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Author manuscript

J Cogn Dev. Author manuscript; available in PMC 2018 January 01.

Published in final edited form as:

J Cogn Dev. 2017 ; 18(1): 63–86. doi:10.1080/15248372.2015.1135800.

The Socialization of Children’s Memory: Linking Maternal Conversational Style to the Development of Children’s Autobiographical and Deliberate Memory Skills

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Abstract

Data from a large-scale, longitudinal research study with an ethnically and socioeconomically diverse sample were utilized to explore linkages between maternal elaborative conversational style and the development of children’s autobiographical and deliberate memory. Assessments were made when the children were 3, 5, and 6 years of age, and the results reveal concurrent and longitudinal linkages between maternal conversational style in a mother-child reminiscing task and children’s autobiographical memory performance. Maternal conversational style while reminiscing was also significantly related to children’s strategic behaviors and recall in two deliberate memory tasks, both concurrently and longitudinally. Results from this examination replicate and extend what is known about the linkages between maternal conversational style, children’s abilities to talk about previous experiences, and children’s deliberate memory skills as they transition from the preschool to early elementary school years.

Keywords

memory; autobiographical memory; metacognition; narrative

A substantial literature documents age-related differences in children’s memory skills that include the ability to narrate details of past experiences (Fivush, Haden, & Reese, 2006) and use strategies in tasks that require deliberate remembering (Schneider & Pressley, 1997). Although associations among children’s autobiographical and deliberate memory skills are suspected, it is not yet understood how children’s abilities to talk about their past are linked to their use of deliberate techniques to remember (Ornstein, Haden, & San Souci, 2008). We explore these issues in the context of a longitudinal research design with a diverse sample.

Explorations of memory for autobiographical experiences and studies of deliberate or strategic memory are generally treated in separate literatures. However, Ornstein, Haden, & Elischberger (2006) suggest that the underlying processes of encoding, storing, and retrieving information from memory, as well as reporting what is retrieved seem to be

involved in remembering both specific events that are typically experienced without intent to remember and materials that are encoded with the expectation of a subsequent memory assessment. Indeed, it seems possible that the essential skills needed to talk about past experiences may set the stage for later accomplishments within the domain of deliberate memory. More specifically, talking about the past may help to prepare for future assessments of memory, in part because such conversations provide opportunities to practice searching memory and reporting what is retrieved (Ornstein et al., 2006).

Previous research on the socialization of cognition has allowed for the exploration of the mechanisms underlying the development of autobiographical and deliberate memory. This work highlights the importance of the social context for the emergence and consolidation of children's memory. Indeed, researchers have long discussed the impact of adult scaffolding when children are attempting to learn a new skill and have argued that assistance leads to later independent competence for children (Vygotsky, 1978; Cox, Ornstein, & Valsiner, 1991). As children become involved in social activities that are somewhat beyond their capabilities – including tasks that involve remembering – adults often scaffold their performance, thereby enabling them to complete tasks that they could not do independently. Over time, as children take part in these adult-guided activities, they come to be able to participate without adult assistance (Vygotsky, 1978; Haden, Haine, & Fivush, 1997). From this social constructivist perspective, social interaction, particularly language interaction, serves as an important mechanism that underlies development (Fivush, et al., 2006).

Autobiographical Memory Development

An autobiographical memory is an explicit, episodic memory of an event that occurred in a specific time and place in one's personal past (Bauer & Fivush, 2010). Variations in the development of autobiographical memory skills in children have been linked to differences in the ways in which mothers reminisce with their young children about jointly experienced events. In contrast to mothers who adopt a "low elaborative" conversational style, "high elaborative" mothers generally pose more *Wh-* questions, make more associations between the event being discussed and other experiences, follow-in more frequently on comments made by their children, and routinely positively evaluate their children's contributions during the conversation. It has been hypothesized that exposure to early supportive and scaffolded conversations with highly elaborative mothers may "set the stage" for children's later skills in reminiscing, as well as independent (and unscaffolded) narratives about previous experiences (Larkina & Bauer, 2010). Thus, children of high elaborative mothers are thought to become increasingly skilled in recalling past experiences and in using the narrative conventions of the culture to organize their reports (Fivush et al., 2006).

Maternal reminiscing style has been shown to be stable over time (Fivush et al., 2006; Nelson & Fivush, 2004). Fivush, Haden, and Reese (1996) report that the mothers who showed higher levels of elaboration early in their children's development continued to evidence higher levels of elaboration at later points in time. Although they note that all mothers generally increase in their levels of elaboration, more highly elaborative mothers continue to show higher levels of elaboration over time than less elaborative mothers. Thus, although it seems reasonable that all mothers may adapt to children's increased skills over

time, some mothers are consistently more elaborative relative to other mothers across the preschool years (Fivush et al., 1996; Fivush et al., 2006). Moreover, children of highly elaborative mothers, in turn, come to tell more detailed, elaborated, and coherent narratives of their personal past, with both their mothers and unfamiliar adults, than children of less elaborative mothers (Reese & Fivush, 1993; Fivush et al., 2006; Larkina & Bauer, 2010). That is, the more elaborative mothers are, the more their children recall both concurrently and in conversations at later points in time (e.g., Fivush et al., 2006).

Of note, the vast majority of research in this field has focused on middle-class European-American mothers and children, but there is growing evidence that the association between maternal elaborativeness and children's contributions to reminiscing conversations applies to children from diverse sociocultural traditions, as well (e.g., Melzi, 2000; Leyva, Reese, Grolnick, & Price, 2008). However, ethnographic and empirical research suggests that not all cultures value long embellished narratives or those that are structured in the ways often produced by white, middle-class American parents and children (Hoff, 2001). For example, in Japan, excessive talking is viewed negatively, and as a result, the personal narratives of Japanese children tend to be short reports of past events with minimal details (Minami & McCabe, 1995).

In addition, African-American adults' narratives have been shown to be structured differently than the narratives of white, middle-class adults, which likely influences the narrative development of the children in those communities (Hoff, 2001). To illustrate, Michaels (1983) suggests that the "topic centered" narratives of white, middle-class groups tend to be firmly organized around a single topic, whereas the "topic associating" narratives told in African-American communities are more likely to consist of a loosely related set of personal anecdotes. Heath (1983) describes African-Americans' narratives as "performances," a description that is consistent with Michaels' characterization of them as topic associating narratives. As a result, children within African-American sociocultural groups may be quite skilled in utilizing the narrative conventions that are valued in their culture, but the style of their narratives may differ somewhat from the structure of narratives in white, middle-class groups (Hoff, 2001).

Importantly, class differences have been understudied, and socioeconomic status and family income have not often been assessed directly in relation to mother-child reminiscing. The existing literature provides conflicting evidence regarding linkages between maternal education and maternal conversational style in reminiscing. Farrant and Reese (2000), for example, report that New Zealand parents of lower education levels also displayed individual variation in their talk about the past, such that mothers with lower levels of education also exhibited both high and low elaborative reminiscing styles. In contrast, Reese and Newcombe (2007) found large main effects of maternal education for many maternal and child conversational variables in their elaborative reminiscing style training study, such that mothers with less education and their children had shorter and less evaluative conversations about the past when compared to more educated mothers and their children.

Deliberate Memory Development

In assessments of deliberate memory, participants study to-be-remembered materials (e.g., objects, pictures, words) under conditions in which they know that a later test of memory will occur (Ornstein et al., 2008). Paralleling children's increasing proficiency in talking about the past, there are significant age-related changes in the use of deliberate strategies for remembering information. In contrast to the typically incidental nature of autobiographical memory, the use of specific mnemonic techniques requires that children behave intentionally as they "work to remember" information (Ornstein et al., 2006; Schneider & Pressley, 1997).

Children as young as 18-months of age have exhibited a variety of strategy-like behaviors (e.g., naming, pointing) towards objects or hiding locations of objects when told that they would need to remember where the items were hidden (DeLoache, Cassidy, & Brown, 1985). Similarly, Baker-Ward, Ornstein, & Holden (1984) demonstrated that when given explicit instructions to "work to remember," 4-year-olds were capable of utilizing deliberate study-like behaviors (e.g., naming, visual examination), but the use of these strategic behaviors was only related to higher levels of recall among the 6-year-olds in the study. Although the deployment of these behaviors is not generally related to recall success in the preschool years, their use nonetheless suggests that the young children have a basic understanding that they should do *something* as they work to remember items.

It is important to emphasize that these demonstrations of early strategy use (even if unsuccessful) are observed with very salient materials in familiar environments, and during common activities (Ornstein & Light, 2010; Ornstein et al., 2008). In many cases, young elementary school students will not spontaneously make use of appropriate mnemonic techniques of which they are capable, but they can be trained to use effective strategies, such as organized sorting (Schneider & Pressley, 1997). Indeed, with increases in age and experience, children improve in their deployment of appropriate techniques for remembering, and over the course of the elementary school years, there are marked changes in the effectiveness of these strategies (Ornstein, Baker-Ward, & Naus, 1988).

Even with the considerable evidence supporting age-related changes in the use of memory strategies, important issues regarding the development of these skills remain relatively unexplored. For example, little is known about the factors associated with the emergence of strategies, the processes by which these skills are mastered, and the ways in which they come to be employed successfully in different task settings (Ornstein et al., 1988; Ornstein & Light, 2010). The comparative cultural literature indicates that the formal schooling context is associated with the development of memory strategies (see Wagner, 1978; Scribner & Cole, 1978; Rogoff, 1981). Moreover, recent work indicates that aspects of teachers' language during instruction that emphasize metacognition and cognitive processing impact the emergence and refinement of memory and more general cognitive skills (Coffman, Ornstein, McCall, & Curran, 2008; Grammer, Coffman, Sidney, & Ornstein, in press). Importantly, one component of teachers' instructional style – metacognitive language (i.e., strategy suggestions, metacognitive rationales, or metacognitive questions) – is a fairly low frequency event in classrooms (occurring, on average, in 9.5% of intervals observed in a sample of first grade teachers), but is viewed as

influential in children's memory development because it may impact the ways in which children approach a range of cognitive tasks (Coffman, et al, 2008).

Linkages between Autobiographical and Deliberate Memory in Children

Ornstein et al. (2006) suggest that although autobiographical and deliberate memory abilities differ in several respects, there are also some marked similarities between the two forms of remembering. Autobiographical memory can be seen as a blend of incidental and deliberate memory. Encoding is certainly incidental in that events are typically experienced without the intent to remember, whereas searching one's memory for the details of an experience in order to talk about it clearly involves processes that are under the deliberate control of the child. Strategic memory, on the other hand, seems to be primarily deliberate, albeit with possible automatic influences as a result of prior knowledge. Regardless of how one conceptualizes these two types of memory, however, both involve the key underlying processes of encoding, storage, retrieval, and reporting. As such, both types of memory require processes that are under children's control, such as specific and targeted memory searches, the use of strategies to facilitate remembering, and the creation of reports of what is remembered.

Autobiographical and deliberate memory in children are also similar because in each case adult-to-child "talk" has been identified as a potential mediator of developmental change in children's skills (Fivush et al., 2006; Coffman et al., 2008). Moreover, just as parent talk has been shown to influence developing abilities to talk about past events, it seems possible that it may also impact the development of children's deliberate memory skills. For example, when mothers make memory requests in conversations with their children, details from previously established memory representations must be retrieved and reported. Parent-child conversations about past events provide opportunities for children to practice searching memory and using the narrative conventions of the culture to express what has been retrieved. Thus, talking about the past during the preschool years may help children gain skills that are important in deliberate memory tasks that require preparation for future memory assessments (Ornstein et al., 2006).

Despite the intuitive nature of the claims that similar mechanisms may underlie the development of autobiographical and deliberate memory, few researchers have attempted to address the question of whether children with elaborative mothers or who remember more about personal experiences also demonstrate superior performance in other memory tasks, such as those that become important in the school context (e.g., deliberate memory). In a study designed to investigate mother-child conversations as events unfold and linkages to subsequent remembering, Haden, Ornstein, Eckerman, and Didow (2001) reported associations between children's memory for features of a mother-child jointly experienced event and their recall of objects in a deliberate memory task a year later. Using the same sample, Rudek and Haden (2005) reported that mothers who talked more about the process of remembering in their reminiscing conversations had children who engaged in more strategic behaviors in a deliberate memory task a year later. Moreover, Coffman and colleagues reported that at the beginning of Kindergarten, mothers' talk about the process of remembering (i.e., metamemory) in a mother-child reminiscing task was significantly

correlated with their children's spontaneous use of strategic sorting in a free-recall with organizational training task (Coffman, Mugno, Zimmerman, Langley, Howlett, Grammer, & Ornstein, 2011). These findings suggest that early maternal reminiscing may be important for the development of deliberate memory in children.

The current study was designed to examine the concurrent and longitudinal linkages between maternal conversational style in mother-child reminiscing and children's autobiographical and deliberate memory skills. Specifically, we explored the ways in which scaffolding by mothers during conversations about the past related to children's developmental trajectories and later performance in autobiographical and deliberate memory tasks. We predicted that mothers who were classified as high elaborative in reminiscing conversations when their children were 3 years would have children who displayed better autobiographical memory skills in reminiscing, as well as better deliberate memory performance (in terms of both strategic behaviors and recall) at the same time point and at later time points, when compared to children with low elaborative mothers. We also posited that in latent growth curve analyses, children with high elaborative mothers would display higher initial (i.e., intercept) scores at 3 years and steeper growth curves from 3 to 6 years in autobiographical and deliberate memory skills when compared to their peers with low elaborative mothers.

Method

Participants & Procedure

The participants in this project were enrolled in the Durham Child Health and Development Study, a longitudinal study of racially and socioeconomically diverse families. The families were recruited from a largely urban community through postings in the community and phone contact via birth records within three months of each target child's birth using a stratified sampling plan to help ensure variation in participants' racial and socioeconomic status. In order to be eligible for the study, the children needed to be full-term and healthy singleton babies. The mothers needed to be at least 18 years old, fluent in English, planning to remain in the study area for the following three years, either African-American or European-American in ethnicity, and either 200% above or 200% below the poverty threshold as assessed by income-to-needs ratio scores (calculated based on the size of the family in relation to their household income in accordance with the U.S. Department of Health and Human Services' Federal Poverty Guidelines). Each mother-child dyad was seen every six months from 6- to 36-months of age, and then once a year when the children were in Kindergarten, Grade 1, and Grade 2. At each time point, the mothers completed questionnaires, reported on demographic information (e.g., family income, number of years of education), and participated in parent-child joint activities. In addition, the children were administered a battery of assessments designed to measure a variety of developmental outcomes (e.g., language, memory, emotion regulation). All activities were videotaped for later coding. The families received \$50 for participation at each visit, plus mileage reimbursement. The Institutional Review Board at the University of North Carolina at Chapel Hill approved all procedures.

Data used in the current study came from the 3 year ($n = 159$), Kindergarten/5 year ($n = 127$), and First Grade/6 year ($n = 115$) time points, as the focus of this project was on memory development as children transition from the preschool to early elementary school years. At 3 years, mothers reported an average of 14.66 years of education ($SD = 2.53$; range 9 – 20 years). The sample was comprised of equal numbers of male and female child participants (51.6% male); approximately equal numbers of African-American and European-American families (55.3% African American); and, about half of the families reported income 200% or more below the poverty threshold (47.2%), whereas the other families reported income 200% or more above poverty. Due to the attrition of participants over time, chi-square analyses were performed to determine if there were any group differences in ethnicity and socioeconomic status (SES) between the families that remained in the study and those that dropped out after the 3 year visit. These analyses indicated that European-American ($\chi^2(1, N = 159) = 5.22, p < .05$) and below poverty ($\chi^2(1, N = 159) = 3.88, p < .05$) families were more likely to drop out of the study after the 3 year visit than were African-American and above poverty families. It should be noted, however, that there were no differences in any of the outcome measures reported below between participants who did and did not remain in the study.

Measures

Mother-Child Reminiscing Task—The reminiscing task was administered at all three time points as a measure of children’s autobiographical memory and of mothers’ elaborative conversational style. Prior to the administration of the task and without the child present, an experimenter helped each mother nominate three target events to discuss with her child at a later point in the visit. Each of the three events chosen needed to be novel (or one-time) mother-child shared experiences that had occurred in the past month (e.g., attending the circus for the first time). Routine events, events that lasted longer than one day, or events that had a story line (e.g., watching a movie) were excluded from discussion. Following event selection, each mother was asked to talk about each of the three events with her child in whatever way felt natural, for as long as they would like (typically this lasted no more than 10 minutes).

Each conversation was transcribed verbatim from video recordings, and any nonverbal communication or behavior that was relevant to the conversation was noted. A coding scheme was adapted from the structural-functional coding system used by Reese, Haden, and Fivush (1993); this scheme was used because it takes context into account in order to determine the function of conversational exchanges. Independent clauses were the units for most codes. Primary codes of interest for both maternal and child talk included their conversational elaborations and repetitions: for mothers, open-ended question, yes-no question, and statement elaborations and repetitions; for children, memory elaborations and repetitions. In addition, both mothers’ and children’s contributions to the discussion were coded for confirmations, metamemory talk, and associative talk. See Table 1 for examples of each code. Two assistants independently coded 25% of the transcripts at each time point and established inter-rater reliability that averaged greater than 85%, with no single reliability estimate less than 80%. After reliability was established, one of the coders completed the remainder of the files.

For each mother, mean frequencies across events (i.e., average scores) for each individual code were calculated (e.g., open-ended question elaborations, yes-no question elaborations, confirmations, metamemory talk), along with a maternal average elaboration score (the sum of all elaborations – open-ended question, yes-no question, and statement elaborations – divided by 3). A new measure of maternal elaborative conversational style was then developed, building on existing indices of maternal style (e.g., elaborative questions and statements; confirmations of children’s contributions to the conversation). This new measure also incorporates aspects of maternal style that reflect our conceptualization of maternal elaborative style as including associative talk linking the event under discussion to other experiences or prior knowledge, and metamemory talk (i.e., talk about the process of remembering). More specifically, this measure of maternal style includes four components of mothers’ speech: (1) average elaboration score; (2) average associative talk; (3) average confirmations, and; (4) average metamemory talk. As can be seen in Table 2, the four components of maternal elaborative reminiscing style had markedly different means, standard deviations, and ranges. As a result, it was necessary to compute standard scores for each of the four components using *z*-score conversions (i.e., the scores for each component were standardized on the basis of its mean and standard deviation) before the values could be combined in a composite index. The *z*-scores from each of the four components (elaborations, associations, confirmations, and metamemory talk) were then summed in order to calculate the final maternal style variable (referred to as *z*-score composite or maternal reminiscing style hereafter). This method allowed each of the four components of maternal style to contribute an equal weight to the final composite measure, as we argue that even rare events – such as mothers’ use of metamemory language – can have important influences on the ways in which children learn to approach memory-related tasks. Moreover, we did not want the effects of the less frequent conversational techniques to be “washed out” by more frequent conversational strategies (such as elaborations or confirmations). By definition, the means of the resulting maternal style variable were 0, but there was considerable variability when the children were 3 ($SD = 2.59$, range = $-3.71 - 14.26$), 5 ($SD = 2.55$, range = $-3.8 - 9.84$), and 6 ($SD = 2.89$, range = $-4.0 - 10.25$) years of age.

Object Memory Task—The object memory task was completed at each time point as a measure of children’s deliberate memory skills. This task assesses children’s behavioral and linguistic strategies during a study period, as well as children’s recall (Baker-Ward et al., 1984). At each time point, the child was seated at a small table on which there were a number of small, unrelated items (e.g., toy car, comb, paintbrush) hidden underneath a blanket. The number of items hidden varied by time point: 10, 12, and 15 items at 3 years, 5 years, and 6 years, respectively. Children were told to “work to remember” the objects during a two-minute study period. Immediately afterwards, they were asked to remember as many objects as possible.

The coding scheme for this task was designed to capture physical interactions with the stimuli (e.g., playing, manipulation), visual inspection of the objects, and language used during the study period (e.g., naming, association), in addition to recall of the objects. The primary focus was on children’s approaches to the task, rather than the effectiveness of varying types of interactions on the recall of particular objects. As a result, time-sampling

was used to capture children's behavior as they interacted with the items. For coding, the two-minute study period was divided into 24 five-second intervals during which the occurrence of verbal (e.g., naming) and non-verbal (e.g., pointing) behaviors was coded. A distinction between deliberate (i.e., strategic behaviors shown to aid in recall, such as naming and visual examination) and non-deliberate behaviors (i.e., behaviors not strategic in nature, such as playing and onomatopoeia) was made. A final classification was then made for each five-second interval as being either predominately deliberate or non-deliberate in nature. In addition, coders noted the number of unique (and correct) items recalled after the study period.

Two coders independently coded 25% of the files. For each file, percent agreement and Kappa scores were calculated separately for the non-verbal behavior, verbal behavior, and recall. Percent agreement and Kappa scores were required to be at least 80% and 0.7, respectively, in order to be deemed reliable, and after reliability was established, one coder completed the remainder of the records.

Free Recall with Organizational Training Task—This task was administered at the 6 year time point in order to have an indicator of children's spontaneous strategy use as well as performance after organizational training (Moely et al., 1992). The children received three free-recall trials, each consisting of the presentation of 16 cards containing line drawings of easy-to-label objects that were taken from four conceptual categories. These materials allowed for the assessment of the children's use of organizational strategies during both the study period (e.g., sorting) and the recall period (e.g., clustering) based on semantically linked groups.

In the first trial (baseline), cards were presented in a random order and standard free-recall instructions were given to index each child's spontaneous use of organization and other study strategies; recall was assessed immediately following the study period. During the second trial (training), the child was given instructions on how to use categorization for study (i.e., by sorting related items together) and retrieval (i.e., by recalling in clusters of category members), and was told that making use of the category organization would aid remembering. After the training session, the child was asked to recall the cards again. The final (generalization) trial was given after a 15 minute delay, so as to assess the children's application of the sorting and clustering strategies with new materials and without any specific instructions concerning strategy use. On each trial, the children were permitted to study the items until they indicated readiness to recall them.

On both the baseline and generalization trials, the children's sorting and clustering of items (at study and recall, respectively) were measured (using an Adjusted Ratio of Clustering (ARC) score; see Roenker, Thompson, & Brown, 1971), and the number of items recalled was tallied. ARC scores could range between -1 (below chance sorting or clustering) to 0 (chance) to 1 (complete categorization in sorting or clustering). Two coders independently scored all records. Any discrepancies were resolved through examination of the original videotapes.

Results

We first present descriptive statistics in order to characterize our sample, focusing initially on the language the mothers used in reminiscing conversations – considering data from the full sample as well as data from subgroups of the sample – and then characterizing the children’s performance in the three memory assessments. Longitudinal correlations of mothers’ reminiscing style across time points as well as correlations of children’s autobiographical and deliberate memory skills across time points are then presented. Next, mothers’ reminiscing style and children’s memory performance as a function of ethnicity and socioeconomic status are reported before correlations between children’s autobiographical and deliberate memory skills are considered. Finally, concurrent and longitudinal linkages between maternal reminiscing style and children’s autobiographical and deliberate memory performance are described. We also present latent growth curve models of children’s autobiographical and deliberate memory trajectories as a function of maternal reminiscing style.

Descriptive Findings

Mothers’ Reminiscing Style and Children’s Memory Performance—The key features of maternal and child speech in the reminiscing task are displayed in Table 2 as a function of ethnicity (African-American or European-American), socioeconomic status (SES; below poverty and above poverty), and for the full sample. As can be seen, over time all mothers, regardless of ethnic or SES group membership, generally increased in their use of elaborations, associations, confirmations, and metamemory talk, particularly between the 3 and 5 year time points. For example, when examining data from the full sample, maternal elaborations increased from 13.69 at 3 years to 16.58 at 5 years and 17.12 at 6 years. Lower levels of associative talk, confirmations, and metamemory talk were observed, but these aspects of the mothers’ language also increased across the time points. In order to analyze differences in the components of the mothers’ reminiscing style over time, repeated measures analysis of variance (ANOVAs) were conducted. Results revealed significant differences in mothers’ use of elaborations, associations, confirmations, and metamemory talk over the 3 year period, $F_s(2, 182) > 7.31$. Post-hoc tests of pairwise comparisons indicated that significant differences were observed from the 3 to 5 year time points for maternal elaborations, associations, confirmations, and, metamemory talk, $t_s(126) = 3.09, p < .001$. No statistically significant differences were observed in aspects of the mothers’ reminiscing style from the 5 to 6 year time points.

The children also increased dramatically in their use of memory elaborations over time – ranging from 4.72 at 3 years to 10.05 at 5 years and 11.27 at 6 years when examining data from the full sample, although similar patterns emerged for all sub-groups of children. Thus, as children increased in age, they contributed more novel information to the reminiscing conversations. A repeated measures ANOVA revealed a significant difference in children’s scores over time, $F(2, 182) = 40.73$, and pairwise comparisons indicated that the difference between the 3 and 5 year time points was significant, $t(126) = 8.04, p < .001$.

The performance of the children on the two deliberate memory tasks is displayed in Table 3. As can be seen, with increases in age, the children’s performance on the object memory task

was characterized by increased use of deliberate study behaviors and recall, $F_s(2, 194) = 13.53$). Follow-up tests revealed significant differences in children's strategy use and recall scores from the 3 to 5 year time points, $t_s(137) = 7.76, p < .001$. Although there was not a significant increase in children's strategy use in the object memory task from the 5 to 6 year time points, there was such an increase in recall, $t(118) = 6.71, p < .001$. In the free recall with training task administered at 6 years, the children displayed increases from the baseline to the generalization trial in organized sorting during the study period (from -0.13 to 0.35), clustering in recall (from 0.31 to 0.62), and in the number of cards recalled (from 8.39 to 9.10).

Correlational data displayed in Table 4 indicate that maternal reminiscing style at each time point (as assessed using the z -score composite score) was significantly associated with maternal style at the other time points. As can be seen, when reminiscing style was treated as a continuous variable, the r_s were $0.43, 0.34,$ and 0.35 ($p_s < .001$), between 3 and 5 years, 3 and 6 years, and 5 and 6 years, respectively. Further, although not displayed in the table, when maternal style was represented as a dichotomous variable (high elaborative vs. low elaborative using a median split), phi coefficients were $0.24, 0.28,$ and 0.32 ($p_s < .05$). Moreover, as can be seen in the top left portion of Table 4, children's autobiographical memory skills in reminiscing at each time point were positively correlated with performance at the other time points, $r_s = 0.45, 0.42,$ and 0.47 ($p_s < .001$). These correlations indicate that both mothers and children were generally consistent in their level of elaborativeness over time, relative to their peers, such that those with higher scores at one time point also displayed higher scores at other time points. In contrast, the children's performance on the object memory task was less consistent, with statistically significant correlations only being observed from 5 to 6 years for strategy use, $r = 0.23, p < 0.05$, and recall, $r = 0.27, p < 0.01$.

It should be noted that our measure of maternal reminiscing style (the z -score composite) was significantly concurrently correlated with other methods of characterizing mothers' elaborative style that are traditionally found in the literature. For example, at the 3 year time point, the z -score composite was strongly associated with mothers' open-ended question elaborations ($r = .74$), total elaborations ($r = .80$), and the elaboration to repetition ratio ($r = .42$). Similar patterns of correlations between measures of maternal style at the 5 and 6 year visits were also observed. In addition, children's autobiographical memory performance at 3 years of age was significantly correlated with each of the four measures of maternal reminiscing style at 3 years: mothers' open-ended question elaborations ($r = .82$), total elaborations ($r = .74$), the elaboration to repetition ratio ($r = .39$), and our z -score composite measure ($r = .80$). Given these strong linkages between traditional indicators of maternal style and our more nuanced measure, all subsequent analyses that make reference to mothers' reminiscing style are conducted using the z -score composite measure.

Maternal Reminiscing Style and Children's Memory as a Function of Ethnicity and SES—Given the diversity of the sample, it was important to determine if the ethnicity and SES differences in mothers' reminiscing and children's memory displayed in Table 2 were statistically significant. To explore this issue, a series of two-way (ethnicity x SES) ANOVAs were conducted, indicating that mothers and children classified as European-American and above poverty had significantly higher scores than their African-American

and below poverty peers. For example, in the reminiscing task at 3 years, we found main effects of ethnicity and SES, $F_s(1, 155) = 12.97, p < .001$ for mothers' reminiscing style; there were also comparable effects for the children's autobiographical memory, $F_s(1, 155) = 6.40, p < .01$. No interactions between ethnicity and SES were present. Similar effects were observed at the 5 and 6 year time points.

Turning to the deliberate memory data, in the object memory task at 3 years, the European-American children utilized more deliberate strategies than their African-American peers, resulting in a main effect of ethnicity, $F(1, 147) = 14.91, p < .001$. In addition, the above poverty children remembered more items than their below poverty peers, $F(1, 147) = 8.30, p < .01$. No main effects of ethnicity or SES were observed for children's strategic behaviors or recall in the object memory task at the 5 and 6 year time points. Additionally, no interactions between ethnicity and SES were observed at any time point.

Associations between Children's Autobiographical and Deliberate Memory Skills—To what extent are the children's autobiographical and deliberate memory skills related? We examine this issue both concurrently and longitudinally. For example, associations between the children's memory elaborations in the reminiscing task (i.e., autobiographical memory) and aspects of their strategic behavior and recall in the object memory and free recall with training tasks (i.e., deliberate memory) are shown in Table 4. As can be seen, at three years of age, their performance on the reminiscing task was significantly correlated with both their strategy use and recall in the object memory task ($r_s = .23$ and $.47$, respectively). Moreover, their recall in the object memory task at 3 years was also significantly correlated with performance on the reminiscing task at 5 and 6 years ($r_s = .23$ and $.25$, respectively). Turning to associations between children's contributions to reminiscing task at 6 years and their performance on the Free Recall with Organizational Training Task that was only administered at that time point, we found that reminiscing was correlated with their clustering ARC scores on the baseline and generalization trials, as well as with recall on the generalization trial ($r_s = .19, .22$, and $.33$, respectively).

Linking Maternal Reminiscing Style and Children's Memory

Turning to the main questions that motivated this study, we next present linkages between maternal reminiscing style and children's memory performance. We first discuss associations between mothers' style and children's autobiographical memory skills and then turn to children's performance on deliberate memory tasks.

Associations between Maternal Reminiscing and Children's Autobiographical Memory—Consistent with a great deal of research on mother-child reminiscing (Fivush et al., 2006), the concurrent correlations between maternal reminiscing style and children's autobiographical memory displayed in Table 4 were significant at each time point ($r_s = .80, .68$, and $.66$, for the 3, 5, and 6 year time points, respectively). However, because higher levels of elaborations were observed among the European-American and above poverty families than the African-American and below poverty groups (as displayed in Table 2 and discussed above), it is important to know whether these correlations based on the full sample are also found in the subgroups. As such, correlations were calculated separately for

African-American, European-American, below poverty, and above poverty mothers and children and are displayed in Table 5. As can be seen, at each time point, the mothers' reminiscing style was significantly correlated with the children's autobiographical memory within each of the subgroups of participants. Given the consistency of these associations, all subsequent analyses are based on the full sample.

The longitudinal correlations, also displayed in Table 4, suggest substantial linkages between maternal reminiscing style and children's performance in the reminiscing task at later time points, as well ($r_s = .38, .31, \text{ and } .24$ from 3 to 5 years, 3 to 6 years, and 5 to 6 years, respectively). Importantly, these correlations remained statistically significant, even when calculated while controlling for different aspects of children's language abilities (i.e., auditory comprehension, expressive language, and total language, as measured in the Preschool Language Scale-4) at the 3 year visit, indicating that the associations are not driven by children's verbal abilities. Taken together, the statistically significant correlations indicate that maternal elaborative conversational style is highly related to children's performance in the reminiscing task during the same conversation, and also during later conversations.

In addition to correlational analyses, a median split was performed on the maternal reminiscing style measure at 3 years to classify each mother as high or low elaborative relative to the other mothers in the sample. The memory elaborations of the children of the mothers in these two groups at each time point were then calculated and are displayed in Figure 1. As can be seen, the children of both high and low elaborative mothers contributed an increasing number of elaborations as a function of age. However, inspection of Figure 1 also indicates consistent group differences such that the children of high elaborative mothers contributed more memory elaborations in the reminiscing task than their peers with low elaborative mothers at 3 years, $t(157) = -8.82, p < .001$; 5 years, $t(125) = -2.42, p < .05$; and, 6 years, $t(113) = -2.72, p < .01$.

To further explore these developmental findings, latent growth curve modeling was employed to characterize children's initial autobiographical memory at 3 years and the patterns of growth of the children from 3 to 6 years as a function of early maternal reminiscing style. Maximum likelihood parameter estimates were obtained using Mplus Version 7, under the assumption that all missing data were missing at random. Two models, one in which maternal elaborative reminiscing style was treated as a continuous variable and one in which it was dichotomized into two groups (high versus low elaborative style) at 3 years were tested. Although both models fit the data well, the model with maternal style as a dichotomous variable is presented for ease of interpretation. The fit indices of this model were: $\chi^2 = 3.11$; $df = 2$; $p = .21$; CFI = .99; TLI = .97; RMSEA = .06; SRMR = .04; and, effect size = .53. Given these values, the obtained parameter estimates can be interpreted with confidence. Figure 2 illustrates the path model for this analysis.

Consistent with means displayed in Figure 1, the results of the latent growth curve modeling indicated that the memory elaborations in reminiscing for children with low elaborative mothers was 2.38 at the first time point (i.e., the intercept). Children with high elaborative mothers, on the other hand, contributed 6.99 memory elaborations, or 4.61 more

elaborations than their peers with low elaborative mothers, a difference that was statistically significant ($p < .001$). In terms of growth trajectories from 3 to 6 years, the slope of the function for children with low elaborative mothers was 2.42, indicating that they contributed 2.42 additional memory elaborations in reminiscing conversations each year. Children with high elaborative mothers had a slightly smaller, or less steep, slope of 1.95. This difference in slopes between the children with low and high elaborative mothers was not statistically significant, suggesting that there was not a significant difference between these rates of change over the three-year period.

Associations between Maternal Reminiscing and Children's Deliberate Memory

—In contrast to the clear associations between maternal elaborative style and the children's contributions to the reminiscing conversations, as can be seen in Table 4, there were fewer significant correlations between maternal style in reminiscing and the children's deliberate memory performance. For example, maternal elaborative style in reminiscing at 3 years was significantly correlated with the children's concurrent use of strategic behaviors as well as the number of items recalled in the object memory task ($r_s = .17$ and $.40$, respectively), but not at the other time points. Moreover, maternal style as observed at ages 5 and 6 was also not related to children's performance on the object memory task at those time points. Turning to performance on the Free Recall with Organizational Training task, maternal style in reminiscing at 6 years was associated with children's recall on the generalization trial ($r = .34$) and marginally linked to their sorting ARC scores ($r = .19$), suggesting that children with high elaborative mothers were better able to take advantage of organizational training than those with low elaborative mothers.

In addition to correlational analyses, the dichotomous characterization of maternal reminiscing style (high versus low elaborative) at 3 years was utilized to examine the extent to which children's strategic behaviors and deliberate remembering differed at the three time points for the groups of children with high and low elaborative mothers. In the object memory task, the children's strategic behaviors did not vary as a function of maternal style at any time point. However, there were differences in recall at 3 years such that children with high elaborative mothers remembered significantly more objects than their peers with low elaborative mothers, $t(144) = -4.49$, $p < .001$. No significant differences between groups in recall at 5 and 6 years were present. These findings are reflected in Figure 3 in which the mean number of items recalled in the object memory task at each time point is displayed for children with low and high elaborative mothers as classified at 3 years.

To further explore the recall data in the object memory task, latent growth curve modeling was employed to characterize patterns of growth in the children's deliberate recall from 3 to 6 years as a function of early maternal reminiscing style. As was the case in the parallel analysis of predictors of autobiographical memory discussed above, two models, one in which maternal elaborative conversational style was treated as a continuous variable and one in which it was dichotomized into two groups (high versus low elaborative style) at 3 years, were tested. As before, both models fit the data well, and the model with maternal style as a dichotomous variable is presented for ease of interpretation. The fit indices of this model were: $\chi^2 = .53$; $df = 2$; $p = .77$; CFI = 1.00; TLI = 1.14; RMSEA = .00; SRMR = .02; and,

effect size = .66. As a result, the obtained parameter estimates can be interpreted with confidence. Figure 4 illustrates the path model for this analysis.

Consistent with the means presented in Figure 3, the results of the latent growth curve modeling indicated that the number of items recalled by children of low elaborative mothers was 2.36 at the first time point (i.e., the intercept) in the object memory task, whereas children with high elaborative mothers recalled 3.76 items at the first time point, a difference that was significant ($p < .001$). In terms of the growth trajectories from 3 to 6 years, the slope of the function for children with low elaborative mothers was 1.67; that is, children with low elaborative mothers remembered an additional 1.67 items on the object memory task each year. Children with high elaborative mothers had a slope that was less steep and remembered 1.35 more items each year in the task. This difference in slopes between children with low and high elaborative mothers was statistically significant ($p < .05$), indicating that children with low elaborative mothers increased their recall at a faster rate than did their peers with high elaborative mothers, as is clear from inspection of Figure 3.

Discussion

This research represents one of the first longitudinal examinations of the linkages between maternal elaborative reminiscing style and children's autobiographical and deliberate memory development from the preschool to early elementary school years in an ethnically and socioeconomically diverse sample. Previous research has certainly indicated that maternal style in reminiscing is linked to children's autobiographical memory development during the preschool years in white middle-class families (e.g., Fivush et al., 2006), but less is known about the importance of maternal conversational techniques for the development of children's deliberate memory skills. Moreover, even less is known about the ways in which maternal style in reminiscing may influence these two types of memory development in samples that include minority or low socioeconomic children, particularly as these children make the transition to formal schooling.

Linkages between Mothers' Reminiscing Style and Children's Autobiographical Memory

The results reported here replicate the finding that most Western mothers show an increase in elaborativeness over time (Fivush et al., 2006). Mothers became increasingly elaborative (as assessed with the z -score composite measure) from the 3 to the 6 year time points. Similarly, with increases in age, the children contributed more memory elaborations to these conversations about the past with their mothers. In addition to these increases in mean level performance across the assessment points, it is also the case that both mothers and children were consistent over time in their relative contributions to the conversations. That is, the mothers' elaborativeness was correlated at the three time points, as were the children's memory contributions. Further, maternal style and children's autobiographical remembering were highly correlated at each time point.

Given the diversity of the sample, it was important to determine if there were differences between ethnic and SES groups in terms of the mothers' reminiscing style and the children's autobiographical memory performance. European-American and above poverty mothers and children had significantly higher scores in reminiscing than their African-American and

below poverty peers. These mean level differences prompted us to explore correlations between mothers' reminiscing style and children's autobiographical memory within the different ethnic and SES groups. In this regard, at each time point, maternal reminiscing style was significantly correlated with the children's autobiographical memory within each of the subgroups of participants. The patterns of correlations within each of these groups were quite similar to the those observed with the data of the full sample, indicating that regardless of ethnicity and SES, mothers with higher reminiscing style scores had children with more advanced autobiographical memory skills.

One unique aspect of this project is the use of latent growth curve modeling to examine the children's growth trajectories in memory skills from 3 to 6 years, as a function of maternal reminiscing style at 3 years. With these models, we observed that children of high elaborative mothers started off with better autobiographical memory performance at 3 years, but that there were no differences in the speed with which children with high versus low elaborative mothers grew in their autobiographical memory skills. It is possible that having a highly elaborative mother early in life helps a child advance in his or her autobiographical memory earlier than a child with a low elaborative mother. However, the influences of endogenous processes (such as increases in processing speed and underlying knowledge) and exogenous factors (such as exposure to formal schooling) may help the children of low elaborative mothers to "catch up" to their peers. This may especially be the case if a child is enrolled in a classroom with a teacher who is classified as having a "high mnemonic" style, as the type of cognitive processing language used by these teachers has been linked to children's growth in deliberate memory skills in the early elementary school years (e.g., Coffman et al., 2008).

Linkages between Mothers' Reminiscing Style and Children's Deliberate Memory

In addition to the observed correlations between maternal elaborative style and children's autobiographical memory performance, a number of parallel associations were observed between mothers' style of reminiscing and measures of the children's deliberate memory performance. More specifically, maternal style in reminiscing at 3 years was associated with some aspects of children's strategic behavior and recall on the object memory and free recall with training tasks. These linkages were more common between maternal reminiscing style and children's recall than strategic behaviors. One interpretation of these correlations is that in the context of joint reminiscing conversations, highly elaborative mothers may provide their children with many opportunities to search their memories and in this way give them practice in key skills that are required for success in recalling and reporting information in deliberate memory tasks.

When examining the latent growth curve models of children's recall in the object memory, at the first time point children with high elaborative mothers were shown to remember significantly more items than their peers with low elaborative mothers. In addition, the rates of growth in the number of items recalled differed significantly across the two groups of children. Contrary to what had been expected, children of low elaborative mothers displayed a faster rate of growth in recall than did their peers with high elaborative mothers. That is, children with high elaborative mothers started out with better recall on the object memory

task, but over time, their peers with low elaborative mothers increased in the number of items recalled at a faster rate, such that the two groups did not differ at the third assessment point at 6 years.

This difference in deliberate memory growth trajectories between children with low and high elaborative mothers may reflect several factors. A high elaborative maternal style may be particularly useful in helping children develop advanced deliberate memory skills earlier than would otherwise be observed, but, as was suggested above for autobiographical memory, factors such as increases in processing speed, knowledge, and exposure to formal schooling may help the children of low elaborative mothers to catch-up, regardless of their early experiences. It should be emphasized that the school context in the early elementary school years is especially influential in children's deliberate memory development (e.g., Coffman et al., 2008; Morrison, Smith, & Dow-Ehrensberger, 1995; Wagner, 1978). Thus, it could be the case that having a high mnemonic teacher who uses high levels of cognitive processing language is especially influential for children with low elaborative mothers, which might explain their rapid rate of growth as they transition from the preschool to elementary school years.

Future Directions

The findings reported here provide unique information concerning linkages between aspects of the linguistic environment to which 3-year-olds are exposed and their performance on autobiographical and deliberate memory tasks at 3, 5, and 6 years. We made use of a new measure of mothers' elaborative reminiscing style derived from the conceptualization of maternal elaborative style present in the literature as well as aspects of maternal speech that have been shown to be related to children's memory development, including mothers' use of elaborations, associations, confirmations, and metamemory talk. The results presented here are comparable to those reported using traditional methods, but we suggest that because this new measure is more comprehensive than other indicators it may give researchers greater leverage in the future as they probe for linkages to other child outcomes beyond these specific memory skills. Explorations of the linkages between this new measure of maternal conversational style and children's *independent* autobiographical narratives – in terms of the number of memory details provided and the coherence of these narratives – is an important next step, as is a serious effort to relate conversational style to additional indices of deliberate memory.

We treated our measure of maternal style both as a continuous variable in the descriptive and correlational analyses and as a dichotomous variable after performing a median split to test for differences in children's memory performance and growth trajectories as a function of their mothers' reminiscing style group membership. This dichotomization was used as a matter of convenience to test for group differences in children's memory performance, despite our recognition that mothers certainly exist on a continuum of elaborativeness. However, we note that this partitioning of mothers into groups will be especially informative in training studies in which some mothers are trained in the use of elaborative reminiscing techniques. Several research groups have demonstrated that it is feasible to train mothers in an elaborative style of talk, either in the context of ongoing mother-child events (e.g.,

Boland, Haden, & Ornstein, 2003) or in reminiscing with their children (e.g., Reese & Newcombe, 2007).

Just as mothers demonstrate a variety of behaviors in joint conversations that may differentially impact children's understanding and remembering, they may also differ in the behaviors they use to encourage deliberate remembering in their children. Indeed, Larkina, Güler, Bauer and colleagues have reported that mothers do differ in their use of memory strategies during a mother-child collaborative deliberate memory task and that these differences relate to children's recall in the collaborative task and to children's performance in individual deliberate memory tasks over time (see Larkina, Güler, Kleinknecht, & Bauer, 2008; Güler, Larkina, Kleinknecht, & Bauer, 2010). Future research could profitably examine the possible associations between the ways in which mothers reminisce with their children and also help their children deliberately "work to remember" information.

Finally, research that examines aspects of children's home *and* school contexts would be most relevant to understanding the range of factors that contribute to the socialization of children's memory skills. To date, there has been very little work that is focused on examining the combined effects of having an elaborative mother and teacher who uses high levels of cognitive processing language (but see Hudson, Coffman, & Ornstein, 2013). It appears that having a high elaborative mother early in life is particularly important for children's early success in autobiographical and deliberate memory, but that once children enter Kindergarten, the differences between groups of children with high and low elaborative mothers becomes less pronounced. Gaining a better understanding of what happens in Kindergarten classrooms could shed some light on these findings, and could provide insights on how to facilitate the best possible learning environments for children at home and at school.

Acknowledgments

The research reported here represents a portion of Hillary A. Langley's dissertation, carried out under the direction of Peter A. Ornstein. This work was supported by grants from the National Science Foundation (BCS-0126475 & BCS-0720660), and by a postdoctoral fellowship provided by the National Institute of Child Health and Human Development (T32-HD07376) through the Center for Developmental Science at the University of North Carolina at Chapel Hill to the first author. We would like to thank all of the families that participated over the years, and the incredible team of research assistants who helped to collect and process these data.

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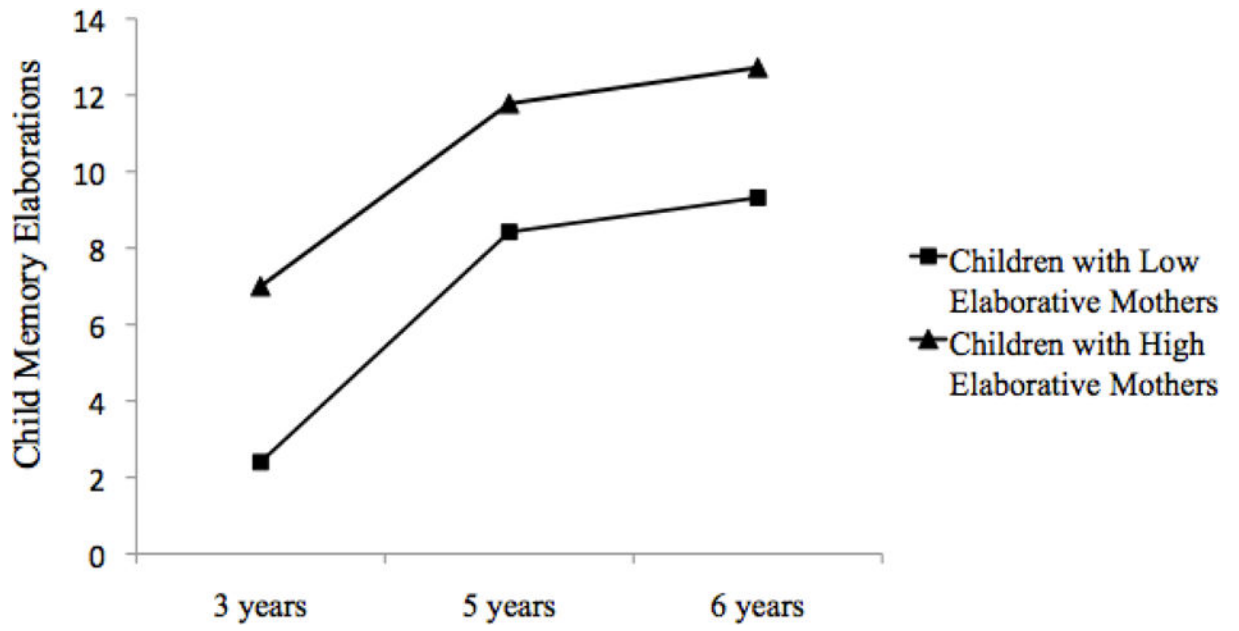


Figure 1. Children’s Mean Number of Memory Elaborations in the Reminiscing Task as a Function of Maternal Elaborative Conversational Style in Reminiscing at 3 years

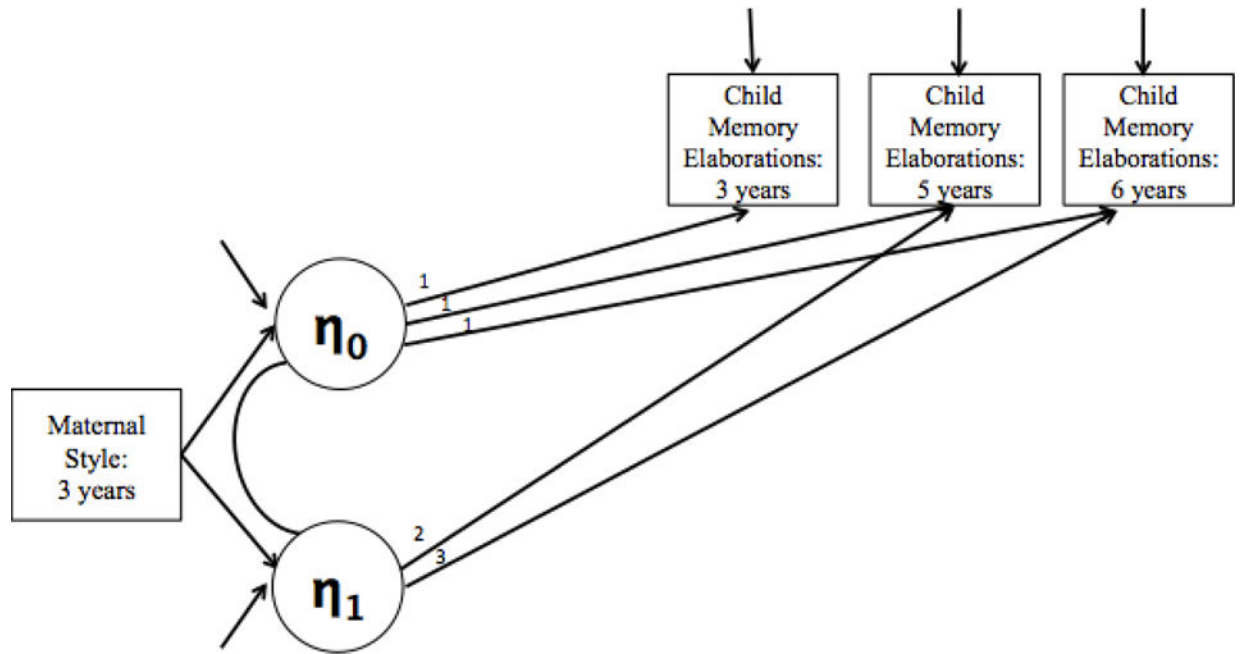


Figure 2. Latent Growth Curve Analysis of Children's Memory Elaborations in the Reminiscing Task as a Function of Maternal Conversational Style at 3 years

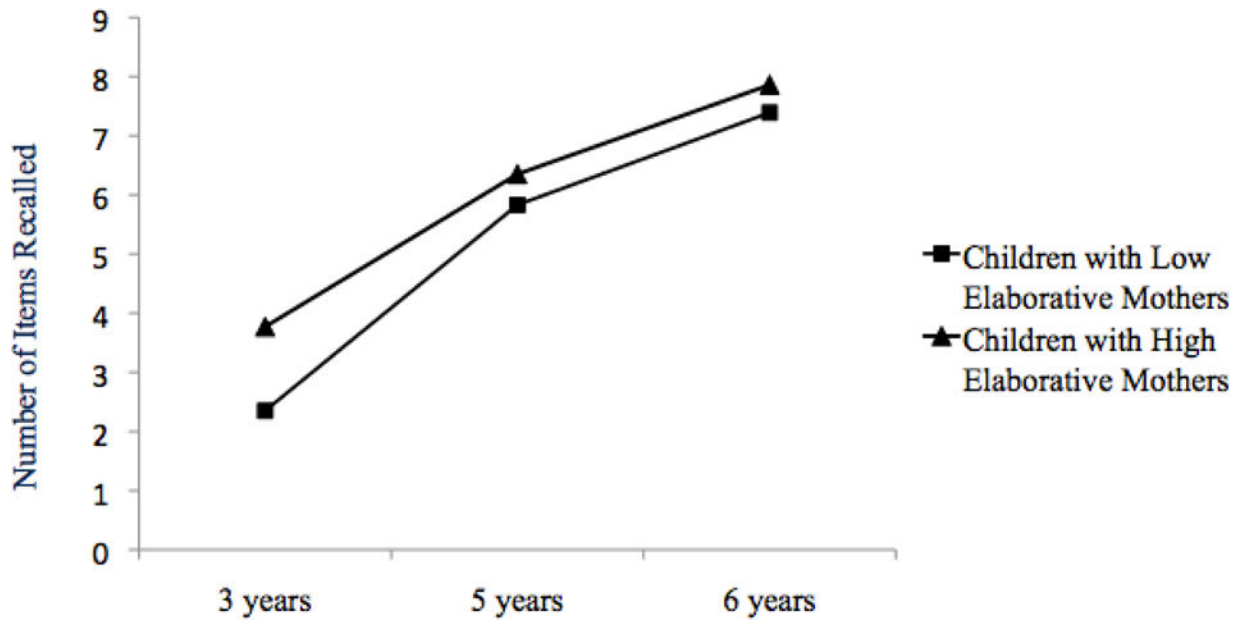


Figure 3. Children’s Mean Number Items Recalled in the Object Memory Task as a Function of Maternal Elaborative Conversational Style in Reminiscing at 3 years

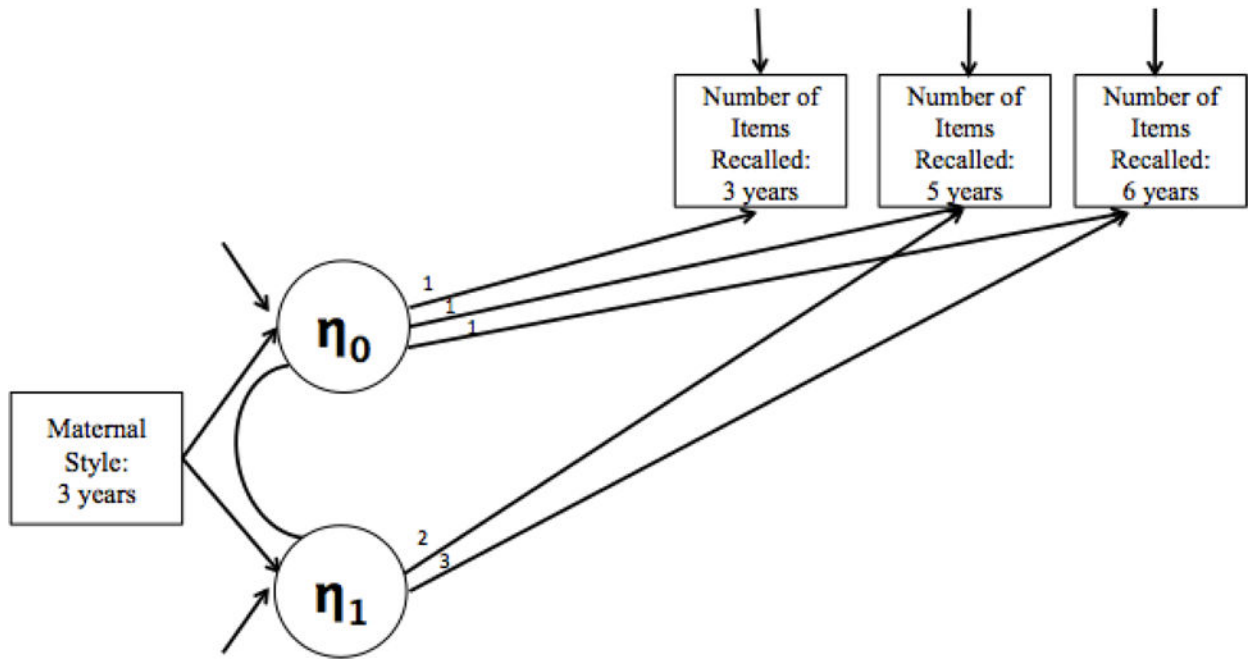


Figure 4. Latent Growth Curve Analysis of Children's Recall in the Object Memory Task as a Function of Maternal Elaborative Conversational Style in Reminiscing at 3 years

Table 1

Definitions and Examples of Codes from the Mother-Child Reminiscing Task

Code	Definitions	Examples
Maternal Open-Ended Question Elaborations (or Repetitions)	Open-ended questions asking the child to provide new (or repetitive) memory information about an event.	"What did we do at the zoo?" "Who went with us?" "What kinds of animals did we see?"
Maternal Yes-No Question Elaborations (or Repetitions)	Questions that ask the child to confirm or deny a new (or repetitive) piece of memory information provided by the mother.	"Were you wearing a hat?" "Was it hot or cold outside?" "Did you have fun?"
Maternal Statement Elaborations (or Repetitions)	Any declarative comment made by the mother that provides new (or repetitive) information about the event.	"We ate popcorn at the zoo." "Your friend Sally came with us on the field trip."
Child Memory Elaborations (or Repetitions)	Children either move the conversations to a new (or already discussed) aspect of the event or provide new (or repetitive) information about the event being discussed.	"I saw a giraffe at the zoo." "I wore my favorite dress!" "I was scared of the lions."
Maternal and Child Associative Talk	Statements or questions that are not about the particular event under discussion, but are related to the one under discussion, including talk about past or future events that are comparable to the event under discussion, as well as comments about facts about the world related to the event under discussion.	"Can we go back to the zoo again soon?" "Giraffes are my favorite animals." "A baby lion is called a cub."
Maternal and Child Confirmations	Comments that in some way confirm information provided by the other conversational partner.	"Yes, you did eat popcorn at the zoo." "Yes, you're right!" "Uh huh."
Maternal and Child Metamemory Talk	Memory remarks about the process of remembering or about the other conversational partner's memory performance.	"I had forgotten that happened!" "I can't believe you still remember that." "Why don't you take a second to think because I know you can remember what happened."

Table 2
Descriptive Statistics from the Mother-Child Reminiscing Task: Maternal and Child-Level Variables

Variable	3 years			5 years			6 years		
	<i>n</i>	Mean	<i>SD</i>	<i>n</i>	Mean	<i>SD</i>	<i>n</i>	Mean	<i>SD</i>
Maternal Elaborations									
African-American	88	11.13	7.16	75	14.10	8.56	71	14.62	7.85
European-American	71	16.85	7.39	52	20.16	12.11	44	21.16	10.40
Below Poverty	75	10.15	6.33	60	12.40	5.87	48	13.79	8.38
Above Poverty	84	16.85	7.62	67	20.32	12.32	67	19.51	9.46
Full Sample	159	13.69	7.78	127	16.58	10.55	115	17.12	9.43
Maternal Associations									
African-American	88	4.62	8.79	75	8.89	10.95	71	9.21	8.71
European-American	71	2.94	4.85	52	9.51	10.07	44	8.89	7.39
Below Poverty	75	4.54	9.13	60	9.68	13.66	48	7.87	6.95
Above Poverty	84	3.27	5.20	67	8.67	6.76	67	9.96	8.93
Full Sample	159	3.87	7.32	127	9.15	10.56	115	9.09	8.20
Maternal Confirmations									
African-American	88	3.93	3.27	75	5.55	4.41	71	6.42	4.62
European-American	71	7.35	4.30	52	9.79	7.45	44	8.66	5.11
Below Poverty	75	3.69	3.01	60	4.93	3.53	48	6.03	4.77
Above Poverty	84	7.04	4.33	67	9.40	7.23	67	8.16	4.85
Full Sample	159	5.46	4.11	127	7.29	6.19	115	7.27	4.91
Maternal Metamemory Talk									
African-American	88	0.10	0.35	75	0.44	0.69	71	0.35	0.52
European-American	71	0.24	0.36	52	0.87	0.93	44	0.75	1.05
Below Poverty	75	0.08	0.20	60	0.42	0.58	48	0.37	0.69
Above Poverty	84	0.23	0.45	67	0.80	0.96	67	0.60	0.84
Full Sample	159	0.16	0.36	127	0.62	0.82	115	0.51	0.79
Child Memory									
Elaborations									
African-American	88	3.73	3.82	75	8.68	5.70	71	10.38	6.13
European-American	71	5.94	3.93	52	12.04	9.16	44	12.72	7.40

Variable	<u>3 years</u>		<u>5 years</u>		<u>6 years</u>	
	<i>n</i>	Mean	<i>n</i>	Mean	<i>n</i>	Mean
European-American	75	2.88	60	7.63	48	9.59
Below Poverty	84	6.36	67	12.22	67	12.48
Above Poverty	159	4.72	127	10.05	115	11.27
Full Sample						

Note: Each participant is classified as either African-American or European-American *as well as* either Below Poverty or Above Poverty.

Table 3
Descriptive Statistics from the Object Memory and Free Recall with Training Tasks: Child-Level Variables

	3 years			5 years			6 years		
	Mean	(SD)	Range	Mean	(SD)	Range	Mean	(SD)	Range
Object Memory									
Strategic Behavior	13.99	(4.56)	2–24	17.52	(5.35)	0–24	17.07	(5.99)	0–24
Recall	2.97	(2.06)	1–9	6.17	(2.32)	0–11	7.62	(2.36)	0–14
Free Recall with Training Task									
Sorting ARC (Baseline)							-0.13	(0.31)	-0.23–1
Clustering ARC (Baseline)							0.31	(0.40)	-1–1
Recall (Baseline)							8.39	(2.65)	2–16
Sorting ARC (Generalization)							0.35	(0.60)	-0.23–1
Clustering ARC (Generalization)							0.62	(0.45)	-0.67–1
Recall (Generalization)							9.10	(3.11)	2–16

Correlations between Maternal Reminiscing Style, Children's Autobiographical Memory, and Children's Deliberate Memory Performance

Table 4

	Child Memory Elaborations			Maternal Reminiscing Style		
	3 years	5 years	6 years	3 years	5 years	6 years
Mother-Child Reminiscing Task						
Child Memory Elaborations: 3 years	–					
Child Memory Elaborations: 5 years	.45***	–				
Child Memory Elaborations: 6 years	.42***	.47***	–			
Maternal Reminiscing Style: 3 years	.80***	.38***	.31***	–		
Maternal Reminiscing Style: 5 years	.41***	.68***	.24*	.43***	–	
Maternal Reminiscing Style: 6 years	.41***	.38***	.66***	.34***	.35***	–
Object Memory Task						
Strategic Behavior: 3 years	.23**	.04	.00	.17*	.04	.13
Recall: 3 years	.47***	.23*	.25*	.40***	.32***	.29**
Strategic Behavior: 5 years	–.20	–.11	–.06	–.11	–.01	–.02
Recall: 5 years	.03	–.05	.04	.06	–.11	–.05
Strategic Behavior: 6 years	–.11	–.15	–.03	–.11	–.21	.02
Recall: 6 years	.13	.00	.14	.11	.07	.10
Free Recall with Training Task						
Sorting ARC (Baseline): 6 years	–.05	–.12	–.13	–.08	–.03	.01
Clustering ARC (Baseline): 6 years	.04	.03	.19*	.00	–.07	.03
Recall (Baseline): 6 years	.06	.07	.14	.05	.07	.09
Sorting ARC (Generalization): 6 years	.06	.14	.12	.00	.00	.19+
Clustering ARC (Generalization): 6 years	.10	.13	.22*	.11	.14	.14
Recall (Generalization): 6 years	.12	.17+	.33***	.10	.12	.34***

Note.

+ $p < .10$,* $p < .05$,** $p < .01$,

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Table 5

Concurrent Correlations between Maternal Reminiscing Style and Children's Autobiographical Memory Performance at 3, 5, and 6 years as a Function of Ethnicity and SES

	Correlations
3 years	
African-American	.79 ^{***}
European-American	.78 ^{***}
Below Poverty	.55 ^{***}
Above Poverty	.85 ^{***}
Full Sample	.80 ^{***}
5 years	
African-American	.58 ^{***}
European-American	.74 ^{***}
Below Poverty	.32 [*]
Above Poverty	.75 ^{***}
Full Sample	.68 ^{***}
6 years	
African-American	.54 ^{***}
European-American	.76 ^{***}
Below Poverty	.69 ^{***}
Above Poverty	.62 ^{***}
Full Sample	.66 ^{***}

Note.

* $p < .05$,

** $p < .01$,

*** $p < .001$