no attempt was made to directly ask the participants about whether the recalled event was negative, positive, or neutral, it is difficult to make firm conclusions about the emotional tone of children’s early memories. Instead, the results of these previous investigations may be more accurately discussed in terms of children’s inclusion of emotion terms in their memory narratives.

A final limitation of the previous research that must be addressed focuses on the content of children’s early memories. Wang (2004) did not report any descriptive data regarding the content of her participants’ first memories, which precluded any discussion of the types of events that young children describe and whether such content varies across age or culture. Peterson et al. (2005) did attempt to characterize the types of events that children describe as their earliest
memories. As previously discussed, they found that the largest number of their participants’ earliest memories were classified as “miscellaneous other” and that the three remaining categories (trauma, transition, and play events) were equally represented. Further, excluding the miscellaneous category, Peterson et al. found that girls described relatively more trauma-related and transitional events while boys described more play events.

Although an examination of content is essential to understanding children’s earliest memories, the manner in which Peterson and colleagues collected these data may have resulted in biased conclusions. As noted in the report of their findings, the participants in their study were recruited as part of other studies that examined children’s recall of injuries that required treatment in an emergency room. The participants were asked about their injuries during several visits over the course of many years, and during one of these visits, the participants were additionally asked to recall their earliest memories. Importantly, because the children were queried about their first memories in a context that was linked to discussions of their prior injuries, they may have been primed to discuss trauma-related events. Although the trauma category did not capture the majority of the participants’ earliest memories, it is possible that the number of trauma-related events reports was inflated. Therefore, it is unclear whether the findings reported by Peterson and her colleagues accurately depict the content of children’s earliest memories.

Wang (2004) and Peterson et al. (2005) made significant contributions to our understanding the maintenance and loss of early memories across the childhood years and provided a foundation for future research in this area. However, the methodological limitations outlined in this section limit the conclusions that can be asserted regarding children’s early memories.

1 Peterson et al. (2005) used the term trauma to categorize earliest memories. It is presumed that their trauma category was intended to capture events that were physically or emotionally negative in nature but that such events did not meet clinical diagnostic criteria for trauma.
memories. The current investigation sought to build upon these previous investigations by addressing these limitations. In particular, in this study, I ask the participants to recall up to five of their earliest memories to assess the nature of children’s first memories, including age at earliest memory and the content, emotional valence, and narrative structure of the earliest memory. To facilitate the participants’ ability to provide meaningful age estimates, I asked them specific questions (e.g., “Was there anyone else there with you when this happened?”) to help them place the event in time. Further, I obtained parental confirmation of the plausibility of the memories as well as parental estimates of when each memory occurred. In order to assess the emotional tone of the participants’ earliest memories, I asked each child to indicate the valence of the events described in their memory narratives using an age-appropriate rating scale. In addition to addressing the limitations of the previous investigations, the current investigation provided scaffolding for the participants’ understanding of what it means to remember with the expectation that this scaffolding might increase their recall of events that are part of their autobiographical memory—not events about which they merely have knowledge.

*Children’s Meta-Autobiographical Memory*

An important consideration in any investigation of children’s earliest memories is the development of children’s comprehension of the mental state of remembering. An understanding of the verbs, *remember* and *forget*, “reflects and is a fundamental part of a person’s metamemory,” which is an individual’s knowledge of memory (Wellman & Johnson, 1979, p. 79). Without an appreciation for what it means to remember, children would not be able to meaningfully respond to queries about their autobiographical memories. In this section, I describe several studies that have examined the development of children’s understanding of mental representations. In addition, I discuss whether the findings from these investigations of
children’s metamemory translate into knowledge of their autobiographical memory, that is, their meta-autobiographical memory.

As previously discussed, Welch-Ross (1995) proposes that the emergence of autobiographical memory is in part dependent upon the knowledge that one is remembering a personally experienced event, in contrast to “knowing of” an event. That is, in order for children to recognize that they are recalling a personally experienced event, they must understand that knowing about an event depends upon having personal experience with that event. In support of this proposition, Welch-Ross provides evidence from research that children acquire this knowledge at about age three (Pillow, 1989; Taylor, 1988), which coincides with the age of earliest reported memories. In one investigation, three-year-old children were asked to determine which one of two puppets would be able to tell them the color of a hidden object, the puppet that had viewed the object or the one that had not. The participants were able to select the correct puppet; this was interpreted as an indication that by the age of three, children understand that perception is a source of knowledge (Pillow, 1989). In another study, children were shown a picture of a giraffe and an elephant. Then a puppet was shown a small piece of the picture that did not include enough detail to identify the animals. When asked whether the puppet would be able to identify the animals from the small piece of the picture, three- to four-year-old children correctly indicated that the puppet would not be able to identify the animals. Younger children, however, did not demonstrate an understanding that the puppet lacked personal experience with the image and would not be able identify the animals.

One study not cited by Welch-Ross (1995) suggests that three-year-old children are not able to appreciate the informational access of another person (Wimmer, Hogrefe, & Perner, 1988). One child was either told about or shown the contents of a box while another child did not
receive any information. The children were then asked whether they knew what was in the box and whether the other child knew what was in the box. Although the three-year-old children did not demonstrate an understanding of the importance of the other child’s informational access for knowing the contents of the box, some of the four-year-old and all of the five-year-old children did. Thus the ability to appreciate that personal experience is requisite for remembering appears to continue emerging through about age five.

In addition to the proposed requirement of an appreciation of personal experience for recognizing that one is recalling a personally experienced event, Welch-Ross (1995) also suggests that an understanding of the mental state of remembering is essential. Citing the findings of dissertation research (Seier, 1995 cited in Welch-Ross, 1995), she indicates that the acquisition of this competence also occurs at about age three and coincides with the age of earliest reported memories. Counter to this proposition, however, is evidence that children this young do not have a complete understanding of the mental state of remembering. For example, in one study, preschoolers and first and second graders were engaged in a series of tasks that varied with regard to the participants’ previous knowledge, present knowledge, or lack of knowledge about the location of a hidden object (Wellman & Johnson, 1980). Specifically, in the previous knowledge condition, participants were allowed to watch as the object was “hidden” under one of two boxes. In the present knowledge condition, participants were asked to hide their eyes while the object was placed under one of two boxes, a transparent box or an opaque box. When the object was placed under the transparent box, it allowed the participants to have “present sight,” and when it was hidden under the opaque box, participants were able to infer its location. Finally, in the guess condition, “magic boxes” were used that allowed the experimenter
to change the location of the hidden object and to control whether the participants were correct in their selection of the object’s location.

To assess children’s ability to differentiate among the mental states remember, know, and forget, Wellman and Johnson (1980) asked participants several questions after each task beginning with two preliminary questions: “Did you see where I put the block?” and “Where is the block?” After indicating their choice of the object’s location, participants were asked: “Do you know it’s there?”, “Do you remember it’s there?”, and “Do you guess it’s there?” The results indicate that while five-year-old children demonstrated a nascent ability to differentiate the terms, four-year-old children “completely confused remembering, knowing, and guessing” (p. 1100). Wellman and Johnson concluded that the four year olds did not understand that remembering entails having prior knowledge. Importantly, however, they also suggest that young children are not insensitive to distinctive uses of the terms remember and know. For example, when asked to identify whether specific statements (e.g., the researcher went swimming last summer versus the participant went swimming last summer) were “something you know” or “something you remember,” four-year-old children were able to correctly differentiate their application of these terms. Thus, four-year-old children’s ability to understand the mental state of remembering is still emerging through the early school-age years, and their ability to differentiate remember from other mental state terms appears to be context-dependent.

Finally, also relevant to the mental state of remembering is an understanding of how one knows what one knows. In fact, Perner (2000) suggests that children are not capable of recalling personally experienced events if they lack experiential awareness and an understanding of the origins of knowledge. Research indicates that the ability to monitor one’s source of information emerges at about three to five years of age, which is similar to the age at earliest reported
memories (Pratt & Bryant, 1990); therefore, source monitoring is thought to play a role in the emergence of autobiographical memory (Gopnik & Graf, 1988).

In one investigation of when children begin to identify the source of their own beliefs, three-, four- and five-year-old children were engaged in a task that required that they identify their source of information about the contents of six drawers (Gopnik & Graf, 1988). For two of the drawers, participants were shown the contents; for another two drawers, the participants were told the contents of the drawer; and for the last two drawers, the participants were given a clue about the contents. Immediately after the item in each drawer was revealed, the participants were asked “What’s inside?” After providing a correct response, they were then asked how they knew what was inside and were given three forced-choice options: “Did you see it, did I tell you about it, or did you figure it out from a clue?” To assess delayed source monitoring, after completing the initial task, the participants were presented with drawers that were emptied of their contents. The participants were shown each item individually and asked, “Which drawer was this in?” The results of this study indicate that compared to the five year olds, three-year-old children have difficulty identifying the source of their beliefs. In addition, children in the youngest group did not demonstrate an ability to identify the source of their beliefs after a delay, even when they performed well on the initial task. Thus, the ability to identify the source of one’s knowledge and to retain that information continues to emerge through about age five.

To summarize, the extant research on children’s developing metamemory skills, in particular, the ability to understand the mental state of remembering, suggests that the ability to recognize that one is recalling a personally experienced event continues to develop across the preschool years. Not until children are about five years of age do they consistently demonstrate an ability to understand that personal experience is requisite for remembering (Wimmer et al.
1988) and to identify the source of their knowledge (Gopnik & Graf, 1988). Further, even at age five, children still have difficulty differentiating *remember* from other mental state terms (Wellman & Johnson, 1980).

Although the research outlined in this section contributes a great deal to our knowledge of children’s understanding of the mental state of remembering, little is known about how these findings translate into children’s knowledge of their autobiographical memory—or their meta-autobiographical memory. For example, is a child’s ability to identify which drawer contained a particular object (e.g., Gopnik & Graf, 1988) predictive of her ability to determine whether she knows about a life event because she has heard stories about the event or because she personally experienced it? As previously discussed, Wellman and Johnson (1980) noted that the four-year-olds in their study had difficulty differentiating mental state terms on an hidden-object task but demonstrated this ability under other circumstances. Thus, although there is evidence that preschool-age children have a limited understanding of what it means to remember, it is possible that with support and in a personally-relevant context, they would be better able to comprehend this mental state.

**Current Research**

Although a great deal of research has focused on the earliest memories of adults, to my knowledge, only two studies have explicitly asked children to recall their first memories. Given that these bodies of research have yielded inconsistent findings, particularly with regard to gender differences in age of earliest memory and the emotional valence of these memories, there is reason to believe that children’s earliest memories are distinct from adults’. In addition, methodological limitations of the previous investigations of children’s first memories do not permit strong conclusions to be made about the nature of children’s earliest memories. Thus,
further research is warranted. Finally, no previous research has attempted to support children’s recall of their first memories through scaffolding their understanding of the mental state of remembering. The overarching goal of the current study is to add to extant knowledge of children’s earliest memories by addressing the limitations of previous research and supporting children’s understanding of what it means to remember.

There were three specific aims of the research: (1) to examine age-related differences in children’s earliest memories, including age at earliest memory, density of early memories (i.e., number of memories recalled), types of events recalled, and structure and emotional valence of their earliest memories; (2) to provide support for children’s ability to comprehend and apply the mental states term “remember” to their own autobiographical memories; and (3) to explore differences in children’s earliest memories based on their understanding of the term “remember.” To achieve these aims, children in three age groups (pre-kindergarten, first grade, and third grade) were provided with simple criteria for what it means to remember an event. To assess their understanding of the mental state of remembering, the participants were presented with several scenarios that assessed their ability to correctly identify whether or not an event could be remembered (versus some other mental state, such as knowing). Next, the participants were asked to recall up to five of their earliest memories. For each memory narrative, participants were asked to label and rate their feelings at the time of the event and to estimate their age at the time of the event. In a follow-up parent interview, parents provided ratings of their confidence that the event described in each memory narrative occurred, noted the extent to which the event had been a topic of family discussion and whether or not reminders of the event were available to their child. Finally, for each memory narrative, parents provided an estimate of their child’s age at the time of the described event.
Hypotheses and Research Questions

Hypothesis 1: I predict an age-related increase in participants’ age at the time of the event described in their earliest memory narratives. Specifically, across the three age groups, the earliest memory narratives of the oldest age group are expected to describe events that occurred at an older age than those recalled by the younger two age groups. The earliest memory narratives of participants in pre-kindergarten are expected to describe events that occurred the earliest in time across all three groups. Further, it is expected that compared to male participants, female participants will recall events that occurred at a younger age.

Hypothesis 2: I predict a gender difference in the emotional valence of participants’ earliest memories. Across all age groups, compared to male participants, female participants are expected to rate their earliest memories as being more emotionally charged.

Hypothesis 3: Whereas female participants are expected to recall their earliest memory narratives in the form of a plotted story, male participants are expected to recall their earliest memory narratives in the form of moment-in-time descriptions (as described by Peterson et al., 2005).

Hypothesis 4: I expect an age-related increase in participants’ understanding of remember as indicated by their correct identification of the mental state of remembering in various scenarios. Participants in the oldest age groups are expected to perform at ceiling (i.e., answer all seven scenarios correctly) and better than participants in the youngest two age groups. Participants in the pre-kindergarten group are expected to demonstrate the poorest understanding of remember. It is further expected that participants who demonstrate the poorest performance on the remember scenarios will report an earlier age of first memory, arising from vague reports of infant experiences that are unlikely to be veridical.
Finally, I examine the content and density of the participants’ earliest memories for the purpose of characterizing children’s earliest memories; however, no specific predictions for these variables are offered. Specifically, what types of events do children remember as their earliest memories? How many memories do children recall when asked to recall their earliest memories, and are there age-related differences in the number of memories recalled? These questions will be addressed by the proposed research.

Method

Participants

Children attending pre-kindergarten, first grade, and third grade at childcare centers and parochial schools in a Southeastern city were recruited for participation in this study. Parents of these children received a letter that explained the purpose of the study and an informed consent form to request their written permission for their child’s participation. In addition, parents were asked to indicate their willingness to be contacted by a researcher for a follow-up interview. Informed consent for participation was obtained for 95 children, representing approximately 45% of the children for whom consent was requested. Of these children, three female children were excluded from the sample. One was removed due to equipment failure, and two were not included in the final sample because whereas they were recruited from a pre-kindergarten classroom, they were outliers with regard to age in months. Data for 92 participants were included in the final sample. Of these participants, 32 were in pre-kindergarten (19 males, mean age = 56.16, \(SD = 5.77\)), 31 were in first grade (15 males, mean age = 83.90, \(SD = 5.72\)), and 29 were in third grade (12 males, mean age = 109.76, \(SD = 5.55\)).

Of the parents who provided consent for their child to participate, 100% agreed to participate in a follow-up interview. Of the 92 parents whose children were included in the final
sample, 53% completed the follow-up interview. This yielded a total of sample of 49 parent-child dyads with complete data. As assessed by interviewer’s impression, the sample was predominantly white and based on the location of the childcare centers and types of schools attended, consisted of children from families of middle socioeconomic status.

**Materials**

*Parent Letter and Informed Consent Forms.* A letter explaining the purpose of the interview was sent to parents by means of participating childcare centers and schools (see Appendix A). Parents also received an informed consent form seeking written permission for their child to participate in the study. The consent form also included a request for parental participation in a follow-up interview. Parents were asked to indicate on the consent form whether or not they consented for their child to participate and to indicate their own consent to participate in a follow-up parent interview and the means by which they preferred to be contacted by the researcher (see Appendix B).

*Interview Protocol and Questionnaire.* Researchers followed established guidelines for conducting interviews with child participants (see Appendix C). These guidelines specified the order of tasks within the interview and the prompts for eliciting information from participants, including their memory narratives. The child interview was comprised of two main parts: the Remember Scenarios and the Earliest Memories Interview. In addition, participants responded to questions from the Life Experiences Questionnaire with the expectation that the information provided would be useful for helping participants estimate their age at the time of the events described in their memory narratives. Each interview was audio recorded in its entirety for later transcription.
Remember Scenarios and Illustrations. The Remember Scenarios were developed to both support and assess participants’ understanding of the concept “remember” as distinct from other types of mental activity (e.g., to know). Seven scenarios describe the experiences of a character, Lee, or Lee’s friend, Taylor (see Appendix C). The scenarios assessed participants’ understanding that the ability to remember an event depends upon having personal experience with that event, maintaining a mental representation of the event, and being able to identify oneself as the source of knowledge about the event. Participants’ understanding of the requirement of personal experience was assessed through varying the specified character’s state of consciousness (i.e., awake-asleep, there-not there). Participants’ appreciation of the requirement of maintaining a mental representation was assessed by varying the time that had elapsed since the event had occurred (e.g., just happened, happened a long time ago, happened when Lee was one day old). Finally, participants’ ability to understand the importance of monitoring the source of one’s knowledge about an event was assessed by asking participants whether or not Lee could remember the first day he or she was born with the aid of a photograph. See Table 1 for a summary of each scenario and the requirements listed above that each scenario addresses.

Illustrations representing each scenario were presented in conjunction with the verbal presentation of the scenarios. These illustrations were hand-drawn and depicted the protagonist, other relevant characters, and background information (see Appendix D). Each illustration was mounted on an 8 ½ × 11 sheet of black construction paper and laminated. After reading each scenario and presenting the corresponding illustration, the researcher questioned the participants regarding whether or not they believed a specified character could remember the described event. The researcher then asked participants to provide a reason for their answer. Thus, participants
provided an answer and a reason for their answer for each scenario, yielding a total of seven answers and seven reasons. Participants’ responses to the questions were recorded on the data collection form (see Appendix E).

Table 1

A Summary of the Seven Remember Scenarios and the Requirements of Memory Addressed by Each

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Personal experience</th>
<th>Mental representation</th>
<th>Source of knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lee went to the grocery store with his mother and is now home from the store. Does Lee remember his trip to the grocery store?</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Lee went to visit his grandmother and they played together. The visit happened a long time ago. Does Lee remember playing with Grandmother?</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Lee’s friend, Taylor, went to the gas station, but Lee did not go. Can Lee remember what happened when Taylor went to the gas station?</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Lee’s mom came into his room at night and turned off his nightlight. Lee did not wake up. Can Lee remember his/her mother turning off the nightlight?</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Lee’s friend, Taylor, spent the night at Lee’s house and woke up when Lee’s mom came into the room. Taylor had a glass of water and it took him/her a while to go back to sleep. Does Taylor remember Lee’s mom bringing him/her a glass of water?</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Lee got his first present when he was one day old. Does Lee remember getting his first present?</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>This picture shows Lee on the same day that Lee was born. If Lee sees the picture now, can he remember what happened on the day he was born?</td>
<td></td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>
Earliest Memories Interview. During the Earliest Memories Interview, researchers instructed participants to think about and describe their earliest memory. In total, participants were prompted to recall up to five earliest memories. Following each memory report, the researcher asked each participant to describe how he or she felt at the time of the event and to rate the intensity of the self-generated feeling on a scale from one, representing “a little” [emotion], to three, representing “really” [emotion]. During the interview, researchers recorded brief descriptions of the participants’ memory reports and the participants’ ratings of the emotional valence of each memory on the data collection form (see Appendix E).

Life Experiences Questionnaire. Researchers asked the participants questions regarding their specific life experiences for the purpose of helping participants to estimate when each of the memories they reported occurred. For example, participants were asked to list the individuals with whom they live. For participants who reported having a younger sibling, the researcher was able to use the birth of the sibling as a time marker to help determine when the described event occurred (i.e., before or after the sibling’s birth). Researchers recorded participants’ responses to these questions on the data collection form (see Appendix E).

Parent Interview. Following the child interview, researchers conducted a follow-up parent interview to obtain further information from parents regarding their children’s memory narratives. Specifically, parents were asked to rate several aspects of their child’s memory report. Using a seven-point scale, parents rated their confidence that the event described in their child’s memory report occurred, with one indicating that the event did not occur, four indicating that the event may have occurred, and seven indicating that the event definitely occurred. Parents also were asked to rate how frequently the event described in the memory narrative is a source of family discussion using a three-point scale, with one indicating “rarely or never” and three
indicating “often.” To assess the presence of additional sources of possible reinstatement, parents were asked whether or not reminders of the event are available to the child. If the parent indicated that reminders of the event are available, they were asked to further describe the reminders (e.g., souvenirs, pictures) and the availability of the reminders to their child (e.g., put away in a photo album that the child rarely views). Finally, parents provided an estimate of their child’s age at the time of the event. Parents’ responses were recorded on the phone version of the parent interview form (see Appendix F) or the email version of the parent interview form (Appendix G).

Procedure

After obtaining informed consent, participants were interviewed individually in a quiet room at their childcare center, school, or home (for participants who were recruited through personal connections). Before beginning the interview, researchers built rapport with the participant through informal questions (e.g., about ongoing activities at the participant’s childcare center or school). The researcher then briefly described the purpose of the interview to the participant and obtained his or her assent to participate. Interviews were audio recorded and required approximately 30 minutes to complete.

As previously described, the interview was comprised of two main parts: (1) presentation of the Remember Scenarios for the purpose of assessing and supporting the participants’ understanding of the mental state term “remember” and (2) the Earliest Memories Interview during which participants describe their earliest memories. In addition, the researcher posed the questions in the Life Experiences Questionnaire to participants to assist them in estimating their age at the time of the events described in their memory reports. These components of the overall interview were always presented in order with the Remember Scenarios presented first, followed
by the Earliest Memories Interview, and finally, the Life Experiences Questionnaire. This order was only violated in the event a participant was not able to generate any narratives of their earliest memories when initially prompted. In this situation, the researcher proceeded to the Life Experiences Questionnaire, and after its completion, prompted the participant again to think of and describe his or her earliest memories.

The researcher began the interview by stating to the participant, “Today we’re going to talk about what it means to remember.” The researcher then described to the participant criteria necessary to remember a personally-experienced, past event. Specifically, the researcher stated, “Here’s how you know if you remember something that happened. You were there when it happened; you saw what happened with your own eyes and heard it with your own ears; and you can think about what happened.” The researcher repeated the definition. This definition provided participants with a framework for understanding the requirements for remembering past events. Further, the criteria were intended to help participants form judgments about the ability of the characters in the Remember Scenarios, presented next, to remember the event described in each vignette.

Participants were told that they were going to hear stories about a child named Lee who was their age (i.e., Lee’s age corresponded to that of each participant) and that the researcher was going to ask them questions about what Lee could remember. The researcher told the participants that by asking these questions, “I can tell if I did a good job explaining to you what it means to remember.” Then each of the seven scenarios was presented in conjunction with illustrations that represented each scenario. The scenarios assessed participants’ ability to appropriately apply the criteria for remembering that was previously presented or otherwise demonstrate that they understanding and correct application of the mental state term, remember. Specifically, as
previously described, the scenarios assessed participants’ understanding that the ability to remember an event depends upon having personal experience with that event, maintaining a mental representation of the event, and being able to identify oneself as the source of knowledge about the event. The scenarios were presented in the same order of increasing difficulty for all participants. The gender of the character, Lee, or Lee’s friend, Taylor, corresponded to the gender of the participant.

Following the presentation of each scenario, participants were asked whether or not the specified character could remember the event described in the scenario (e.g., “Does Lee remember his trip to the grocery store?”). After the participants indicated their beliefs regarding the characters ability to remember the event, the researcher asked participants to provide reasons for their answers. Specifically, if participants incorrectly indicated that the character could remember an event, then the researcher asked, “Why do you think that Lee/Taylor can remember what happened when [event]?” For correct responses, the researcher asked participants, “How do you know that Lee/Taylor can remember?” After participants provided their answers and reasons, the researcher acknowledged the correctness or incorrectness of their responses and provided support for their understanding of the mental state term, remember, by repeating and applying the criteria for remembering an event. For example, following an incorrect response that indicated Lee could not remember going to the grocery store, the researcher would respond, “Well, in this case Lee can remember going to the grocery store. He was there at the grocery store with his mother; he saw what happened there with his own eyes and heard it with his own ears; and he can think about his trip to the grocery store.” Thus both correct and incorrect responses provided an opportunity for the researcher to support participants’ understanding of the mental state term, remember.
Following the presentation of the Remember Scenarios, the researcher introduced the Earliest Memories Interview by stating to participants, “We talked about what Lee can remember and what Lee cannot remember. Now I want you to think about some things that you can remember.” Participants were instructed to “remember something that happened a long time ago when you were younger than you are now. I want you to think about your earliest memory. Tell me everything about the first thing you remember.” Following the initial prompt, the researcher instructed participants to “think about another one of your earliest memories. Tell me another one of your earliest memories.” Participants were prompted to recall up to five earliest memories. The researcher used empty prompts to elicit participants’ memory reports. Specifically, at each pause in the participants’ memory reports, the researcher prompted for more information by asking the participant, “Can you tell me more about [event]?” When the participant responded in the negative, the researcher sought additional confirmation that the participant had exhausted his or her recall for the event by asking, “Is that all you can remember?” Thus two empty responses, in which participants either indicated that they could not recall any additional information or provided only redundant information, were required to signal the completion of the memory report.

Immediately following the completion of each memory narrative, the researcher assessed participants’ subjective appraisals of the emotional valence and intensity of their earliest memories. Specifically, the researcher first asked participants to label how they felt at the time of the event. After the participant provided an emotion label (e.g., happy or sad), the researcher assessed the intensity of the emotion by asking participants, “Were you a little [emotion], medium [emotion], or really [emotion]?” In the event participants did not understand the request for an emotion label to describe their feelings at the time of the event, the researcher offered
clarification by stating, “Did you feel happy, or sad, or just okay, or some other feeling?” Thus participants provided emotion labels and intensity ratings for each of the memory narratives. Taken together, the emotion label and the intensity rating yielded an overall emotion rating on a seven point scale ranging from really negative to really positive, with a neutral emotion rating falling in the middle.

After participants reported five earliest memories or indicated that they had exhausted their recall of earliest memories, the researcher turned to the Life Experiences Questionnaire. The information gleaned from participants’ responses to the questions about their life circumstances was used to craft questions to assist participants with estimating their age at the time of the events described in their earliest memories. For example, if a participant reported that he or she moved at the age of three, then the researcher was able to use that information to help the participant date his or her earliest memories by asking whether the events described occurred before or after the move. Thus participants answered the questions in the Life Experiences Questionnaire, and then the researcher returned to the participants’ earliest memory reports for the purpose of assisting participants in their attempts to estimate their ages at the time of the events. For each memory narrative, the researcher first sought any needed clarification for ambiguous aspects of the memory (e.g., “You said ‘we’ went to the zoo. Who went with you?”), and the researcher then requested the participants’ assistance in dating their memories. For example, the researcher might have asked what school the participant was attending, whether any younger siblings were yet born, and if the participant lived in his or her old or new house when the event occurred. Finally, the researcher, after posing all relevant questions crafted from the Life Experiences Questionnaire, asked participants to estimate their ages at the time of the
events. Thus the researcher attempted to help participants localize the events they described in time so that they could more accurately estimate their age at the time of each event.

After participants reported their age estimates for the events described in each of their memory narratives, the interview was complete. The researcher asked participants if they had any questions and then thanked participants for their assistance. As a token of the interviewer’s appreciation, the participants were allowed to select a small gift such as a pencil and eraser, a watercolor set, or stickers.

Upon completion of each interview, the audio recording of the interview was transcribed by an undergraduate research assistant. The resulting transcript was then used to prepare the parent interview form. The purpose of the parent interview was to gather additional information about the memories participants reported during the Earliest Memories Interview. Researchers identified the memory narratives child participants provided during the interview and transferred these memories to the parent interview. Parents were then contacted by either phone or email, as they indicated on the consent form, to complete the parent interview. Given the number of interviews and the length of time required to produce a complete transcript of the interview, parents were typically contacted approximately one month after the completion of their child’s interview.

As previously described, parents were asked to rate several aspects of their child’s memory report. Using a seven-point scale, parents first rated their confidence that the event described in their child’s memory report occurred (1 = the event did not occur, 4 = the event may have occurred, and 7 = the event definitely occurred). Additional information was sought from the parents about each memory only if they indicated that the event described in the memory report may have occurred, which corresponds to a rating of four or higher. Parents were asked to
rate how frequently the event described in the memory narrative is a source of family discussion using a three-point scale (1 = “rarely or never,” 3 = “often.” Parents provided a yes or no response to a query regarding whether or not reminders of the event are available to the child. If the parent indicated that reminders of the event are available, they were asked to further describe the reminders (e.g., souvenirs, pictures) and the availability of the reminders to their child (e.g., put away in a photo album that the child rarely views). For each memory narrative, parents also provided an estimate of their child’s age at the time of the event. Although not explored in the analyses described in this report, parents were also asked to describe what they believed their child’s earliest memory to be. At the conclusion of phone interviews or upon receipt of complete parent interview data sent via email, parents were thanked for their participation.

Coding

Remember Scenarios. As described above, after reading each of the Remember Scenarios to the participants, two questions were posed to participants. The first question required them to determine whether or not the specified character could remember the event described in the scenario. Next, participants were asked to provide a reason to support their answer. When a correct answer was provided, participants were asked to support how they knew that their answer was correct (i.e., “How do you know that Lee/Taylor can/cannot remember [event]?”). When an incorrect response was provided, however, participants were asked why they thought their answer was correct (i.e., “Why do you think that Lee/Taylor can/cannot remember [event]?”).

Participants’ responses to the Remember Scenario questions were coded by examining their answer in combination with the reason for their answer. First, participants’ answers were coded into one of four mutually exclusive categories: 1) Do Not Know, 2) No, 3) Yes, and 4) Qualified Answer (e.g., “maybe”). Next, participants’ reason for each answer was coded into one
of seven mutually exclusive categories: 1) Do Not Know, 2) Mentalistic, 3) Perceptual, 4) State, 5) Time, 6) Multiple Reasons, and 7) Other. Reasons that were categorized as Mentalistic included words such as “remember,” “think,” and “forget.” Perceptual reasons were those that relied on perceptual evidence that such as, “Lee saw what happened.” Reasons that conveyed information about the state of the character, such as “he was there,” “he was asleep,” or “he was just a baby” were included in the State category. Reasons that were classified as Time included references to the time that had passed since an event occurred. These included statements such as, “It just happened,” or “it was a long time ago.” In the event participants offered multiple reasons that fell into different categories, then they received a code of Multiple Reasons. However, if any one of their multiple reasons was a mentalistic term, then they only received a code of Mentalistic. This is because it is assumed that mentalistic terms represent the most sophisticated way of thinking about one’s ability to recall an event. Finally, reasons that did not fall into any of these categories were coded as Other. Reasons coded as Other included stories that participants told to the interviewer about the scenario in lieu of providing a reason to support their answer. Finally, a code of correct or incorrect was given for each scenario, based on participants’ answers and reasons together. The criterion for whether or not the answer and reason together were correct or not was whether participants demonstrated an understanding of the mental state term remember. For example, for Scenario 7 (i.e., “If we show this picture to Lee, can Lee now remember when he was one day old?”), an answer-reason response of “Yes, because he was awake” would not demonstrate an understanding of remember and would be coded as incorrect. However, an answer-reason combination of “No, because he was just a baby, and he can’t think about when he was just one day old” would be coded as correct. A count of
the total number of correct answer-reason combinations was calculated to represent participants’ performance on the Remember Scenarios.

A female, undergraduate research assistant and I coded the participants’ answers and reasons for each scenario, and coded the correctness of each answer-reason combination for each scenario. I trained the second coder on the application of the coding scheme, and we coded a subset of ten participants’ responses to ensure reliability. (Reliability was calculated by percent agreement and a criterion of .90 was set and achieved in training.) After reliability was established, each coder was randomly assigned 50% of the transcripts, which contained participants’ responses. Additionally, approximately 20% ($n = 18$) of the entire set of transcripts was randomly selected and double-coded for calculating inter-rater reliability. Percent agreement ranged from 87% on reason coding to 97% for correctness of the answer-reason combination. Disagreements were resolved through discussion.

**Earliest Memory Coding.** During the interview, participants were prompted to recall up to five of their earliest memories. A male, undergraduate research assistant and I identified the memories provided during the interview for subsequent coding and inclusion in the follow-up parent interview. Narratives were selected as earliest memory reports if they contained at least two past tense propositions. Further, memory narratives that described events that were clearly pre- or peri-natal in nature (e.g., “I held onto my mommy’s heart when I was being born.”) or that described milestones that typically occur during the first year of life (e.g., learning to crawl, getting first tooth) were not selected as an earliest memory and were not included in the parent interview. In the event participants estimated that an event occurred at or prior to twelve months of age but that could have reasonably occurred after this time (e.g., riding a tricycle at the park with grandfather), the memory narratives were selected as an earliest memory and were included
What it Means

in the parent interview. A final criterion for selecting earliest memory narratives focuses on the nature of the prompt used to elicit the memory report. Narratives that were elicited by a prompt for specific information and not an open request for the participant’s earliest memory (e.g., information elicited during the Life Experiences Questionnaire about a pet’s death) were not selected as earliest memories. I served as the master coder and coded 100% of the transcripts. The undergraduate research assistant coded approximately 25% of the entire set of transcripts ($n = 25$) to ensure inter-rater reliability. There was 92% agreement between the master coder and the assistant in the memories chosen as earliest memories.

Following identification of participants’ earliest memories, memory narratives were coded for content (i.e., the type of event described in the memory narrative) and narrative structure. Content categories included vacations/out-of-town visits, family interactions, play behaviors, birthday celebrations, gifts/objects, injuries/illnesses/deaths, transitions, pets, school-related events, and misbehavior/punishment. The structure of each memory was classified into one of three categories following the coding scheme employed by Peterson et al. (2005): moment-in-time, plotted story, and repeated event. According to this scheme, a moment-in-time memory is characterized by a “description of many aspects of one isolated episode” (p. 637). In contrast, in order for a memory to meet the criteria for a plotted story, causal and temporal linkages were required. Finally, memories that were categorized as repeated events described events that occurred on more than one occasion (e.g., a bedtime routine).

A male, graduate research assistant and I coded all early memory narratives for content and structure. I trained the second coder on the application of the coding schemes for content and for structure, and we coded a subset of ten participants’ responses to ensure reliability. (Reliability was calculated by percent agreement and a criterion of .90 was set and achieved in
training.) After reliability was established, each coder was randomly assigned 50% of the
transcripts. Additionally, approximately 20% (n = 18) of the entire set of transcripts was
randomly selected and double-coded for calculating inter-rater reliability. Percent agreement of
.96 was achieved for content coding and .92 for narrative structure coding. Disagreements were
resolved through discussion.

*Implausible Memories.* As previously described, participants were prompted to recall up
to five of their earliest memories. However, events that were deemed implausible were not
identified as an earliest memory for inclusion in subsequent analyses and on the parent interview.
Implausible memories were memories of events that were unlikely to be based on actual recall
but instead were likely based on knowledge of or beliefs about an event (e.g., participants’ own
birth, getting first tooth). As a conservative estimate, only events that were pre- or peri-natal in
nature and those that represented milestones that typically occur during the first year of life were
coded as implausible. In addition, memories that likely occurred at or prior to twelve months and
that participants estimated to have occurred at or prior to this age were coded as implausible. In
the event participants estimated that an event occurred at or prior to twelve months of age, but
the event could have reasonably occurred after this time, the memory narratives were selected as
an earliest memory and were included in the parent interview. The total number of implausible
memories reported during the interview was counted for each participant.

Two female, undergraduate research assistants coded memories as implausible and
provided a count for each participant. I trained both coders on the application of the implausible
memory coding scheme, and they coded a subset of ten participants’ transcripts to ensure
reliability. (Reliability was calculated by percent agreement and a criterion of .90 was set and
achieved in training.) After reliability was established, each coder was randomly assigned 50%
of the transcripts. Additionally, approximately 20% \((n = 18)\) of the entire set of transcripts was randomly selected and double-coded for calculating inter-rater reliability. Percent agreement of .90 was achieved implausible memory coding. Disagreements were resolved through discussion.

Results

Preliminary Analyses

Preliminary analyses were conducted to examine potential effects of interview location on the two primary dependent variables of interest: the number of remember scenarios answered correctly and participants’ age at their earliest memory. As shown in Table 3, the majority of participants were recruited from one of four locations. Two of these locations were childcare centers and two were private schools. Additionally, three participants were recruited through personal connections and were interviewed at their respective homes. These participants were excluded from the preliminary analyses examining the effects of interview location due to the group’s small sample size. Because the three age groups were not equally represented across school locations, the effect of age group was also examined in preliminary analyses examining location effects.

Beginning with the number of remember scenarios answered correctly, a 4 (interview location) × 3 (age group) ANOVA indicated that there was not a significant main effect of interview location \(F(3, 78) = .50, p = .68, \eta^2 = .02\). Therefore, independent of the participants’ age group, there was not a difference between the four interview locations in the number of remember scenarios answered correctly (see Table 3). However, there was a significant main effect of age group \(F(2, 78) = 43.23, p < .001, \eta^2 = .53\). For participants included in this analyses, those in the oldest age group \((M = 5.92)\) answered a greater number of the remember scenarios correctly than the participants in first grade \((M = 5.06)\) did, who in turn answered more
remember scenarios correctly than the pre-kindergarten age group ($M = 1.78$). There was not a significant age group by interview location interaction [$F(5, 78) = 1.82, p = .12, \eta^2 = .10$], suggesting that the difference in participants’ performance on the remember scenarios is not an effect of the interview location but instead is age-related. I will discuss the main effect of age group in greater detail in a subsequent section given that this age-related difference in performance on the remember scenarios was an \textit{a priori} prediction.

Turning to the effects of interview location on the participants’ age at earliest memory (as estimated by the child), a 4 (interview location) × 3 (age group) ANOVA revealed that there was not a significant main effect of interview location [$F(3, 67) = 2.15, p = .10, \eta^2 = .09$]. Therefore, participants at each interview location did not report significantly different estimates for their age at earliest memory (see Table 2). The analysis further indicated that there was neither a significant main effect of age group [$F(2, 67) = .05, p = .95, \eta^2 = .002$], nor was there a significant age group by interview location interaction [$F(5, 67) = .32, p = .90, \eta^2 = .02$]. Because these analyses did not reveal an effect of interview location on the variables of interest, it will not be considered in subsequent analyses.

\begin{table}
\centering
\caption{Mean chronological age, mean age at earliest memory (EM), and mean number of remember scenarios (RS) answered correctly by interview location}
\begin{tabular}{lllll}
\hline
Interview Location & $n$ & Age in months ($SD$) & Age at EM ($SD$) & Number of RS correct ($SD$) \\
\hline
Childcare center #1 & 17 & 62.88 (16.20) & 24.29 (10.31) & 3.24 (1.72) \\
Childcare center #2 & 8 & 56.25 (9.63) & 38.00 (14.03) & 1.75 (2.32) \\
Private school #1 & 29 & 84.76 (20.24) & 35.04 (16.94) & 4.28 (2.34) \\
Private school #2 & 35 & 93.26 (18.14) & 37.64 (13.87) & 5.00 (1.82) \\
\hline
\end{tabular}
\end{table}
An additional set of preliminary analyses were conducted in order to determine if there were any systematic differences between participants with and without complete parent data. Across all participants, slightly more than half (53%) had parent interview data. Of those with parent data, 13% of the parent interviews were conducted over the phone while 40% were submitted via email. A one-way ANOVA was conducted to examine whether participants varied systematically by age across three groups: participants without parent data, with parent data obtained over the phone, and with parent data obtained via email. The results of this analysis revealed no significant differences among these groups in the age in months of the participants in each \[F(2, 90) = 2.21, p = .12\]. Therefore, each age group was equally represented among participants without parent data, those with data obtained over the phone, and those with parent data obtained via email (see Table 3).

Further analyses were conducted to examine any potential between-group differences among participants without parent data, those with parent data obtained over the phone, and those with parent data obtained via email on the primary dependent variables of interest: the number of remember scenarios answered correctly and participants’ age at their earliest memory. First, with regard to the number of remember scenarios answered correctly, a one-way ANOVA revealed that these groups were not significantly different \[F(2, 91) = 1.18, p = .31\]. Similarly, a separate one-way ANOVA indicated that there was no significant difference between the groups in their reported age at earliest memory \[F(2, 80) = .24, p = .79\]. Further, to examine group differences on these variables of interests between participants without parent data and those with parent data, across data collection methods, two independent samples t-tests were conducted. No group differences were revealed for either the number of remember scenarios answered correctly \(t = .67, p = .51\) or age at earliest memory \(t = .41, p = .68\). Because there
were no differences among participants based on whether or not they had parent data or how parent data were obtain on the primary variables of interest, this variable is not considered in subsequent analyses (see Table 3). Further, based on these analyses, there is no evidence that the parents’ reports for the subset of the sample for whom these data are available are not representative of the sample as a whole.

Table 3

Means for age in months, age at earliest memory (EM), and number of remember scenarios (RS) answered correctly by parent interview

<table>
<thead>
<tr>
<th>Parent Interview</th>
<th>n</th>
<th>Age in months (SD)</th>
<th>Age at EM (SD)</th>
<th>Number of RS correct (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No parent data</td>
<td>42</td>
<td>87.10 (21.53)</td>
<td>34.95 (15.56)</td>
<td>4.37 (1.98)</td>
</tr>
<tr>
<td>Phone</td>
<td>12</td>
<td>81.08 (20.93)</td>
<td>31.36 (18.17)</td>
<td>4.83 (2.29)</td>
</tr>
<tr>
<td>Email</td>
<td>37</td>
<td>76.59 (23.30)</td>
<td>34.30 (13.30)</td>
<td>3.81 (2.46)</td>
</tr>
</tbody>
</table>

Descriptive Results

Number of Memories Reported. Participants in each age group were prompted to recall up to five of their earliest memories. Across all age groups, participants recalled an average of 3.18 (SD = 1.69) memories with a range of zero to five memories. As can be seen in Figure 1, whereas there were participants in both of the younger age groups who were not able to recall any early memories during the interview, all participants in the third grade were able to produce at least two earliest memories. A one-way ANOVA revealed a significant difference in the number of memories recalled during the interview across age groups [$F(2, 91) = 22.82, p < .001$]. Bonferroni post hoc analyses indicated that participants in pre-kindergarten ($M = 1.90$, $SD = 1.63$) recalled significantly fewer earliest memories than participants in either first ($M = 3.52$,
SD = 1.41) or third grade (M = 4.24, SD = 1.02). The number of memories recalled for the oldest two age groups was not significantly different.

![Figure 1](image)

*Figure 1.* Percentage of children within each age group recalling 0, 1, 2, 3, 4, or 5 earliest memories.

As previously described, participants were prompted to recall up to five of their earliest memories. Given that the primary interest of this investigation is children’s *earliest* memories, the focus of the remainder of this descriptive summary is the memory narratives that describe the event that occurred earliest in time for each participant. Both child participants and their parents were asked to estimate the child’s age at the time of the event described in each memory narrative. Therefore, for participants with parental data, it is possible to examine both child and parent estimates of age at earliest memory. However, because parent data are not available for all participants, the descriptive results presented in the following summary and in the subsequently presented tests of the hypotheses examine child-provided estimates of age, unless otherwise indicated.
Content of Earliest Memories. The content of participants’ earliest memory narratives was coded into one of ten categories (see description in Method). The percentage of memories in each category is displayed in Table 4 for all participants, for boys and girls separately, and for each age group. None of the ten categories could be combined in a way that preserved the distinct nature of the memories contained in each, and as a result, the number of categorizations was too great to conduct meaningful analyses of group differences. Therefore, the following section provides a discussion of differences in the content of participants’ earliest memories based the percentage of memories in each classification; however, any differences identified have not been confirmed to be statistically significant.

Across all age groups, the greatest percentage of participants described memories that were categorized as play behaviors. The category of illnesses/accidents/deaths accounted for the next highest percentage of participants’ earliest memories. When gender is taken into consideration, however, it appears that while the content of boys’ memories mimics the general pattern of the sample overall, girls’ earliest memories were more equally distributed across categories and did not follow the same overall pattern of categorization. For boys, the greatest percentage of memories was categorized as play behaviors. Although illnesses/accidents/deaths accounted for the next highest percentage for boys, this category represented a much smaller percentage of their memories than play behaviors did. For girls, the reverse pattern was revealed. Specifically, the greatest percentage of girls’ earliest memories was categorized as illnesses/accidents/deaths, and play behaviors accounted for the second highest percentage of their memories.

When the content of children’s memories is considered for each age group individually, it appears that play behaviors characterize a large percentage of earliest memories for each age
group. For the youngest two age groups, this category accounts for the greatest percentage of their memories. For participants in pre-kindergarten, the second highest percentage of memories is vacations/out-of-town events. The categorization of earliest memories for participants in first grade, however, appears to mimic the pattern of the entire sample with illnesses/accidents/deaths accounting for the second highest percentage of memories. For participants in the oldest age group, illnesses/accidents/deaths accounts for the greatest percentage of memories followed by play behaviors. It is also interesting to note that participants in the third grade also described a relatively large percentage of memories that were categorized as transitions. No participants in pre-kindergarten described transitions, and compared to the third grade participants, a smaller percentage of the memories described by participants in the first grade were categorized as transitions. It is worth noting again, however, that these differences are descriptive in nature and have not been confirmed to be statistically significant.
Table 4

Percentage of Earliest Memories in each Content Category

<table>
<thead>
<tr>
<th>Category</th>
<th>Total</th>
<th>Male</th>
<th>Female</th>
<th>Pre-K</th>
<th>1st Grade</th>
<th>3rd Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vacations/Out-of-town events</td>
<td>7.6</td>
<td>4.3</td>
<td>10.9</td>
<td>12.5</td>
<td>9.7</td>
<td>0.0</td>
</tr>
<tr>
<td>Family interactions</td>
<td>3.3</td>
<td>4.3</td>
<td>2.2</td>
<td>0.0</td>
<td>3.2</td>
<td>6.9</td>
</tr>
<tr>
<td>Play behaviors</td>
<td>25.0</td>
<td>37.0</td>
<td>13.0</td>
<td>21.9</td>
<td>29.0</td>
<td>24.1</td>
</tr>
<tr>
<td>Birthday celebrations</td>
<td>8.7</td>
<td>10.9</td>
<td>6.5</td>
<td>9.4</td>
<td>9.7</td>
<td>6.9</td>
</tr>
<tr>
<td>Gifts/Objects</td>
<td>7.6</td>
<td>4.3</td>
<td>10.9</td>
<td>9.4</td>
<td>9.7</td>
<td>3.4</td>
</tr>
<tr>
<td>Illnesses/Accidents/Deaths</td>
<td>17.4</td>
<td>15.2</td>
<td>19.6</td>
<td>6.3</td>
<td>16.1</td>
<td>31.0</td>
</tr>
<tr>
<td>Transitions</td>
<td>8.7</td>
<td>6.5</td>
<td>10.9</td>
<td>0.0</td>
<td>6.5</td>
<td>20.7</td>
</tr>
<tr>
<td>Pets</td>
<td>2.2</td>
<td>2.2</td>
<td>2.2</td>
<td>6.3</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>School-related events</td>
<td>7.6</td>
<td>6.5</td>
<td>8.7</td>
<td>6.3</td>
<td>12.9</td>
<td>3.4</td>
</tr>
<tr>
<td>Misbehavior/Arguments</td>
<td>2.2</td>
<td>2.2</td>
<td>2.2</td>
<td>3.1</td>
<td>0.0</td>
<td>3.4</td>
</tr>
</tbody>
</table>

Emotional valence of Earliest Memories. For the purpose of describing the emotional valence of children’s earliest memories, participants were asked to describe and rate the intensity of their feelings at the time of the described event. This summary is limited to a description of the emotional valence (i.e., positive, negative, neutral) of participants’ earliest memories because a more in-depth analysis of emotional intensity is presented in a subsequent section.

Overall, the majority of earliest memory narratives described events that were labeled by the participants using positive emotion words. Specifically, of the 82 earliest memory narratives collected, 59 were positive in nature while only 22 were negatively valenced. Only one earliest memory narrative described an event that was labeled as neutral. (In order to conduct meaningful
analyses of group differences in emotional valence, this neutral memory narrative was removed from subsequent analysis of emotional valence.) A chi square analysis revealed that participants in each age group were not equally likely to label their earliest memories as positively valenced ($\chi^2 = 10.52, p = .005$). As illustrated in Figure 2, more participants in the youngest two age groups labeled their earliest memories as positively valenced; however, half of the participants in the oldest age group rated their earliest memories as being negatively valenced. Therefore, older participants were equally likely to recall a positive or a negative earliest memory whereas younger participants were more likely to recall a positively valenced earliest memory.

Figure 2. Percentage of children within each age group providing negatively, neutrally, and positively valenced earliest memories.

Tests of Main Hypotheses

Hypothesis 1: It was predicted that there would be an age-related increase in participants’ age at the time of the event described in their earliest memory narratives.

Specifically, across the three age groups, the earliest memory narratives of the oldest age group were expected to describe events that occurred at an older age than those recalled by the
younger two age groups. The earliest memory narratives of participants in pre-kindergarten were expected to describe events that occurred at the youngest age of all three groups. Further, it was expected that compared to male participants, female participants would recall events that occurred at a younger age.

As previously discussed, both child participants and their parents provided age estimates for each of the memories described during the child interview. Therefore, for participants with parent data, group differences in age at earliest memory were examined using both child and parent estimates, each of which are described in turn. First, to examine group differences in age at earliest memory for memories that were identified as occurring the earliest in time of all reported memories using child estimates of age, a 2 (gender) × 3 (age group) ANOVA was conducted. This analysis indicated no significant main effects of age group \( [F(2, 75) = .01, p = .99, \eta^2 < .001] \) or gender \( [F(1, 75) = .10, p = .75, \eta^2 = .001] \). Further, the age group by gender interaction was not significant \( [F(2, 75) = .16, p = .86, \eta^2 = .004] \). Therefore, for child-estimated earliest memories, there were no age-related or gender differences in the average age at earliest memory (see Table 5).

<table>
<thead>
<tr>
<th></th>
<th>Pre-K</th>
<th>1st Grade</th>
<th>3rd Grade</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>34.27 (15.67)</td>
<td>33.60 (19.12)</td>
<td>32.50 (12.12)</td>
<td>33.52 (15.77)</td>
</tr>
<tr>
<td>Female</td>
<td>33.43 (11.93)</td>
<td>34.00 (15.66)</td>
<td>36.35 (14.15)</td>
<td>34.92 (14.10)</td>
</tr>
<tr>
<td>Total</td>
<td>34.00 (14.30)</td>
<td>33.80 (17.17)</td>
<td>34.76 (13.26)</td>
<td>34.20 (14.91)</td>
</tr>
</tbody>
</table>

The previous analysis examined age-related and gender differences in mean age at earliest memory for memories occurring earliest in time based on child estimates of age. For
participants with parent data, it was also possible to examine group differences in mean age at earliest memory for these same memories using parent estimates of age. Parent and child estimates of age at earliest memory were significantly and positively correlated ($r = .43$, $p = .006$), such that as children’s estimates of age at earliest memory increased, parents’ age estimates also increased. Further, a paired samples t-test revealed that across all participants, although parents ($M = 38.38$, $SD = 18.74$) provided older estimates of age at earliest memory than child participants did ($M = 34.64$, $SD = 14.92$), this difference was not significant ($t = -1.28$, $p = .21$).

To examine whether parents and children differed in their estimates of age at earliest memory across age groups, a mixed model ANOVA was conducted, with source of age estimate (child vs. parent) as the within-participants factor and age group as the between-participants factor. The results of this analysis revealed a significant interaction between the source of the age estimate and age group on the age at earliest memory [$F(2, 36) = 3.56$, $p = .04$, $\eta^2 = .16$]. As illustrated in Figure 3, whereas child estimates were similar across age groups, parental estimates varied by age group. Specifically, as grade level increased, parental estimates of age at earliest memory decreased.
Additional analyses for age at earliest memories were possible for participants with parent data. In particular, parents were asked to indicate the degree to which the event described in their child’s earliest memory narrative had been a topic of family discussion and whether or not reminders of the event had been available to their child. Using child and parent age estimates, the following analyses examined the effects of each of these parent variables on age at earliest memory.

Discussion of the Earliest Memory. Using a scale from one (rarely or never) to three (often), parents were asked to indicate the extent to which the event described in their child’s earliest memory narrative had been a topic of family discussion. However, for the purpose of the following analyses, this variable was dichotomized to represent events that are rarely or never discussed and those that had been discussed with some frequency. It was necessary to dichotomize this variable because the sample size for each level of discussion was very small when each was maintained separately. The following analyses examine the effect of familial
discussion of the event described in the earliest memory narrative by age group and by gender on age at earliest memory using both child and parent estimates.

Beginning with age group differences in age at earliest memory using child estimates, a 2 (discussion) × 3 (age group) ANOVA revealed that neither the main effect of discussion \( [F(1, 33) = .08, p = .77, \eta^2 = .003] \) nor of age group \( [F(2, 33) = .07, p = .93, \eta^2 = .004] \) were significant. Further, the discussion by age group interaction was not significant \( [F(2, 33) = 1.22, p = .31, \eta^2 = .07] \). Therefore, using child estimates of age, age at earliest memory did not significantly differ across age groups nor did it differ based on whether or not the event described in the earliest memory narrative was a source of family discussion. However, using parental estimates of age at earliest memory, a 2 (discussion) × 3 (age group) ANOVA revealed a main effect of discussion that approached significance \( [F(1, 34) = 3.78, p = .06, \eta^2 = .10] \). As illustrated in Figure 4, across age groups, parents who report some discussion of the event described in the earliest memory narrative estimated a younger age at earliest memory \((M = 31.42, SD = 18.23)\) compared to parents who report no or only rare discussion of the event \((M = 44.29, SD = 17.01)\). There was no significant main effect of age group \( [F(2, 34) = 1.47, p = .24, \eta^2 = .08] \), and the age group by discussion interaction was not significant \( [F(2, 34) = .31, p = .74, \eta^2 = .02] \).
To examine whether there were gender differences in age at earliest memory depending on whether or not the event described in the earliest memory narrative was a topic of family discussion, a 2 (discussion) × 2 (gender) ANOVA was conducted. This analysis indicated that neither the main effect of discussion \( F(1, 35) = .17, p = .68, \eta^2 = .005 \) nor of gender \( F(2, 34) = .51, p = .48, \eta^2 = .01 \) was significant. Further, the discussion by gender interaction was not significant \( F(1, 35) = .34, p = .56, \eta^2 = .01 \). Therefore, using child estimates, age at earliest memory did not differ by gender, and there were no differences in age at earliest memory for events that parents indicated were a topic of some family discussion and those that were not.

However, using parental estimates of age at earliest memory, a 2 (discussion) × 2 (gender) ANOVA, revealed a significant main effect of discussion \( F(1, 36) = 5.73, p = .02, \eta^2 = .14 \). As illustrated in Figure 5, across age groups, parents who report some discussion of the event described in the earliest memory narrative estimated a younger age at earliest memory \((M = 31.42, SD = 18.23)\) compared to parents who report no or only rare discussion of the event \((M = \)
44.29, $SD = 17.01$). There was no significant main effect of gender $[F(1, 36) = .83, p = .37, \eta^2 = .02]$, and the age group by discussion interaction was not significant $[F(1, 36) = .37, p = .55, \eta^2 = .01]$.

![Figure 5](image)

*Figure 5.* The effects of gender and level of discussion on parental estimates of age at earliest memory.

**Reminders of the Earliest Memory.** Parents were asked to indicate whether or not their child had access to reminders, such as pictures or souvenirs, of the event described in their child’s earliest memory narrative. The following analyses examine the effect of event reminders by age group and by gender on age at earliest memory using both child and parent estimates.

Beginning with age group differences in age at earliest memory using child estimates, a 2 (reminders) × 3 (age group) ANOVA revealed that neither the main effect of reminders $[F(1, 34) = .112, p = .30, \eta^2 = .03]$ nor of age group $[F(2, 34) = .04, p = .97, \eta^2 = .002]$ were significant. Further, the reminders by age group interaction was not significant $[F(2, 34) = .17, p = .84, \eta^2 = .01]$. Therefore, using child estimates of age, age at earliest memory did not significantly differ across age groups and did not differ based on whether or not parents reported that reminders of
the event described in the earliest memory narrative were available to their child. However, using parental estimates of age at earliest memory, a 2 (reminders) × 3 (age group) ANOVA revealed a significant main effect of reminders $[F(1, 34) = 5.57, p = .02, \eta^2 = .14]$. As illustrated in Figure 6, across age groups, parents who reported that reminders were available estimated a younger age at earliest memory ($M = 32.05, SD = 14.82$) compared to parents who reported that no reminders were available ($M = 45.67, SD = 20.25$). Further, the analysis revealed a main effect of age group that approached significance $[F(2, 34) = 2.86, p = .07, \eta^2 = .14]$. As illustrated in Figure 6, independent of whether or not reminders of the event described in the earliest memory narrative were available, parents of children in the third grade ($M = 28.45, SD = 18.37$) estimated the youngest age at earliest memory followed by estimates for children in first grade ($M = 39.94, SD = 21.11$) and children in pre-kindergarten ($M = 44.23, SD = 12.24$). The age group by reminders interaction was not significant $[F(2, 34) = .76, p = .48, \eta^2 = .04]$. 
To examine whether there were gender differences in age at earliest memory depending on whether or not event reminders were available to the child, a 2 (reminders) \( \times \) 2 (gender) ANOVA was conducted. Using child estimates of age at earliest memory, this analysis indicated that neither the main effect of reminders \( [F(1, 36) = 2.33, p = .14, \eta^2 = .06] \) nor of gender \( [F(1, 36) = 1.73, p = .20, \eta^2 = .05] \) was significant. Further, the reminders by gender interaction was not significant \( [F(1, 35) = 2.08, p = .16, \eta^2 = .06] \). Therefore, using child estimates, age at earliest memory did not differ by gender, and there were no differences in age at earliest memory regardless of whether or not parents indicated that reminders of the event described in the earliest memory narrative were available to their child. However, using parental estimates of age at earliest memory, a 2 (reminders) \( \times \) 2 (gender) ANOVA, revealed a significant main effect of reminders \( [F(1, 36) = 7.37, p = .01, \eta^2 = .17] \). As illustrated in Figure 7, across gender, parents who reported that event reminders were available to their children estimated a younger age at earliest memory \( (M = 32.05, SD = 14.82) \) compared to parents who reported that no event

\[\text{Figure 6. Parental Estimates of age at earliest memory by age group and by the availability of event reminders.}\]
reminders were available ($M = 45.67, SD = 20.25$). There was no significant main effect of gender [$F(1, 36) = 1.04, p = .32, \eta^2 = .03$], and the reminders by gender interaction was not significant [$F(1, 36) = 2.45, p = .13, \eta^2 = .06$].

![Graph showing age at earliest memory by gender and availability of event reminders](image)

**Figure 7.** Parent estimates of age at earliest memory by gender and by the availability of event reminders.

**Hypothesis 2:** A gender difference in the emotional valence of participants’ earliest memories was predicted. Across all age groups, compared to male participants, female participants were expected to rate their memories as being more emotionally charged.

Participants were asked to label and rate the intensity of their feelings at the time of the event described in their earliest memory narratives. To examine gender differences in the emotional valence of participants’ earliest memories, the labels provided by participants to describe their feelings at the time of the event were categorized as positively or negatively valenced or neutral. However, only one earliest memory was labeled by a participant as being emotionally neutral; therefore, this memory was excluded from analyses examining group
difference in valence. A chi square analysis revealed that male and female participants did not differ in the emotional valence of their earliest memories ($\chi^2 = .15, p = .70$). Therefore, compared to male participants, female participants were not more likely to label their earliest memory narratives as positively valenced.

In addition to examining emotional valence, gender and age-related differences in intensity ratings of earliest memories were assessed. Participants were asked to rate their feelings at the time of the event using a rating scale that ranged from -3 (really [negative emotion label]) to 3 (really [positive emotion label]). To eliminate the effect of emotional valence on participants' intensity ratings, the absolute value of the ratings (i.e., one to three) was examined. With regard to gender, a chi square analysis revealed that male and female participants did not differ in their intensity ratings of their earliest memories ($\chi^2 = .96, p = .62$). A separate chi square analysis examining age differences, however, did reveal a marginally significant effect ($\chi^2 = 9.01, p = .06$). Specifically, as illustrated in Figure 8, participants in pre-kindergarten and in first grade rated their earliest memories as more emotionally intense than those in third grade did.

![Figure 8. Mean emotional intensity ratings of earliest memories by age group.](image-url)
Hypothesis 3: It was expected that female participants would recall their earliest memory narratives in the form of a plotted story, and male participants would recall their earliest memory narratives in the form of moment-in-time descriptions (as described by Peterson et al., 2005).

Participants’ earliest memory reports were classified as plotted stories, moment-in-time descriptions, and repeated events (see Table 6). Only one participant in each age group described an earliest memory that was categorized as a repeated event; therefore, analysis of the structure of participants’ earliest memory narratives excluded these participants’ earliest memory narratives. A chi square analysis revealed that male and female participants did not differ in the structure of their earliest memories ($\chi^2 = 3.04, p = .29$). Therefore, neither male nor females participants were more likely to report their earliest memories in the form of a plotted story.

<table>
<thead>
<tr>
<th>Structure</th>
<th>Total ($N = 83$)</th>
<th>Male ($n = 43$)</th>
<th>Female ($n = 40$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moment-in-time</td>
<td>42</td>
<td>22</td>
<td>20</td>
</tr>
<tr>
<td>Plotted story</td>
<td>38</td>
<td>18</td>
<td>20</td>
</tr>
<tr>
<td>Repeated event</td>
<td>3</td>
<td>3</td>
<td>0</td>
</tr>
</tbody>
</table>

Hypothesis 4: An age-related increase in participants’ understanding of remember was predicted as indicated by their correct identification of the mental state of remembering in various scenarios. Participants in the oldest age groups were expected to perform at ceiling (i.e., answer all seven scenarios correctly) and better than participants in the youngest two age groups. Participants in the pre-kindergarten group were expected to demonstrate the poorest understanding of remember. It was further expected that participants who had the poorest
performance on the remember scenarios would report an earlier age of first memory, arising from vague reports of infant experiences that were unlikely to be veridical.

Chi square analyses revealed significant age group differences in the correctness of participants’ responses to each of the remember scenarios (see Table 7). A one-way ANOVA was conducted to examine age group differences in the total number of remember scenarios answered correctly. The results of this analysis revealed a significant main effect of age \( F(2, 91) = 89.05, p < .001 \). Bonferroni post hoc analyses indicated that there was an age-related increase in participants’ performance on the remember scenarios. Participants in the third grade answered more scenarios correctly than the participants in second grade did, who in turn answered more scenarios correctly than the participants in pre-kindergarten did (see Figure 9).

Table 7

<table>
<thead>
<tr>
<th>Scenario</th>
<th>( \chi^2 )</th>
<th>Pre-K (n=32)</th>
<th>1st Grade (n=31)</th>
<th>3rd Grade (n=29)</th>
<th>Total (N=92)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lee went to grocery store</td>
<td>40.66*</td>
<td>6</td>
<td>22</td>
<td>28</td>
<td>56</td>
</tr>
<tr>
<td>Lee went to visit grandmother a long time ago</td>
<td>43.59*</td>
<td>8</td>
<td>27</td>
<td>28</td>
<td>63</td>
</tr>
<tr>
<td>Lee’s friend, Taylor, went to gas station</td>
<td>41.56*</td>
<td>7</td>
<td>25</td>
<td>27</td>
<td>59</td>
</tr>
<tr>
<td>Lee is asleep; mom turns off nightlight</td>
<td>36.87*</td>
<td>12</td>
<td>29</td>
<td>28</td>
<td>69</td>
</tr>
<tr>
<td>Lee’s friend, Taylor, is awake; gets water</td>
<td>29.24*</td>
<td>15</td>
<td>28</td>
<td>29</td>
<td>72</td>
</tr>
<tr>
<td>Lee got first present when one day old</td>
<td>17.50*</td>
<td>7</td>
<td>19</td>
<td>21</td>
<td>47</td>
</tr>
<tr>
<td>Picture of Lee on day of birth</td>
<td>11.28*</td>
<td>2</td>
<td>7</td>
<td>12</td>
<td>21</td>
</tr>
</tbody>
</table>

Note. * \( p < .005 \)
Additional analyses examined whether participants who performed more poorly on the remember scenarios were more likely than those who performed well to provide memory narratives that described events that were not likely to be veridical based on the age at which the memory occurred. To investigate this research question, I focused on the participants’ reports of implausible memories. As previously described, implausible memories were memories of events that were unlikely to be based on actual recall but instead on knowledge of or beliefs about an event (e.g., participants’ own birth, getting first tooth). As a conservative estimate, events that were pre- or peri-natal in nature and those that represented milestones that typically occur during the first year of life were coded as implausible. In addition, memories that likely occurred at or prior to twelve months and that participants estimated to have occurred at or prior to this age were coded as implausible. Such implausible memories were not included on the parent interview. Therefore, age at earliest memory is not a meaningful variable to examine because this
variable represents memories for events that participants estimated occurred after twelve months of age or that were likely to have occurred after this age. The following analysis thus examines participants’ spontaneous reports of implausible memories.

The interviewer typically ceased prompting for memories if participants provided two consecutive implausible memories; therefore, participants had a limited opportunity to report implausible memories. Of primary interest to this analysis is whether or not participants in each age group introduced an implausible memory and if the introduction of an implausible memory is related to participants’ performance on the remember scenarios. Therefore, participants were categorized as having reported either zero or at least one implausible memory.

To investigate whether performance on the remember scenarios was related to participants’ reporting of implausible memories for each age group, a 2 (implausible memory categorization) × 3 (age group) ANOVA was conducted. As expected, the results of this analysis revealed a significant main effect of age group \(F(2, 86) = 75.47, p < .001, \eta^2 = .64\). As previously noted, participants in the third grade answered more scenarios correctly than the participants in second grade did, who in turn answered more scenarios correctly than the participants in pre-kindergarten did (see Figure 9, above). This analysis further revealed that the main effect of implausible memory status was not significant \(F(1, 86) = 1.11, p = .30, \eta^2 = .01\). Therefore, independent of age group, participants who reported no implausible memories and those who reported at least one implausible memory did not differ on their performance on the remember scenarios. Of greatest interest, however, was the significant implausible memory status by age group interaction \(F(2, 86) = 3.48, p < .05, \eta^2 = .08\). This interaction indicates that the effect of age group on remember scenario performance was different for those who reported
at least one implausible memory and those who did not. This interaction is illustrated graphically in Figure 10.

![Bar chart showing number of correct responses by age group and implausible memories]

**Figure 10.** Number of remember scenarios answered correctly by age group and by reporting of implausible memories.

Post hoc tests indicated that among participants who did not report any implausible memories, those who were in the first ($M = 5.21, se = .29$) or third grade ($M = 5.96, se = .26$) performed significantly better on the remember scenarios than participants who were in pre-kindergarten ($M = 1.22, se = .30$). The difference in the performance of participants who did not report any implausible memories and who were in two older groups on the remember scenarios approached significance ($p = .06$), but was not statistically distinct. Similarly, among participants who reported at least one implausible memory, those who were in the first ($M = 4.83, se = .36$) or third grade ($M = 6.00, se = .56$) performed significantly better on the remember scenarios than participants who were in pre-kindergarten ($M = 2.50, se = .34$). Among those who reported at least one implausible memory, the difference in the performance on the remember scenarios for those in the two older groups approached significance ($p = .09$), but was not statistically distinct.
Moreover, there was a significant difference in performance on the remember scenarios between those who did not report an implausible memory and those who reported at least one, but only for participants in pre-kindergarten. Counter to expectations, participants in pre-kindergarten who reported at least one implausible memory \((M = 2.50, se = .34)\) performed better on the remember scenarios than those who did not \((M = 1.22, se = .30)\). Possible explanations for this finding are discussed in greater detail in the subsequent section.

**Discussion**

The primary aim of this investigation was to examine age-related differences in children’s earliest memories. A secondary aim of this research was to support and assess children’s understanding of what it means to remember, and to examine whether or not this understanding is related to their earliest memory recall. Four major findings emerged from this investigation. In this section, I review the major findings of the current research, discuss the extent to which they are consistent with previous research, and offer explanations for unpredicted results. Finally, I examine the strengths and weaknesses of the current investigation and discuss directions for future research.

**Major Results**

First, no gender or age-related differences in age at earliest memory were found when child estimates of age at the time of the event were examined. When considering parental estimates of age for these same memories, however, there was some evidence of age-related differences in age at earliest memory. Second, male and females participants did not differ with regard to the emotional valence or intensity of their earliest memories. Third, there were no gender differences in the structure of participants’ earliest memory narratives. Male and female participants recalled their earliest memories in the form of plotted stories and moment-in-time
descriptions with equal frequency. Fourth, based on participants’ performance on the Remember Scenarios, there appears to be an age-related increase in children’s understanding of what it means to remember. However, there was some evidence that children who performed better on these questions were no less likely to report implausible memories than were those who performed poorly. Specifically, pre-kindergarten participants who reported at least one implausible memory did better on the Remember Scenario questions than those who reported no implausible memories. Each of these findings is discussed below.

**Age at Earliest Memory**

*Child estimates of age at earliest memory.* The current investigation adds to a limited body of extant research on children’s earliest memories. Only two previous investigations explicitly asked children to recall their earliest memories (i.e., Peterson et al., 2005; Wang, 2004). Across all age groups, the mean age at earliest memory in the current investigation was 34.20 months ($SD = 14.91$) based on child estimates of age. The participants in Wang’s (2004) study were in preschool, kindergarten, and second grade. Although she included a younger age group than was included in the current study, the participants in each study were similar in age. Relying on child estimates of age, Wang found a mean age at earliest memory of 28.28 months. Using a much broader age range (i.e., participants were six to nineteen years of age), Peterson and colleagues (2005) reported a mean child-estimated age at earliest memory of 44.7 months. Focusing on the six- to nine-year-old children in their study (i.e., the age group that was closest in age to the participants in the current investigation), the mean child-estimated age at earliest memory was 39.3 months. Therefore, the mean child-estimated age at earliest memory for this age group was higher than that for the total sample of the current study. The mean age at earliest memory for participants in Wang’s study, however, was much lower than the mean age estimates
derived from Peterson and colleagues’ research and was slightly lower than that derived from the current investigation.

The relatively lower mean age at earliest memory found in Wang’s (2004) research may reflect several differences between her study and both the current investigation and the work by Peterson and colleagues (2005). First, participants in both the current investigation and in Peterson and colleagues’ study were asked specific questions which were intended to help them localize the events described in their earliest memory narratives in time. The participants in Wang’s research were not provided such support. Second, whereas implausible memories were excluded from the current investigation and in the research by Peterson and others, it is not clear whether implausible memories were included in Wang’s analyses. In the event implausible memories were retained, the nature of the memories would reduce the mean age at earliest memory for the sample as whole.

**Parental Estimates of Earliest Memory.** Both Peterson et al. (2005) and the present investigation sought parental age estimates for each memory reported. In the current investigation, however, child estimates of age at were used to identify the earliest of all memories reported by each participant. This decision reflects the fact that parent data were available for only half of the participants. Peterson and colleagues obtained parent data for all of their participants and elected to use the parental estimate in their analyses. Comparing the mean parent-estimated age at earliest memory obtained in the current investigation (38.2 months) to that obtain in Peterson and others’ research for their youngest age group (36.1 months), the difference in age at earliest memory between these investigations is reduced. Although merely speculation, perhaps this similarity in parent-estimated age at earliest memory across these studies indicates that parents’ estimates of age are more accurate than child estimates are.
Group differences in age at earliest memory. It was expected in the present investigation that age at earliest memory would increase across the three age groups with participants in the oldest group expected to recall events that occurred latest in time. In addition, female participants were expected to recall events that occurred earlier in time than male participants were. Neither of these hypotheses was supported, however. Using child estimates of age, participants in each age group and both male and female participants provided similar age estimates.

Additional evidence regarding age-related differences in children’s age at earliest memory was provided from these parental estimates of age at earliest memory. Whereas children in each age group estimated similar ages at earliest memory, parental estimates of age at earliest memory for these same memories revealed age-related differences. Specifically, a difference between child and parents estimates that neared significance indicated that parents of children in the youngest age group estimated an older age at earliest memory than the parents of children in the two older age groups. Although not statistically significant, counter to the expected direction of the age effect, parents of third grade children estimated the youngest age at earliest memory.

Assuming parents were able to provide more accurate estimates of age than their children were, this suggests that there is in fact variability in the age at which the events described in participants’ earliest memory narratives occurred. In addition, it appears that there is an age-related increase in the correspondence between child and parent estimates of age at earliest memory with participants in pre-kindergarten and their parents showing the greatest average difference in their age estimates. Pre-kindergarten children may simply lack the ability to correctly estimate their age at the time of their early experiences (see Friedman, 1992). For example, one study found that not until third grade did about half of the participants correctly
recall information about the time of day, month, and season in which two staged events occurred (Friedman & Lyon, 2005).

For participants with parent data, it was possible to examine additional group differences in children’s age at earliest memory. Specifically, familial discussion and other tangible reminders of the events described in children’s earliest memory narratives were found to have an effect on children’s age at earliest memory. Parents who reported that their children engage in some familial discussion of the event described in their earliest memory narratives estimated a younger age at earliest memory than parents who reported that there is little or no discussion of the event. Similarly, parents who reported that their children have some access to tangible reminders of the event described in their earliest memory narratives (e.g., photos or souvenirs) estimated a younger age at earliest memory than parents who reported that that their children do not have access to tangible reminders of the event. As noted, these findings emerged using parental estimates of age. No differences emerged when differences in child-estimated age was examined, likely arising from the similarity of age estimates provided by participants in each age group. In addition, there were no gender differences in familial discussion or reminders of the events described in participants’ earliest memory narratives.

There are a variety of possible explanations for the differences in age at earliest memory between participants with and without familial discussion and exposure to reminders of the events described in their earliest memory narratives. First, it could simply be the case that events that have been discussed and those for which there are reminders are more salient in general, and thus are more likely to be remembered. Perhaps there may be earlier ages at first memory for events that are accompanied by discussions and reminders because these events were more personally significant. Second, child reports of events that are accompanied by discussions and
reminders may be based more on knowledge than memory, per se. These differences in age at earliest memory between participants may arise from errors in children’s source monitoring. For example, young children may not be able to appreciate that their knowledge of an event stems from stories about when they were infants. In other words, the exposure to familial discussion and reminders of the events they described in their earliest memory narratives may be leading to reports of events about which they have knowledge but for which they lack an ability to remember the source of that knowledge. Children may not be able to appreciate that the ability to think about an event does not equate the ability to remember it. Children at older ages may be objectively aware of the limitations of memory (e.g., that it is not possible to remember perinatal events); however, this awareness may not be sufficient to override their beliefs that because they can think about an event, they remember it. Finally, discussions and reminders of events provide an opportunity for reinstatement of the memory representation. Thus, children may report earlier first memories when these events have been scaffolded through familial discussions and tangible reminders (Fivush, Reese, & Haden, 2006).

Emotional Valence

Although female participants were expected to report memories that were more emotionally charged, no gender differences emerged. No *a priori* predictions regarding age-related differences were made regarding emotional valence or intensity; however, exploratory analyses revealed age-related differences in the emotional valence of participants’ earliest memories and their intensity ratings. With regard to the emotional valence of participants’ earliest memories, younger participants were more likely to report positively valenced events than negative, whereas participants in the third grade reported both with nearly equal frequency. Further, on average, participants in the first grade rated their earliest memories as more
emotionally intense than participants in the third grade did. This difference likely reflects first
grade participants’ greater likelihood of rating their memories as either “medium” or “really”
intense than “a little” intense as compared to participants in the third grade.

As noted above, the current investigation found that the emotional valence of memories
differed across the age groups examined such that participants in the third grade reported both
positively and negatively valenced memories with equal frequency, but participants in the
younger age groups recalled more positively valenced events. Whereas only one earliest memory
in the current investigation was labeled as neutral, Peterson and her colleagues characterized the
majority of the earliest memories recalled by their participants as neutral. Further, only when
their oldest two age groups (i.e., 14-19 years of age) were combined did they find evidence of
greater emotional expression, and it was positive in valence. Wang (2004) also reported an age-
related difference in emotional expression, with participants in second grade providing more
emotion expression than preschool children. The different patterns of age differences that
emerged across these studies likely stems from an important methodological difference between
the investigations, namely the means by which emotional valence was determined. Both Wang
and Peterson and her colleagues categorized their participants’ narratives as positive, negative, or
neutral based on the presence or absence of emotion expressions. The current study, however,
relied on participants’ generation of emotion labels to self-categorize their memories.

**Narrative Structure**

Female participants were expected to report memories that were more often recalled in
the form of a plotted story; however, no gender differences emerged. Additionally, no age-
related differences were found for narrative structure. Across all participants, moment-in-time
descriptions and plotted stories were reported with nearly equal frequency.
Both the current study and Peterson and colleagues (2005) examined the structures of children’s earliest memory narratives. Neither investigation found a significant gender or age-related difference in the structure of children’s earliest memory narratives. Whereas the differences were not significant in Peterson’s youngest age group, these participants’ earliest memories were most often recalled in the form of a moment-in-time description, followed by plotted stories and repeated events. Only three earliest memory narratives in the current study were characterized as repeated events. This difference is likely the result of additional prompting in the current study. When participants reported a repeated event, the interviewer asked them if they could think of a specific instance within the repeated event. Therefore, narratives of this type were reduced.

**Age-Related Differences in Performance on Remember Scenarios**

Participants’ performance on the Remember Scenarios increased across the three age groups. Children in pre-kindergarten on average got less than two of the remember scenarios correct, whereas children were on average getting almost six of the seven scenarios correct in third grade. Additionally, analyses revealed age-related increases in the likelihood that children would respond appropriately for each individual scenario. Surprisingly, within the sample of pre-kindergarten children, those who remembered at least one implausible memory answered more of the Remember Scenarios correctly than children who did not provide an implausible memory. No significant differences were found between those who did and did not provide an implausible memory in first or third grade. It was expected that children who provided at least one implausible memory would have a lesser understanding of memory, and would therefore be likely to do poorly on the Remember Scenarios. Thus, the finding for the pre-kindergarteners that they did better on the Remember Scenarios when they also provided at least one implausible
memory is certainly counter-intuitive and difficult to explain. Future research should determine whether this finding can be replicated, or whether it was just a chance occurrence in the present study.

**Narrative Content**

In addition to the major findings, the current investigation also explored the content of children’s earliest memories. Content categories were examined in both the current study and in the research by Peterson and others (2005). Whereas Peterson defined only four categories, the currently study included 10 distinct content categories. The majority of earliest memories were classified as miscellaneous in Peterson’s study. In the current work, no one category received the majority of the memories. Although the utility of Peterson’s more parsimonious coding scheme is appreciated, categories were not collapsed in the current study in the interest of being able to more clearly describe the types of events that children describe in their earliest memory narratives.

Interestingly, both studies identified similar categories as including higher percentages of memories than others. Specifically, Peterson found a gender difference in content with girls more often discussing events that were labeled “trauma” and with boys more often recalling play behaviors. A similar pattern emerged in the current study although differences were not statistically evaluated. For girls, the greatest percentage of earliest memories was categorized as illnesses/accidents/deaths, and play behaviors accounted for the second highest percentage of their memories. For boys, the reverse pattern was revealed. The greatest percentage of memories recalled by boys was categorized as play behaviors. Although illnesses/accidents/deaths accounted for the next highest percentage, this category represented a much smaller percentage of their memories than play behaviors did.
Limitations of the Current Study

This study anticipated and corrected many of the methodological limitations of previous investigations of children’s earliest memories. However, this investigation is not free from errors and also provides opportunities for improvement. One limitation centers on the parent interview. Parents were asked to rate their confidence that their child’s earliest memories actually occurred on a scale from one to seven. The question was intended to provide a means by which memories that were not veridical could be excluded from analyses. However, parents’ various interpretations of that question were not anticipated. For example, whereas some parents treated the question as a rating of the accuracy of the description of the event, others interpreted the question as an assessment of their beliefs regarding their child’s ability to recall the event (most often based on the time that had elapsed since the event or the child’s age at the time of the event). Still other parents took the question for face value, and indicated their confidence that the event occurred. However, problems with the question are evident—even when it is interpreted as envisioned. For example, some participants described events that did occur but that occurred prior to their birth. Parents of these children who correctly interpreted the question as a request for them to indicate their level of confidence that the event occurred provided a rating that is not useful for eliminating implausible memories.

Re-wording the question to clarify its meaning or including more than one event rating scale would be more beneficial than the current confidence rating scale. Specifically, having information about the parents’ confidence that the event occurred is not as useful as having a rating that indicates the level of their child’s accuracy in recalling the event would be. Perhaps even more informative would be a rating that indicated the extent to which parents believe that their child is recalling the event from memory or instead knows of the event from familial
discussions or other reminders of the event. Essentially, however, the confidence rating is of limited use because it only permits an assessment of whether or not participants are recalling events that their parents can confirm did occur. Further, given the various interpretations of the question, the data that are available should be interpreted with care.

Another limitation of the current study is the return rate for the parent interviews. Although approximately half of the participants’ parents answered the follow-up questions, thereby providing invaluable information about their children’s memories, evaluation of these data is limited because the sample size may be too small for analyses to detect significant differences. Therefore, to include the maximum number of participants in the analyses, it was often necessary to use child estimates of age at earliest memory. In light of evidence that suggests children have difficulty making time judgments (Friedman, 2002), however, there is reason to believe that parental estimates of age at earliest memory are may be more accurate and thus valuable for identifying between-group differences.

Another limitation of the current study is the interviewers’ consistency of responding to participants’ implausible memory reports. Although every effort was made to anticipate and respond consistently to participants, this goal was not achieved with regard to reports of implausible memories. Specifically, on some occasions, when participants introduced an implausible memory, the researcher requested a different memory and did not again address the participants’ implausible memories. On other occasions, however, after prompting for a different memory, the interviewer returned to the implausible memory, and said to the participant, “You told me about the time you [implausible memory event, e.g., drinking from baby bottle]. Do you really remember when you did that?” Therefore, not all participants were given equal opportunity to recant their implausible memory reports whereas others were. Although it may be
informative when participants report an implausible memory—regardless of whether or not it is recanted—it is also informative to know whether or not children are able to re-evaluate their memory reports and to apply their knowledge regarding what it means to remember. Unfortunately, inconsistency across participants does not make this comparison possible. Further, implausible memories were counted for all participants, regardless of whether or not the interviewer gave the participant an opportunity to recant. This count still permits an examination of differences between participants who do not introduce implausible memories and those who do. However, this method subsumes participants who know to recant their implausible memory reports with those who do not, thereby glossing over a potentially important distinction.

In the present investigation, we examined the content of children’s earliest memories using 10 distinct content categories. This large number of categories made examinations of statistical differences between groups impossible. While it might have been possible to collapse categories, doing so would have resulted in a loss of clear descriptions of the types of events that children recalled as their earliest memories. Peterson at al. (2005) used only four categories for their content coding, allowing for a more parsimonious, but less descriptive examination. As mentioned above, most of the earliest memories in Peterson’s study were coded as miscellaneous, leading to some ambiguity regarding the types of events children were actually describing. Future work should strive to find balance between the methods of content coding used in Peterson at al. (2005) and the present investigation.

**Strengths of the Current Study**

Despite the limitations of the current investigation, it is worthwhile to revisit the many strengths of this study. First, this study provided participants with support for understanding what it means to remember. This scaffolding, which is unique to this investigation, allowed
participants to think about what is required to remember past events and allowed researchers an opportunity to assess participants’ understanding of this mental state term. An understanding of the verbs *remember* and *forget* “reflects and is a fundamental part of a person’s metamemory,” which is an individual’s knowledge of memory (Wellman & Johnson, 1979, p. 79). By supporting participants’ appreciation of what it means to remember, the inclusion of the Remember Scenarios was intended to assist participants to meaningfully respond to queries about their autobiographical memories. Although any benefit of this support for participants’ recall of earliest memories may not be readily evident in the results of this study, it is nonetheless informative that participants who appear to demonstrate an understanding what it means to remember still provide reports of implausible memories. This may suggest that although children possess a nascent understanding of the remember-know distinction, they are still struggling with its application in searches of their own autobiographical past.

An additional strength of this investigation is the way in which the emotional valence of children’s earliest memories was assessed. Previous investigations of children’s earliest memories (Wang, 2004; Peterson et al., 2005) utilized coding schemes that required explicit reference to emotion in the participants’ reports of their earliest memories. Using this approach to evaluate emotionality, Peterson and colleagues found that the majority of earliest memory narratives were characterized as being neutral in tone. By requiring explicit references to emotion, the researchers may have failed to acknowledge the participants’ perspective regarding the emotionality of their past experiences and instead focused on the extent to which participants included specific references to emotion. The present investigation revealed that when participants were asked directly to describe their feelings at the time of the events described in their earliest memory narratives, the majority of children indicated that the event was positively
valenced. However, participants in the oldest age group were equally likely to report positive and negative experiences as their earliest memory. The methodology used in previous research was limited in that prevented the detection of these important findings.

The results of this investigation contribute to the limited extant literature by providing support for previous research findings and extending what is known about children’s earliest memories. Beyond providing support for the extant literature, however, this study improved upon previous investigations by addressing methodological limitations. In particular, both child and parent estimates of age at earliest memory were gathered, which provided an opportunity to validate children’s age estimates. This study helped to elucidate potential effects of familial discussion and reminders of past events on recall. Together, this information helps to localize the remembered events in time and identify factors that my aid children’s recall of their earliest memories.

*Recommendations for Future Research*

The present investigation did not find age-related changes in the age at earliest memory as estimated by children. It may be important to examine density of earliest memories rather than age at one earliest memory in future investigations. Weigle and Bauer (2000) found no difference in the age of earliest memory between deaf and hearing adults. They did find differences, however, in the density of their earliest memories (as measured by the average of their two earliest memories). It may be that density of earliest memories is also a variable of interest in identifying patterns of development across the childhood years. However, given the possible limited utility of child age estimates, such analyses may be more likely to reveal differences when parent estimates of age are examined. Future studies should gather alternative parent contact information to maximize the parent interview completion rate.
The age-related differences in performance on the Remember Scenarios were an exciting finding that will be explored in planned future studies. By assessing participants’ ability to apply their understanding of remember to scenarios about a fictional character, the present study revealed interesting age-related differences in the development of metamemory across the childhood years. Future research will seek to further elucidate children’s understanding of the mental state term *remember*. Although this study provided a foundation for future investigations of children’s meta-autobiographical memory, the artificial nature of the task used in this study may limit the generalizability of the findings to real-life applications. One possible avenue for future research may be to examine children’s ability to classify self-relevant experiences as being those about which they either: 1) have knowledge, 2) remember, or 3) lack knowledge. This may be accomplished by having parents nominate child-relevant early-life experiences. Children’s ability to categorize these events may further elucidate the development of children’s meta-autobiographical memory and would allow an investigation of children’s application of their understanding of remember to their own autobiographical past but in a format that may be less cognitively demanding than the recall requested of participants in the present investigation.

The current research has helped to provide a foundation upon which future investigations of children’s meta-autobiographical memory can build. The results of this investigation provide additional knowledge regarding children’s ability to search their autobiographical memory. The next step is to further evaluate how children come to apply their understanding of what it means to remember to their own life experiences.
References


Pratt, C., & Bryant, P. (1990). Young children understand that looking leads to knowing (so long as they are looking into a single barrel). *Child Development, 61, 973-982.*


Appendix
Appendix A

PARENT COVER LETTER

[Date Here]

Dear Parents,

I am a Psychology graduate student at NC State University, and I am currently conducting a research project examining age-related differences in children’s early memories that will fulfill, in part, the requirements for my master’s degree. I am interested in recruiting students in pre-kindergarten, first, and third to take part in this project. The principal of [name of childcare center/school], [name of program director/principal], has graciously approved this project and provided the opportunity for your child to participate.

Although previous research has examined adults’ early memories, little research has explored children’s early memories. The purpose of this research is to learn more about typical memory development, including the types of events that children recall from early in life.

With your permission, your child will be interviewed individually at [name of childcare center/school]. Interviews will be audio recorded. Each child in the study will be asked to describe several early experiences. Children will also be asked several questions to help them determine at what age the event occurred. For example, the interviewer may ask the child whether he or she has any younger siblings and if so, whether that sibling was present at the time of the event. The interviewer will also ask each child to rate certain aspects of the event using an age-appropriate scale (e.g., “How did you feel when [event] happened?”). Finally, with your permission, an interviewer will contact you at your convenience (by telephone or email, as you prefer) to share your child’s early memories and to ask you to assist us in confirming when the events occurred.

Your child may choose to withdrawal at any time during the interview. After the completion of the study, your child’s responses will be identified only by number to protect his or her privacy, and the audio tapes will be destroyed.

Of course, your child cannot be interviewed without your written permission and your child’s own verbal agreement to take part. Please complete one of the attached consent forms and indicate whether or not your child may take part in this activity. Return the completed consent form to your child’s teacher and keep the additional consent form for your records.

I greatly appreciate your consideration. Completion of this research project will assist in my training and prepare me for my future as a developmental psychologist. If you have any questions, please call me at 604-1252 or my faculty advisor, Dr. Lynne Baker-Ward, at 515-1731.

Sincerely,

Rebekah Siceloff
Ph.D. Student in Psychology
Appendix B
INFORMED CONSENT FORM

North Carolina State University
INFORMED CONSENT FORM for RESEARCH

Title of Study: What it Means to Remember: Children’s Reports of their Early Memories

Principal Investigator: Rebekah Siceloff
Faculty Sponsor: Lynne Baker-Ward

We are asking you and your child to participate in a research study. The purpose of this study is to better understand children’s memories for everyday events.

INFORMATION
If your child agrees to participate in this study, he or she will be instructed regarding what it means to remember an event, and his or her ability to apply the concept of “remember” will be assessed through his or her responses to questions about several scenarios. Further, your child will be asked to talk about his or her memories for several everyday past experiences. Your child will be asked to rate how emotional the event was and to indicate when the event occurred. Your child will be interviewed during one session, and the entire interview will take approximately 25-30 minutes. Interviews will be audio recorded, which will permit analysis of children’s responses. All recordings will be labeled with a participant number; no names will be associated with the recordings. All tapes will be erased after completion of the study. With your permission, after interviewing your child, we will contact you, at your convenience, to confirm several aspects of your child’s memory reports.

RISKS
No risks are expected in participating in this study. However, if your child ever feels uncomfortable discussing his or her past experiences with the researcher, he or she may choose to withdraw from the study.

BENEFITS
There are no direct benefits to the participant. However, the results of this study may help psychologists to better understand the maintenance and loss of autobiographical memories across childhood.

CONFIDENTIALITY
The information in the study records will be kept strictly confidential. Data will be stored securely in a locked drawer in the office of the principal investigator. Your child's name will not be on any form with the exception of the informed consent, and his or her name will be kept anonymous by a three digit number. No reference will be made in oral or written reports which could link your child to the study. Of course, as is always the case, in the unlikely event that a child clearly describes an act of child abuse, confidentiality will be breached, and we will share the report with Social Services, as all citizens are required to do under the NC Child Abuse Reporting Act.

COMPENSATION
For participating in this study your child will receive a small gift as a token of the researcher's appreciation. If your child withdraws from the study prior to its completion, he or she will still receive a small gift.

CONTACT
If you have questions at any time about the study or the procedures, you may contact the researcher, Rebekah Siceloff, at NCSU, Dept. of Psychology, 640 Poe Hall, 2310 Stinson Drive, Raleigh, NC, 27695, or (919) 604-1252. If you feel you have not been treated according to the descriptions in this form, or your child's rights as a participant in research have been violated during the course of this project, you may contact Dr. David Kaber, Chair of the NCSU IRB for the Use of Human Subjects in Research Committee, Box 7514, NCSU Campus (919/513-3086) or Mr. Matthew Ronning, Assistant Vice Chancellor, Research Administration, Box 7514, NCSU Campus (919/513-2148).
PARTICIPATION
Participation in this study is voluntary; you and your child may decline to participate without penalty. If you and
your child decide to participate, you may withdraw from the study at any time without penalty and without loss of
benefits to which you are otherwise entitled. If your child withdraws from the study before data collection is
completed, his or her data will be returned to you or destroyed at your request.

CONSENT
☐ “I have read and understand the above information. I have received a copy of this form. I agree to let my child
participate in this study with the understanding that they may withdraw at any time. Further, I agree that the
researcher may contact me to discuss my child’s memory reports.”

Parent's name Mr./Mrs./Ms. __________________________________________ (Please Print)

Parent’s signature ____________________________ Date_________________

Please indicate how you would prefer to be contacted by the researcher:

Email: ____________________________
OR
Phone: ____________________________ (Best time to call: ________)

Child’s name ____________________________ Date of Birth ________________

☐ “I have read and understand the above the information. My child does NOT have permission to participate.”

Parent's signature ____________________________ Date_________________

Child’s name ____________________________

Note: The consent form that was distributed to parents was printed on legal size paper.
Appendix C

INTERVIEW GUIDELINES

Instructions: Earliest Memories Study
Version for FEMALE Participants

[On tape, record participant #, date, and interview location.]

Thank you for talking with me today. My name is [researcher]. I am going to talk to you about what it means to remember.

Here’s how you know if you remember something that happened:
• You were there when it happened;
• You saw what happened with your own eyes and heard it with your own ears;
• You can think about what happened.

[Repeat criteria]

Now I’m going to show you some pictures and tell you about Lee, a girl who is [participant’s age], just like you. I’m going to ask you some questions about Lee; I’m going to ask you about what Lee can remember. That way, I can tell if I did a good job explaining about what it means to remember.

Okay. Before we get started, I’ll tell you again how you know if you remember something that happened:
• You were there when it happened;
• You saw what happened with your own eyes and heard it with your own ears;
• You can think about what happened.

Part I: Scenarios

[After reading each scenario and asking whether Lee/Taylor can remember the event described, follow up with one of the following questions, based on the correctness of the participant’s response:
• “How do you know?” (correct response)
• “Why do you think that?” (incorrect response)
• “Tell me why you’re not sure.” (“I don’t know” response)]

Scenario #1
This is Lee and this is Lee’s mother [point to picture]. Lee went to the grocery store with her mother. Lee and her mother got a grocery cart and then bought groceries. Now Lee is home from the grocery store. Does Lee remember her trip to the grocery store?
Appendix C (continued)

Scenario #2
This picture shows Lee with her grandmother. This is Lee and this is Lee’s grandmother [point to picture]. Lee went to visit her grandmother, and they played together in the backyard. In this picture, Grandmother is pushing Lee on a swing. Lee’s visit to Grandmother’s house happened a long time ago. Can Lee remember playing on the swing with her Grandmother?

Scenario #3
This picture shows Lee’s friend, Taylor. This is Taylor [point to picture.] Taylor went to the gas station with her father [point to father]. Taylor watched her father put gas in the car. Lee did not go to the gas station. Can Lee remember what happened when Taylor went to the gas station?

Scenario #4
This picture shows Lee sleeping. Lee is sound asleep in bed. It’s very, very late at night. Lee’s mother comes into Lee’s room. She turns off the night light. She is very quiet and doesn’t wake Lee up. Does Lee remember her mother turning off the nightlight?

Scenario #5
This picture also shows Lee sleeping [point to Lee]. Do you see Taylor in the picture, too [point to Taylor]? Taylor spent the night at Lee’s house. Taylor slept in Lee’s room. When Lee’s mom came into the room, Taylor woke up. Taylor asked Lee’s mom for a glass of water. Lee’s mom brought Taylor a glass of water. It took a little while for Taylor to go back to sleep. Does Taylor remember Lee’s mom bringing her a glass of water?

Scenario #6
Here is a very special picture of Lee. This picture shows Lee on the same day that Lee was born. Lee was a very tiny baby. Lee was such a tiny baby that all she could do was eat, and sleep, and wear diapers. Lee had not learned how to walk or talk yet. Lee was just one day old. Lee got her first present when she was one day old. Now Lee is [participant’s age]. Does Lee remember getting her first present?

• [For incorrect responses to this scenario, state, “I don’t think Lee could think about what happened when she was a tiny baby. Lee was there, but she can’t think about what she saw with her own eyes or heard with her own ears.”]

Scenario #7
So, Lee can’t think about what happened or tell me about what she heard and what she saw when she was just one day old. Lee is now [participant’s age]. What if I show this picture to Lee now? If I show this picture to Lee, can Lee remember now what happened when she was one day old?

• [For this scenario, if the child responses that Lee can remember, state, “Lee can see the picture, but she doesn’t remember what happened when she was just one day old. She can only see what is in the picture.”]
Appendix C (continued)

Part II: Earliest Memory Interview
(See data collection form)

Okay. So we just talked about things that Lee can remember and things that Lee cannot remember. Now we’re going to do something different. Now I want you to remember something that happened a long time ago, when you were younger than you are now. I want you to think about your earliest memory. Tell me everything about the first thing you remember.

[After each spontaneous report is provided, prompt the participant to provide more information by stating, “Tell me more about [nominated event].” Provide this prompt until the participant indicates that she does not have anything else to add, and then ask, “Is that all you can remember [about nominated event]?” Before asking the participant to recall another early memory, ask “How did you feel when [event] happened?” Then ask “Were you a little [emotion], medium [emotion], or really [emotion]?” After the first memory report is provided, prompt the child to recall another early memory by stating, “Can you think of something else that happened a long time ago, when you were younger than you are now? Tell me about another earliest memory.” Provide this prompt after each memory report either until the participant has provided a total of 5 memories or until participant indicates that she cannot recall any additional memories.]

Part III: Life Experiences Questionnaire
(See data collection form)

Now I’m going to ask you some things about yourself and your family, okay?

[See data collection form for questions.]

Part IV: Dating Earliest Memories

[Use the information from the life experiences questions to help determine when the memories described in Part II occurred. In addition, it may be appropriate to ask the participant where the event happened, why it occurred (i.e., was the event a special occasion?), or other questions that are relevant. The final question posed should be, “Do you know how old you were when [event] happened?”]
Appendix D

ILLUSTRATIONS OF SCENARIOS

Scenario 1

Scenario 2
Appendix D (continued)

Scenario 3

Scenario 4
Appendix D (continued)

Scenario 5

Scenarios 6 & 7
Appendix E
DATA COLLECTION FORM

PART I: META-MEMORY
For correct responses, ask child “How do you know?” For incorrect responses, ask “Why do you think that?” If the child states that he or she is not sure, state “Tell me why you’re not sure.”

Scenario #1
1. Remember? YES NO
2. How do you know? OR Why do you think that?

Scenario #2
1. Remember? YES NO
2. How do you know? OR Why do you think that?

Scenario #3
1. Remember? YES NO
2. How do you know? OR Why do you think that?

Scenario #4
1. Remember? YES NO
2. How do you know? OR Why do you think that?

Scenario #5
1. Remember? YES NO
2. How do you know? OR Why do you think that?

Scenario #6
1. Remember? YES NO
2. How do you know? OR Why do you think that?

Scenario #7
1. Remember? YES NO
2. How do you know? OR Why do you think that?
PART II: EARLIEST MEMORY

Use the space below to make notes about the participant’s memory reports. After each spontaneous report is provided, prompt the participant to provide more information by stating, “Tell me more about that.” Provide this prompt until the participant indicates that he or she does not have anything else to add, and then ask, “Is that all you can remember?” Before asking the participant to recall another early memory, ask “How did you feel when [event] happened?” Then ask “Were you a little [emotion], medium [emotion], or really [emotion]?”

“Now we’re going to do something different. I want you to remember something that happened a long time ago, when you were younger than you are now. I want you to think about your earliest memory. Tell me everything about the first thing you can remember.”

“How did you feel when [event]?” Then ask “Were you a little [emotion], medium [emotion], or really [emotion]?”

<table>
<thead>
<tr>
<th>LITTLE</th>
<th>MEDIUM</th>
<th>REALLY</th>
</tr>
</thead>
</table>

“Can you think of something else that happened a long time ago, when you were younger than you are now? Tell me about another one of your earliest memories.”

“How did you feel when [event]?” Then ask “Were you a little [emotion], medium [emotion], or really [emotion]?”

<table>
<thead>
<tr>
<th>LITTLE</th>
<th>MEDIUM</th>
<th>REALLY</th>
</tr>
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</table>

*Notes about additional memories may be written on the back of the page.*
Appendix E (continued)

PART III: LIFE EXPERIENCES QUESTIONNAIRE
These questions are asked to help children estimate their age at the time of the event described in each memory report. In addition, for children who have difficulty recalling any early memories, these questions may help them to think about past experiences.

1. Tell me about your family (i.e., who is in your family; do you have any brothers or sisters; if yes, what are their names and how old are they?).
   a. Is there anyone else who has ever lived with your family?

2. Do you have any pets? If yes, what are their names? Do you know how old you were when you got [pet’s name]?

3. Have you ever lived in another city or town?

4. Have you always lived in the home that you live in now? If no, where did you live before? Do you know how old you were when you moved into the home that you live in now?

5. For older children: Have you always gone to [name of childcare center/preschool/school]? If no, do you remember where you went before?

6. Have you had any big changes that you can tell me about?

PART IV: DATING EARLY MEMORIES
Use the information from the life experiences questions to help determine when the memories described occurred. In addition, it may be appropriate to ask the participant where the event happened, why it occurred (i.e., was the event a special occasion?), who else was present during the event, or other questions that are relevant. The final question posed should be, “Do you know how old you were when [event] happened?”
Appendix F
EARLIEST MEMORIES STUDY: PARENT INTERVIEW
PHONE VERSION

Part I: Memories of Early Experiences

Participants in this study were asked to recall their earliest memories. I will read each memory that your child recalled during the interview, and after each memory, I will ask you several questions about the memory. One of the questions requests that you indicate your level of confidence that the described event actually occurred. To do so, I will ask you to rate on a scale from 1 to 7 how confident you are that the event occurred. A rating of 1 indicates that you do not believe the event occurred; a rating of 4 indicates that it may have occurred, but you are not certain; and a rating of 7 indicates that you are certain the event occurred.

1 ------ 2 ------- 3 ------- 4 ------- 5 ------- 6 ------- 7
(Did not occur) (Not sure) (Event occurred)

We are also interested in whether children actually remember the events they described, or if they simply know about the events through family discussions, photographs, or other items that may provide them with knowledge of the described events. For memories that describe events that you are certain occurred, I will ask you to indicate how often the memory is a topic of family discussion and whether photographs or other items (e.g., souvenirs, toys) are associated with the described event. Finally, for each memory that you believe did occur or may have occurred, I will ask you to estimate your child’s age at the time of the event.

Please let me know if you have any questions during the interview.

Memory #1:

[Provide brief header that summarizes memory report.]

1. On a scale from 1 to 7 (with one indicating that you believe the event did not happen, and seven indicating that you are certain the event occurred), please rate your confidence that the event occurred.

2. [If the parent indicates that he or she is certain the event occurred.] Please indicate on a scale from 1 (never/rarely) to 3 (frequently) how often the event is a topic of family discussion.
Appendix F (continued)

3. *If the parent indicates that he or she is certain the event occurred.* Has your child seen photographs or other items that may serve as reminders of the event?

☐ Yes  ☐ No

   a. *If yes* Please describe the items and how available they are to your child (e.g., photos that are kept in a photo album that your child rarely sees, photos kept in a frame that is always available to your child; a souvenir that is prominently displayed).

☐

4. *If the parent indicates that he or she believes that the event did occur or may have occurred.* Please estimate your child’s age at the time of the event. (Be as specific as possible, for example, 3 years and about 5 months.)

☐

5. Is there anything you would like to add about this memory report?

☐

Memory #2:

[Provide brief header that summarizes memory report.]

1. On a scale from 1 to 7 (with one indicating that you believe the event did not happen, and seven indicating that you are certain the event occurred), please rate your confidence that the event occurred.

☐

2. *If the parent indicates that he or she is certain the event occurred.* Please indicate on a scale from 1 (never/rarely) to 3 (frequently) how often the event is a topic of family discussion.

☐

3. *If the parent indicates that he or she is certain the event occurred.* Has your child seen photographs or other items that may serve as reminders of the event?

☐ Yes  ☐ No
Appendix F (continued)

a.  *If yes* Please describe the items and how available they are to your child (e.g., photos that are kept in a photo album that your child rarely sees, photos kept in a frame that is always available to your child; a souvenir that is prominently displayed).

☐

4.  *If the parent indicates that he or she believes that the event did occur or may have occurred.* Please estimate your child’s age at the time of the event. (Be as specific as possible, for example, 3 years and about 5 months.)

☐

5.  Is there anything you would like to add about this memory report?

☐

Memory #3:

[Provide brief header that summarizes memory report.]

1.  On a scale from 1 to 7 (with one indicating that you believe the event did not happen, and seven indicating that you are certain the event occurred), please rate your confidence that the event occurred.

☐

2.  *If the parent indicates that he or she is certain the event occurred.* Please indicate on a scale from 1 (never/rarely) to 3 (frequently) how often the event is a topic of family discussion.

☐

3.  *If the parent indicates that he or she is certain the event occurred.* Has your child seen photographs or other items that may serve as reminders of the event?

☐ Yes ☐ No

a.  *If yes* Please describe the items and how available they are to your child (e.g., photos that are kept in a photo album that your child rarely sees, photos kept in a frame that is always available to your child; a souvenir that is prominently displayed).

☐
Appendix F (continued)

4. *If the parent indicates that he or she believes that the event did occur or may have occurred.* Please estimate your child’s age at the time of the event. (Be as specific as possible, for example, 3 years and about 5 months.)

  □

5. Is there anything you would like to add about this memory report?

  □

**Memory #4:**

[Provide brief header that summarizes memory report.]

1. On a scale from 1 to 7 (with one indicating that you believe the event did not happen, and seven indicating that you are certain the event occurred), please rate your confidence that the event occurred.

  □

2. *If the parent indicates that he or she is certain the event occurred.* Please indicate on a scale from 1 (never/rarely) to 3 (frequently) how often the event is a topic of family discussion.

  □

3. *If the parent indicates that he or she is certain the event occurred.* Has your child seen photographs or other items that may serve as reminders of the event?

   □ Yes □ No

   a. *If yes* Please describe the items and how available they are to your child (e.g., photos that are kept in a photo album that your child rarely sees, photos kept in a frame that is always available to your child; a souvenir that is prominently displayed).

      □

4. *If the parent indicates that he or she believes that the event did occur or may have occurred.* Please estimate your child’s age at the time of the event. (Be as specific as possible, for example, 3 years and about 5 months.)

   □
5. Is there anything you would like to add about this memory report?


Memory #5:

[Provide brief header that summarizes memory report.]

1. On a scale from 1 to 7 (with one indicating that you believe the event did not happen, and seven indicating that you are certain the event occurred), please rate your confidence that the event occurred.


2. [If the parent indicates that he or she is certain the event occurred.] Please indicate on a scale from 1 (never/rarely) to 3 (frequently) how often the event is a topic of family discussion.


3. [If the parent indicates that he or she is certain the event occurred.] Has your child seen photographs or other items that may serve as reminders of the event?


   a. [If yes] Please describe the items and how available they are to your child (e.g., photos that are kept in a photo album that your child rarely sees, photos kept in a frame that is always available to your child; a souvenir that is prominently displayed).


4. [If the parent indicates that he or she believes that the event did occur or may have occurred.] Please estimate your child’s age at the time of the event. (Be as specific as possible, for example, 3 years and about 5 months.)


5. Is there anything you would like to add about this memory report?


Appendix F (continued)

Part II: Memories Discussed at Home
We are also interested in what you think is your child’s earliest memory based on events that your child still discusses at home. This may be an event that was not reported during the interview.

1. What do you think is your child’s current earliest memory (i.e., an event that he or she has discussed within the past six months)? Please describe.

   

2. Please estimate your child’s age at the time of the event you described above. (Be as specific as possible, for example, 3 years and about 5 months.)

   

3. For the event described above, who brings up the discussion of the event (e.g., you, your child, another family member, etc.)?

   

4. Please indicate on a scale from 1 (never/rarely) to 3 (frequently) how often the event is a topic of family discussion. ______

5. Has your child seen photographs or other items that may serve as reminders of the event?
   □ Yes □ No
   
   a. If yes please describe the items and how available they are to your child (e.g., photos that are kept in a photo album that your child rarely sees, photos kept in a frame that is always available to your child, a souvenir that is prominently displayed).

   

Part III: Demographic Information
We are interested in collecting demographic information for the purpose of being able to describe the sample of children that participated in this study.

1. What is your child’s gender? □ Female □ Male

2. What is your child’s race?

3. What language does your child speak at home?
Appendix F (continued)

4. What is your child’s religious affiliation? 

5. What is your child’s date of birth? 

6. Is there any additional information about your child that you would like to share? 

May contact you in the near future if we have any additional questions regarding your child’s early memories? 

Yes  No

If we may contact you, please indicate below how you would prefer we contact you.

☐ Phone (Best time to call: )

☐ Email 

Thank you for completing this questionnaire and providing information about your child’s early experiences. I hope you have enjoyed this experience. If you have any questions about the questionnaire, or if you are interested in learning more about the results of the study, please do not hesitate to contact me at ersicelo@ncsu.edu.

Sincerely,

Rebekah Siceloff
Dear Parent,

Thank you for your time and participation in the Earliest Memories Study. As a participant in the study your child, [child’s name], was asked to remember and describe his/her early experiences with an interviewer. Now I would like to share with you the memories that your child described and to ask for your assistance with further detailing your child’s early experiences. Please complete the questions in the questionnaire that follows and return your responses to ersicelo@ncsu.edu. If you would prefer to conduct this interview over the telephone or if you have any questions, please feel free to contact me at the email address above or at 604-1252.

Regards,
Rebekah Siceloff

Part I: Memories of Early Experiences

During the interview, your child described the following memories. Please read each memory, and then indicate your level of confidence that the described event actually occurred. Specifically, a rating of 1 indicates that you do not believe the event occurred; a rating of 4 indicates that it may have occurred, but you are not certain; and a rating of 7 indicates that you are certain the event occurred. The scale is provided below. In addition, we are interested in whether children actually remember the events they described or if they simply know about the events through family discussions, photographs, or other items that may provide them with knowledge of the described events. For memories that describe events that you are certain occurred, please indicate how often the memory is a topic of family discussion and whether photographs or other items (e.g., souvenirs, toys) are associated with the described event. Finally, for each memory that you believe did occur or may have occurred, please estimate your child’s age at the time of the event.

1 ------- 2 ------- 3 ------- 4 ------- 5 ------- 6 ------- 7
(Did not occur) (Not sure) (Event occurred)

Memory #1:

[Memory summary HERE]

1. Using the above scale, please rate your confidence that the event occurred. 

2. If you are certain the described event occurred, please indicate on a scale from 1 (never/rarely) to 3 (frequently) how often the event is a topic of family discussion. 

Appendix G (continued)

3. If you are certain the above event occurred, has your child seen photographs or other items that may serve as reminders of the event?  □ Yes  □ No
   a. If yes please describe the items and how available they are to your child (e.g., photos that are kept in a photo album that your child rarely sees, photos kept in a frame that is always available to your child; a souvenir that is prominently displayed).

4. If you believe that this event did occur or may have occurred, please estimate your child’s age at the time of the event. (Be as specific as possible, for example, 3 years and about 5 months.)

5. Please use the space below if there is anything you would like to add about this memory report.

Memory #2:

[Memory summary HERE]

1. Using the above scale, please rate your confidence that the event occurred.  

2. If you are certain the described event occurred, please indicate on a scale from 1 (never/rarely) to 3 (frequently) how often the event is a topic of family discussion.  

3. If you are certain the above event occurred, has your child seen photographs or other items that may serve as reminders of the event?  □ Yes  □ No
   a. If yes please describe the items and how available they are to your child (e.g., photos that are kept in a photo album that your child rarely sees, photos kept in a frame that is always available to your child; a souvenir that is prominently displayed).
Appendix G (continued)

4. If you believe that this event did occur or may have occurred, please estimate your child’s age at the time of the event. (Be as specific as possible, for example, 3 years and about 5 months.)

5. Please use the space below if there is anything you would like to add about this memory report.

Memory #3:

[Memory summary HERE]

1. Using the above scale, please rate your confidence that the event occurred. 

2. If you are certain the described event occurred, please indicate on a scale from 1 (never/rarely) to 3 (frequently) how often the event is a topic of family discussion.

3. If you are certain the above event occurred, has your child seen photographs or other items that may serve as reminders of the event?  

   a. If yes please describe the items and how available they are to your child (e.g., photos that are kept in a photo album that your child rarely sees, photos kept in a frame that is always available to your child; a souvenir that is prominently displayed).

4. If you believe that this event did occur or may have occurred, please estimate your child’s age at the time of the event. (Be as specific as possible, for example, 3 years and about 5 months.)

5. Please use the space below if there is anything you would like to add about this memory report.
Appendix G (continued)

**Memory #4:**

[Memory summary HERE]

1. Using the above scale, please rate your confidence that the event occurred. □

2. If you are certain the described event occurred, please indicate on a scale from 1 (never/rarely) to 3 (frequently) how often the event is a topic of family discussion. □

3. If you are certain the above event occurred, has your child seen photographs or other items that may serve as reminders of the event? □ Yes  □ No

   a. If yes please describe the items and how available they are to your child (e.g., photos that are kept in a photo album that your child rarely sees, photos kept in a frame that is always available to your child; a souvenir that is prominently displayed). □

4. If you believe that this event did occur or may have occurred, please estimate your child’s age at the time of the event. (Be as specific as possible, for example, 3 years and about 5 months.) □

5. Please use the space below if there is anything you would like to add about this memory report. □

**Memory #5:**

[Memory summary HERE]

1. Using the above scale, please rate your confidence that the event occurred. □

2. If you are certain the described event occurred, please indicate on a scale from 1 (never/rarely) to 3 (frequently) how often the event is a topic of family discussion. □
Appendix G (continued)

3. If you are certain the above event occurred, has your child seen photographs or other items that may serve as reminders of the event?  □ Yes  □ No
   
   a. If yes please describe the items and how available they are to your child (e.g., photos that are kept in a photo album that your child rarely sees, photos kept in a frame that is always available to your child; a souvenir that is prominently displayed).
   
5. If you believe that this event did occur or may have occurred, please estimate your child’s age at the time of the event. (Be as specific as possible, for example, 3 years and about 5 months.)

4. Please use the space below if there is anything you would like to add about this memory report.

Part II: Memories Discussed at Home

1. What do you think is your child’s current earliest memory (i.e., an event that he or she has discussed within the past six months)? Please describe.

2. Please estimate your child’s age at the time of the event you described above. (Be as specific as possible, for example, 3 years and about 5 months.)

3. For the event described above, who brings up the discussion of the event (e.g., you, your child, another family member, etc.)?

4. Please indicate on a scale from 1 (never/rarely) to 3 (frequently) how often the event is a topic of family discussion. □
Appendix G (continued)

5. Has your child seen photographs or other items that may serve as reminders of the event?
   □ Yes □ No

   a. If yes please describe the items and how available they are to your child (e.g.,
      photos that are kept in a photo album that your child rarely sees, photos kept in a
      frame that is always available to your child, a souvenir that is prominently
      displayed).

Part III: Demographic Information

We are interested in collecting demographic information for the purpose of being able to
describe the sample of children that participated in this study.

1. What is your child’s gender? □ Female □ Male

2. What is your child’s race?

3. What language does your child speak at home?

4. What is your child’s religious affiliation?

5. What is your child’s date of birth?

6. Please indicate below if there is any additional information about your child that you
   would like to share.

   □

May contact you in the near future if we have any additional questions regarding your child’s
eyearly memories? □ Yes □ No

If we may contact you, please indicate below how you would prefer we contact you.

□ Phone □ (Best time to call: □)

□ Email □
Appendix G (continued)

Thank you for completing this questionnaire and providing information about your child’s early experiences. I hope you have enjoyed this experience. If you have any questions about the questionnaire, or if you are interested in learning more about the results of the study, please do not hesitate to contact me at ersicelo@ncsu.edu.

Sincerely,

Rebekah Siceloff