Social Factors in the Development of Autobiographical Memory: The State of the Art

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Abstract

This review addresses theory and research on the role of self understanding, language, theory of mind, attachment security, and parental style in children’s autobiographical memory development. Social-cognitive factors appear to interact with parental style in producing children’s first verbal memories. Emotional factors, such as attachment security, may also prove to be critical for the socialization of life histories. Further longitudinal studies will be necessary to examine individual differences in the growth of this complex and multiply determined skill.

Keywords: autobiographical memory; self understanding, theory of mind; attachment security

Autobiographical memory is a complex and multiply determined skill, consisting of neurological, social, cognitive, and linguistic components. At the most basic level, autobiographical memories refer to personally experienced past events. More conservative definitions are that memories of past events are only autobiographical if they are verbally accessible (Pillemer & White, 1989), in narrative form (Nelson, 1996), involve a sense of recollection (Perner, in press a) and constitute part of the life story (Nelson, 1996). One problem with stipulating recollection as a prerequisite for autobiographical memory is that recollection is difficult to measure in adults, and may be impossible to measure in preverbal infants (Rovee-Collier, 1997). A further problem with restricting autobiographical memories to those that fit into the life story is that often it is impossible to know at the time of an event how important that event will later be to the life story. Indeed, autobiographical memories may fall in or out of the life story depending on the stage of life and the context in which the life story is being told (e.g., Linde, 1993).

Most autobiographical memories, however, do involve verbal communication. Although adults sometimes engage in private reminiscing that consists mostly of images, a primary purpose of reminiscing is social (Hyman & Faries, 1992). This communication of autobiographical memories with and to others necessarily entails that the memory be verbally accessible. Focusing on verbally accessible memories does not preclude very young children from the phenomenon of interest. Children start to talk about the past nearly as soon as they begin to talk, at about 18 months of age...
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(Reese, 1999; Sachs, 1983). Children’s early verbal reports only consist of two-word associations, at most, whereas by the time they are 3-1/2 years old, they are capable of telling a fairly coherent story about a past event with little prompting from an adult (Fivush, Haden, & Adam, 1995; see Reese, in press, for a review of the research on children’s very early verbal memory).

The goal of this review is to provide an update of recent advances in the field of children’s autobiographical memory development. The focus will be on verbally accessible memories of past events, because these memories are the best possible candidates for eventually making their way into the life story. The neurological components of memory and the growth of nonverbal memory in infancy and early childhood have been reviewed extensively (see Barr & Hayne, 2000; Howe & Courage, 1993, 1997; Nelson, 1995; Wheeler, Stuss, & Tulving, 1997). Recent reviews have also covered the role of stress (Howe, 1997) and suggestibility in children’s event memory (Ceci & Bruck, 1993). This review will instead focus on the social, cognitive, and linguistic components of autobiographical memory, going into depth on those recent studies that have related children’s autobiographical memory to independent assessments of their social, cognitive and linguistic skills. Most of the studies reviewed have not assessed the accuracy of the autobiographical memories, because for the purpose of building up a life history, accuracy may not be the most important criterion for a memory’s eventual significance. Instead, a belief in the value of the memory, whether true or false, for the self may be a more important determinant of what gets into the life story (Singer & Salovey, 1993). That is, if one believes that the event really happened, if one bases his/her identity in part upon that event, and if one bases his/her future behavior upon that event, then the event is a true autobiographical memory.

Recent Theories of Autobiographical Memory Development

The last decade saw a veritable explosion in theories of autobiographical memory development. Most of these theories have been cast in terms of explaining infantile amnesia, the phenomenon by which adults cannot recall events from their early childhood (Dudycha & Dudycha, 1941). The conundrum is that if indeed children show evidence of long-term memory at an earlier age than previously thought possible, why then are adults unable to recall most of their early childhood experiences? The average age of adults’ earliest childhood memories is between 3 and 3-1/2 years in most retrospective studies. Thus, the task became to understand why infantile amnesia ended (and presumably true autobiographical memory began) at the beginning of the preschool period.

(i) Primary influence theories. One group of theories rests on the assumption that children lack a critical cognitive or social-cognitive framework before this age that would enable them to encode memories in such a way that they could later be retrieved as self relevant. Howe and Courage (1993, 1997), for instance, proposed that visual self-recognition, as commonly measured in the mirror task of self-recognition (MSR; Lewis & Brooks-Gunn, 1979), was the critical conceptual framework enabling autobiographical memory. Before children pass the MSR task at about 18 months to 2 years, they are not capable of encoding and storing memories as self relevant. Later, when trying to retrieve these memories from the perspective of things that happened to ‘me,’ they are unsuccessful because they did not yet have a ‘me’ to which to attach the memory. Growth in self understanding continues to occur after age 2 years, of
course, but in this theory MSR is the necessary prerequisite for autobiographical encoding and storage. Povinelli (1995; see also Suddendorf & Corballis, 1997 for related ideas) also hypothesized the importance of self understanding for autobiographical memory, but believed that children do not have a ‘proper’ self until they are capable of understanding delayed self-recognition: I am the same person today that I was yesterday and last year. Povinelli, Landau, and Perilloux (1996) developed an ingenious task to measure delayed self-recognition (DSR) that is analogous to MSR but with a built-in delay. Children are marked surreptitiously with a sticker and after a delay are shown a video or photo of their marked selves. Children who will reach up to obtain the sticker after a brief delay purportedly understand the connection between a past and present self and are capable of autobiographical memory. Povinelli (1995) predicted that a proper self comes into play at around 4 years of age, after sufficient representational awareness has been achieved. Conway and Pleydell-Pearce (2000), in their cognitive-motivational theory of adults’ autobiographical memory, concurred with these theorists that the main task of autobiographical memory is self grounding. Conway and Pleydell-Pearce instead focus on the incompatibility of goals for the self in the first five years of life (e.g., basic attachment goals) and adults’ self goals (e.g., identity goals) as the primary reason for infantile amnesia. The mismatch between self goals at encoding and retrieval is theorized to result in an inability to reconstruct memories from earliest childhood.

Like Povinelli (1995), Perner and Ruffman’s (1995) theory emphasized children’s growing understanding of mind at around age 4 years as a critical prerequisite for autobiographical memory. For Perner and Ruffman (1995), however, the critical accomplishment occurs as children gain a better understanding of the link between what they know and how they know it (origins of knowledge understanding). With this understanding, children become capable of true recollection. As they remember a past event, they can re-experience the event. Only then is their memory truly episodic or autobiographical. Perner (in press, a) later refined his reason for infantile amnesia not to be a problem with understanding the origins of knowledge per se, but a problem for children in understanding how their re-experiences of an event related to the original event. In other words, children under age 4 years do not have the phenomenological capacity for recollection. Thus any ‘memory’ they display for the event might in fact be reported from a conversation or be a simple association, not a true memory of the event as directly experienced. As in Howe and Courage’s (1993) theory, the critical framework missing is the capacity for encoding and later retrieving an event as personally experienced; however, the ability that enables this framework is not present until much later in Perner’s theory than in Howe and Courage’s theory.

(ii) Multiple influence theories. Another group of theorists has also focused on presumed cognitive or social-cognitive deficits in the early preschool years that do not allow autobiographical memories to be encoded and retrieved, but have located these critical abilities in the larger social and linguistic realm for the child. Pillemer and White (1989), for instance, noted that children younger than about age 4 are not able to understand fully the causal-temporal sequence of events that would enable fluent retrieval from an adult’s perspective. For example, young preschoolers do not understand how steps of an event relate causally to each other, or in general how events are temporally ordered in relation to each other. Fivush (1988) proposed that young preschoolers do not yet have a sense of self-in-time; they are unable to order self-relevant events into a chronological and evaluative life story. In addition, Welch-Ross
(1995) emphasized the initial importance for autobiographical memory of an implicit understanding of the link between experience and knowing from about age 3 years (e.g., seeing the contents of a box leads to knowledge of the contents in the box). Nelson (1996) argued that a necessary cognitive development for autobiographical memory is children’s ability to use language as a representational system at about age 4 years. These explanations have some commonalties with Povinelli’s (1995) notion of an enduring self and Perner’s (in press, a) ideas about connections between past events and re-experiencing events. The multiple influence theorists propose some social, cognitive, or social-cognitive framework contributes to autobiographical memory (e.g., Pillemer & White, 1989) or even enables autobiographical memory (Welch-Ross, 1995).

All of the multiple influence theorists, however, point to the additional powerful influence of social interaction in creating autobiographical memories, even to the point of claiming that children learn these critical cognitive capacities in part through social interaction with others and through reminiscing in particular (Welch-Ross, 1997). Highly elaborative parents who provide a great deal of information about shared past events and who evaluate the past with their children are providing a model for children to encode and retain events in a richer manner themselves. Nelson (1993) theorized that children learn the significance of past events, indeed the function of autobiographical memory, through talking about the past with significant others. Once these social and cognitive contributions have come together, children are capable of beginning to retain events autobiographically and to create a life story. Critically, these accomplishments take place through the medium of language in the context of social interaction (Fivush, 1998; Welch-Ross, in press). One main function of these interactions is to help children place events in an evaluative perspective: what do they mean for the child’s sense of self and for their interactions with others (Fivush, in press)? Children are not just learning what to remember or how to remember, but why they should remember.

The multiple influence theorists have also begun to take the larger social and emotional context for the child, in the form of the attachment relationship with the primary caregiver, into account (Farrar, Fasig, & Welch-Ross, 1997; Fivush & Reese, in press; Nelson, 1999; Pillemer, 1998). If one function of autobiographical memory is to maintain social and emotional bonds, then mothers’ styles of reminiscing and children’s participation in reminiscing should be linked with the mother-child attachment relationship. Mothers with securely attached children may be more elaborative and evaluative when reminiscing with their children. Securely attached children may in turn be more responsive than insecurely attached children in conversations about past events they shared with mothers. Ultimately, securely attached children may develop a richer and more evaluative personal memory system.

This review now turns to a consideration of these theories in light of recent evidence. I will necessarily have to constrain my review to those studies that tested the role of children’s independent social, cognitive, or linguistic capacities for autobiographical memory.

Role of Self Understanding

Only one published study to date has addressed Howe and Courage’s (1993, 1997) hypotheses about the importance of visual self-recognition ability for autobiographical memory. Harley and Reese (1999) measured children’s self-recognition with the
mirror test at age 1-1/2 years as a predictor of children’s memory reports with mothers and experimenters at ages 2 and 2-1/2 years. Children’s independent language, non-verbal memory ability and maternal reminiscing style were also assessed. Children’s memory reports with mothers and experimenters did vary as a function of their earlier self-recognition skill, with early recognizers reporting more with mothers and with experimenters over time. Further analyses with this sample, however, showed that the initial importance of self-recognition was later mediated by maternal reminiscing style when children were 2 years old (Reese, in press). Children who recognized themselves earlier in the mirror test had mothers who responded with increased elaborations in past event conversations with children at age 2 years, and maternal reminiscing style more directly predicted children’s later memory reports. Mothers may notice at some level children’s increased cognitive abilities and respond by increasing their level of elaboration. Thus, there is a link between children’s self-recognition skill and their autobiographical memory, but it appears to be an indirect one that is mediated by social factors. In addition, self-recognition was only one of several important predictors of autobiographical memory in this study, lending credence to a multiple influence perspective.

Other research has focused on the role of an extended self-in-time as the primary contributor to autobiographical memory. Povinelli et al. (1996) operationalized children’s extended self with the delayed self-recognition measure (DSR) outlined previously. In their first series of experiments using this procedure, Povinelli et al. (1996) found that no 2-year-olds reached up to retrieve the sticker upon seeing the video after a brief delay, 25% of 3-year-olds reached for the sticker, and 75% of 4-year-olds did so. Essentially the same results were obtained when children viewed a photograph of the marking event after a brief delay, with 13% of young 3-year-olds, 60% of older 3-year-olds, and 80% of young 4-year-olds reaching up to retrieve the sticker. Povinelli and Simon (1998) further demonstrated that 4- and 5-year-old children differentiated between brief and extended delays for the marking procedure. These older children reached up for the sticker after a brief delay of several minutes, but when shown a video of themselves being marked from the previous week, they did not reach up for the sticker. Three-year-olds, on the other hand, did not differentiate between brief and extended delays for marking, reaching for the sticker at equally low rates in both conditions. Povinelli and Simon concluded that 4- and 5-year-old children have a concept of the self as enduring in time; thus, they understand that transient aspects of self, such as a sticker on one’s head, endure for a short but not a long period. Younger three-year-olds, on the other hand, are unable to connect the past with the present self after even a very brief delay, although these same children are able to detect the marked self in a live condition (Povinelli et al., 1996; Experiment 3). According to Povinelli (1995), only when children have achieved a proper self that is extended in time can they be considered capable of having autobiographical memory, because only then can they connect events that happened to a past self with the present self.

Povinelli and colleagues have demonstrated convincingly the developmental phenomenon by which younger preschoolers are not able to link past and present events. They have not yet, however, linked this developmental accomplishment with independent measures of children’s recall of past events. Skene and Moore (in press) have taken steps in this direction by showing a relation between children’s DSR performance and their episodic memory. Skene and Moore’s episodic memory measure consisted of children’s immediate recall of a sticker game. Recalling the stickers’ order
and the context (i.e., what color cup was covering the sticker) were posited to tap into episodic rather than semantic memory because children had to rely on recollection. Delayed self recognition was positively correlated with both aspects of episodic memory for 4-year-olds, even with children’s general memory for the type of stickers partialled out. As Skene and Moore admit, however, their memory task may not be autobiographical in the sense that it is not likely to comprise a specific past event of personal relevance for the participant; nor does it comprise long-term or verbal recall.

Welch-Ross (in press) reported the first evidence to support a relation between DSR performance and children’s verbal recall. Children’s memory reporting performance varied as a function of DSR, with 3-year-olds who reached for the sticker recalling proportionally more about significant past events with their mothers than children who did not reach for the sticker. The effect of delayed self understanding interacted with mothers’ reminiscing style, such that only among children of highly elaborative mothers did a difference exist between reachers and non-reachers in their verbal memory scores. Welch-Ross interpreted the DSR task as demonstrating children’s understanding of causal connections between the past and present, not necessarily indicating an extended self-in-time. Further work by Povinelli, Landry, Theall, Clark, and Castille (1999) supported the contention that 3-year-old children’s difficulty with the delayed self task is not specific to self-recognition, but is part of a general difficulty with causally connecting past and present events. Similar to the results with live self-recognition (e.g., Reese, in press), the role of delayed self or causal understanding per se appears to interact with social factors, such as the amount of elaborative conversation the child receives about past events from the mother. This pattern of findings is in line with Pillemer and White’s (1989) and Fivush’s (1988) theories that the effects of these cognitive advances are mediated by the way adults introduce children to the function of autobiographical memory.

It is also possible that the results to date have revealed only a limited role for self understanding in autobiographical memory because the measures of self understanding are only partially capturing the ability. Even the DSR procedure does not fully capture the sense of an extended self-in-time as conceptualized by Povinelli (1995), Fivush (1988; in press), and Nelson (in press, a); instead, it appears to measure children’s causal understanding more generally. Pillemer, Picariello and Pruett (1994) have also demonstrated the role of children’s causal-temporal understanding in their autobiographical memory. Children who were 3-1/2 years old at the time of a significant event (a fire alarm at their preschool) were not able to construct a coherent causal chain of events two weeks after the experience. For instance, many of these children stated that they were already outside the building when the fire alarm went off. In contrast, almost all of the children who were 4-1/2 years old at the time of the same event said that they were inside the preschool when the alarm went off. Only one 3-1/2 year old, but nearly half of the 4-1/2 year olds, spontaneously mentioned the cause of the fire alarm. Notably, 57% of the older children displayed some memory for the event 7 years later, compared to only 18% of the children who were 3-1/2 at the time of the event. Thus, a marked change in children’s understanding of causal and temporal sequencing of events at around age 4 years may be contributing to an increase in children’s autobiographical memory.

In sum, the DSR task may be tapping into a larger change in children’s causal-temporal understanding that occurs at about age 4 years. This development would affect children’s ability to construct a self-in-time, but it does not necessarily involve
an evaluation of the significance of a past event with respect to a current concept of self. Even less research has addressed the link between autobiographical memory and evaluative components of self. Welch-Ross, Fasig, and Farrar (1999) found a concurrent relation between 4-year-olds’ self understanding, as measured by the Children’s Self—View Questionnaire (Eder, 1990), and their autobiographical memory. Children with a more consistent, organized sense of themselves had more evaluative conversations with their mothers about past events. These results could mean that children need a coherent sense of self before they can contribute to and benefit from evaluative conversations of the past. There was some indication in these data that only children with an organized self view were able to benefit from an elaborative maternal style. The results may also mean that mothers’ evaluative perspective for past events contributes to children’s organized self-concept, or that mothers respond to their perception of children’s organized self-concept by discussing emotions more freely in past event talk. Longitudinal studies need to be conducted to determine the direction of this relationship.

Self understanding does relate to autobiographical memory even with the current measures, but often only indirectly. These results point to the conclusion that self understanding cannot be considered a solely endogenous characteristic of the child as implied in Howe and Courage (1993) and Povinelli (1995). Instead, social factors, such as parental reminiscing style, interact with children’s self understanding to produce autobiographical memory. There are probably several reasons for this interaction. First, parents’ talk about personally relevant past events may be an important source of information for children’s self understanding. Second, children may not be able to benefit from increased self understanding in their retention of autobiographical memories unless they have the added elaborative and evaluative support from their parents in understanding past events. These conclusions are necessarily speculative due to the limited amount of research conducted in this area so far. Few extensions have been made to children’s independent autobiographical memory, and in only one sample was the role of self understanding studied longitudinally (Harley & Reese, 1999; Reese, in press).

Role of Understanding of Mind

A related body of research has addressed the role of children’s understanding of mind in their ability to encode and display autobiographical memories. Children’s understanding of their own and others’ mental states (theory of mind) is hypothesized to be important in at least two ways for autobiographical memory (Welch-Ross, 1997). First, children’s understanding of the origins of knowledge may contribute to their autobiographical memory skills. Specifically, children begin to understand that visual access equates to knowledge at around 3 years of age (Pillow, 1989). Around age 4 years, children start to understand more specifically what someone might know depending on what they saw (Taylor, 1988). Children also become capable of connecting what they know to the sense modality of the original experience (e.g., either they know because they saw an event or because they were told of an event; Gopnik & Graf, 1988). These origins of knowledge skills are predicted to be related to children’s autobiographical memory in that they aid the child in distinguishing between their own knowledge and others’ knowledge, how they obtained that knowledge, and between personally experienced events and events about which they have been told (Perner & Ruffman, 1995).
A second aspect of theory of mind that is predicted to be related to children’s autobiographical memory is the ability to consider two conflicting representations simultaneously (Perner, in press b; Welch-Ross, 1997). This skill is typically measured with a false belief (Gopnik & Astington, 1988; Wimmer & Perner, 1983) or appearance-reality task (Flavell, Green, & Flavell, 1986). In false belief tasks, children are required to predict what another will do based on a false belief, or they are required to remember their own previous false belief. In appearance-reality tasks, they must resolve the discrepancy between what something appears to be and what it really is. These cognitive skills may be related to autobiographical memory by aiding children’s understanding of the subjective nature of memory and of the potential conflict between their own representations of an event and another person’s representations of an event.

Perner and Ruffman (1995) focused on the way that autobiographical memory depends on children’s understanding of the origins of knowledge. Children aged 3-1/2 to 5-1/2 years of age participated in a range of tasks assessing how they know what they know in addition to a memory measure. The memory measure in this study was children’s free and cued recall of a set of 12 pictures of familiar items. Free recall was posited as a measure of episodic memory and was thus expected to be uniquely correlated with children’s origins of knowledge performance. Perner and Ruffman’s argument is that only when children are capable of understanding informational access can they be aware of having experienced an event and therefore possess an ‘episodic trace’ of the event. Correlations between children’s free recall and their origins of knowledge performance were significant even after their cued recall performance and receptive vocabulary had been partialled out. Perner and Ruffman interpreted these findings as strong support for the idea that episodic memory (or recollective memory) is dependent upon the development of experiential knowing. In an intriguing new study, Perner and Gornik (1999; cited in Perner, in press a) tested 3-1/2- to 6-year-old children’s memory for directly experienced and indirectly experienced events. In a direct-experience condition, children saw pictures on the fronts of cards as they placed them in a box. In an indirect-experience condition, children looked at the back of each card as they put it into a box, but later saw the pictures on the front of the cards in a video. Children over 5 years of age showed better memory for directly than indirectly experienced events. Four-year-olds showed equivalent recall of direct and indirect experiences. Moreover, children’s understanding of which sense modality leads to knowledge (e.g., one should use sight to figure out the color of an object) was the best independent predictor of the difference between their memory for directly vs. indirectly experienced events. Perner’s (in press, a) interpretation of these results is that children who are unable to connect their knowledge with the sense modality in which it was gained are unable to make use of a feeling of recollection in aiding their episodic memory.

Strengths of Perner and colleagues’ studies include the variety of tests used to measure children’s informational access and the inclusion of an independent language measure (Perner and Ruffman, 1995). Limitations of these studies include their concurrent design. Could children’s episodic memory performance instead be aiding their informational access? An additional limitation is the sole use of picture recall as a measure of episodic memory. Perner and Ruffman (1995) acknowledged that we can not be sure when children start to experience a sense of recollection during free recall. An additional test of the hypothesis would measure relations between children’s understanding of mind and their verbal memory for naturally occurring events.
Welch-Ross (1997) tested concurrent relations between 3-1/2 to 4-1/2 year old children’s theory of mind and their verbal reports of past events with mothers. Two aspects of children’s theory of mind were assessed: their origins of knowledge and conflicting representation skills. These two skills were both predicted to enhance children’s autobiographical memory, but for different reasons. Like Perner and Ruffman (1995), Welch-Ross (1997) hypothesized that children’s ability to link knowledge and experience would enable the recollective component of autobiographical memory. Children’s skill with conflicting representations was instead expected to facilitate their coordination of their own event representation with their partners’. Due to their increased ability to coordinate past and present representations of themselves, these same children would also be expected to participate more in and benefit more from past event conversations with adults. In sum, children with a better theory of mind were predicted to report more unique event information in response to mothers’ elaborative questions compared to children with a less developed understanding of mind.

Children with a better theory of mind in this study indeed provided more unique memory responses and fewer empty responses to mothers’ elaborative questions compared to children with a poorer theory of mind, even with age and syntactic ability partialled out. Strengths of this study are the inclusion of measures of conflicting representation in addition to origins of knowledge, and an extension of the relation between theory of mind and autobiographical memory to children’s verbal recall for naturally occurring events. Limitations of this study are a concurrent research design and a possibly inadequate measure of children’s language ability. Children’s syntactic skill in this study was measured in the past event conversations in terms of the mean length of children’s longest utterances (MLUL). Children’s MLUL may not be the best indicator of their language skill by the preschool years. Indeed, children’s MLUL did not correlate with the theory of mind measures in this study, in contrast to many demonstrations of the strong relation between children’s language and their theory of mind (e.g., Astington & Jenkins, 1999). The relation needs to be tested against an independent measure of children’s language skill to be sure that it isn’t due solely to the correlation between theory of mind and language. We also still need to know the directionality of the relation between children’s theory of mind and their autobiographical memory. Could enhanced autobiographical memory skills instead be contributing to children’s understanding of mind?

The research conducted on this topic to date has undoubtedly revealed a link between children’s understanding of mind and their episodic and autobiographical memory. Yet several crucial details remain unknown. Perner (in press, a) proposed that the critical aspect of children’s theory of mind for autobiographical memory is their ability to link what they know to their original experience, whereas Welch-Ross (1997, in press) additionally suggested that success with conflicting representations should also contribute to autobiographical memory. Welch-Ross’s (1997) data support the role of both aspects of theory of mind to autobiographical memory, but a replication of this effect is in order, as well as further specification as to how the two aspects of theory of mind might relate to autobiographical memory in different ways. Moreover, we do not yet know how the link between theory of mind and autobiographical memory might interact with other cognitive factors, such as children’s self understanding or causal-temporal understanding, or with social factors, such as the style of reminiscing to which children are exposed. Researchers are beginning to acknowledge that theory of mind is not a solely endogenous skill, but grows out of children’s social interactions with others (e.g., Dunn, 1988; Perner, Ruffman, & Leekam, 1994;
Ruffman, Perner, & Parkin, 2000). Perhaps one especially important context for learning about theory of mind is when reminiscing with others about shared past events (Welch-Ross, 1997; Welch-Ross, in press). Such conversations might bring up discrepancies between event representations and promote negotiations between parent and child about the objective and subjective details of events. Longitudinal studies are needed to test the relation between social interaction and theory of mind, as well as the relation between theory of mind and autobiographical memory. Finally, theory of mind has not been demonstrated definitively as a prerequisite to autobiographical memory. For instance, in Welch-Ross (1997), children with lower and higher theory of mind skills both provided unique memory information with their mothers, but children with higher theory of mind skills did so to a greater degree. To demonstrate that theory of mind is a prerequisite to autobiographical memory, researchers would need to show a qualitative shift in children’s memory capacities concurrent with or soon after children start passing relevant theory of mind tasks. It’s hard to know what such a qualitative shift would look like, but possible candidates are the presence of unprompted past event discussions contingent upon theory of mind performance, or a statistical discontinuity in the quality or quantity of children’s memory responding before and after passing theory of mind tasks.

Role of Social and Linguistic Factors

The role of social interaction in autobiographical memory, and in particular parents’ style of talking about the past with children, is now well-established (Fivush & Fromhoff, 1988; Hudson, 1990; McCabe & Peterson, 1991; Reese & Fivush, 1993; Reese, Haden, & Fivush, 1993; for a review see Reese & Farrant, in press). Parents who use a highly elaborative style of talking about the past with their children, in which they ask many questions containing new information and confirm children’s responses profusely, have children who later display a more elaborative style of reminiscing both with parents and independently (Farrant & Reese, 2000; Hudson, 1993). Other parents use a less elaborative style of talking about the past that consists of repeating the same question until children produce a specific answer. This style of reminiscing is associated with children providing sparser memory reports later with parents and with experimenters. In the first experimental investigation of maternal reminiscing style, Peterson, Jesso and McCabe (1999) trained mothers to talk about past events in an elaborative way with their 3-1/2 year old children. One year later, children from the training group showed higher vocabulary scores compared to children from a control group, and by age 5-1/2 years, children from the training group gave more complex past event narratives with an experimenter than children in a control group.

Recent research in this area has also focused on the contextual and child characteristics that might shape parents’ naturally occurring style of reminiscing. Haden, Haine and Fivush (1997) demonstrated that mothers’ provision of evaluations in past event narratives (intensifiers, emotional and mental state terms) with children at 40 months predicted children’s independent past event narratives at 70 months, even after controlling for children’s earlier narrative skill. Fathers’ early provision of narrative structure did not predict their children’s later independent narrative skill. Primary caregiver mothers most likely play a greater role than secondary caregiver fathers in facilitating children’s reminiscing, partially as a function of sharing more experiences, but also possibly as a function of their greater frequency of reminiscing. Mothers’
reminiscing style is consistent across time (Reese et al., 1993), across shared and unshared past events (Reese & Brown, 2000), and across children in the same family (Haden, 1998). Maternal reminiscing style, however, does not generalize to other conversational contexts such as free play (Haden & Fivush, 1996). Therefore, maternal reminiscing style is a stable characteristic of the mother but may be specific to a memory context.

Mothers’ reminiscing style is responsive, however, to child characteristics. The bulk of this research has been conducted on the role of children’s gender in maternal reminiscing style. Reese and Fivush (1993) and Reese, Haden, and Fivush (1996) found that parents were more elaborative and evaluative with daughters than with sons when discussing past events. In turn, girls produced more memory information in the interviews than boys from as early as 3-1/2 years of age. These results are intriguing given that women date childhood memories back to younger ages than men (e.g., Mullen, 1994). These effects of child gender appear to be most robust when parents are discussing emotional events. Parents, especially mothers, are more elaborative with daughters than sons about emotional events, particularly regarding sadness (e.g., Adams, Kuebli, Boyle, & Fivush, 1995; Fivush, Brotman, Buckner, & Goodman, 2000).

Children’s skill levels also shape maternal reminiscing style. Most mothers become more elaborative as their children get older and are providing more information (Reese et al., 1993). As mentioned previously, mothers also become more elaborative in response to children’s increased self-recognition skills (Reese, in press) and in response to children’s theory of mind skills (Welch-Ross, 1997). Moreover, mothers are more elaborate with children who have more advanced expressive language skills (Farrant & Reese, 2000). Nevertheless, maternal reminiscing style cannot be reduced to a simple ‘child-effects’ explanation. Two lines of evidence support this contention. First, maternal reminiscing style still predicted children’s verbal memory even when controlling for child characteristics such as their self-recognition skill, language skill, attachment security, and interest in participating in memory conversations (Reese, in press). Second, the experimental manipulation of maternal reminiscing style indicated a causal role in children’s later past event narratives, regardless of children’s gender or initial skill levels (Peterson et al., 1999).

If indeed maternal reminiscing style is casually related to children’s autobiographical memory, what then is the mechanism of this effect? Recent research on the effect of maternal style at the time of encoding helps to clarify these effects. Tessler and Nelson (1994) found that 3-year-old children only mentioned items in a subsequent memory report that had been jointly discussed by mother and child during the event. Similarly, Haden, Ornstein, Eckerman and Didow (in press) demonstrated that objects that were jointly handled and discussed by both mother and child were more likely to be mentioned in a child’s later memory report than objects discussed only by the mother. Fivush (1998) speculated that the elaborative style may also work in a more general way to enhance children’s later memory reports. The rich narrative structure that elaborative mothers provide for children helps them organize their memories, both at the time of encoding and retrieval. Moreover, an elaborative style is probably most effective when the mother is following in on the child’s attentional focus in the event or conversation. In addition, the evaluative perspective that elaborative mothers provide may help children understand the significance of the event for the life story.
Role of Attachment

With the recent emphasis on the evaluative framework that mothers can potentially provide in these conversations, research has also focused on the early attachment relationship between mother and child as a potential contributor to both maternal reminiscing style and children’s autobiographical memory. Attachment security is established in the first year of the child’s life (Ainsworth, Blehar, Waters, & Wall, 1978; Bowlby, 1969). Securely attached dyads interact with greater harmony, nonverbally and verbally, than insecurely attached dyads (e.g., Matas, Arend, & Sroufe, 1978; Meins, 1997). By the preschool years, securely attached children and their mothers should be able to communicate more openly about a variety of topics because of the child’s trust in the mother’s emotional and physical availability (Bowlby, 1988; Bretherton & Munholland, 1999; Etzion-Carasso & Oppenheim, 2000). Indeed, one method of assessing children’s attachment security is to examine their narratives about hypothetical attachment-relevant events (e.g., Bretherton, Ridgeway, & Cassidy, 1990; Waters, Rodrigues, & Ridgeway, 1998). The focus of the attachment and reminiscing research is somewhat different. Rather than viewing reminiscing as a narrative window to attachment security (Koren-Karie, Oppenheim, Haimovich, & Etzion-Carasso, in press), this research has instead examined reminiscing as a separate social-emotional interaction that arises in part from the attachment relationship but may also contribute to attachment security. For instance, the maternal sensitivity that leads to children’s attachment security may also lead to an elaborative maternal reminiscing style. In turn, these elaborative conversations about significant events shared with the primary attachment figure may contribute to the child’s internal working model of the attachment relationship, and ultimately to the child’s internal working model of self (Reese & Farrant, in press). For these reasons, mothers of securely attached children are predicted to display a highly elaborative style, which is more sensitive in response to the child’s agenda in past event conversations (Fivush & Reese, in press; Nelson, 1999; Pillemer, 1998; Reese & Farrant, in press). In turn, securely attached children are predicted to give richer memory reports later on.

Farrar, Fasig, and Welch-Ross (1997) looked specifically at the emotional content of past event narratives between mothers and 4-year-old children as a function of children’s attachment status. Mothers and insecurely attached daughters initiated talk about negative emotions more often than mothers and securely attached daughters. Mothers and securely attached daughters talked in more depth about both positive and negative emotions, once initiated, than mothers and insecurely attached daughters. This finding supports the notion that mothers adopt a more elaborative and evaluative reminiscing style with securely attached children, at least for girls. Fivush and Vasudeva (in press) expanded on these findings by addressing the link between 4-year-old children’s attachment security and mothers’ elaborative reminiscing style for primarily positive events. Similar to Farrar et al., mothers were more elaborative with securely attached children, although the relation held for both boys and girls. Farrant and Reese (2001) sought to examine the developing relation between mother-child reminiscing and children’s attachment security from when children were 1-1/2 years old. Mothers of securely attached children were more elaborative and less repetitive with their children, especially in response to children giving an empty response, such as ‘I don’t know.’ Securely attached children were somewhat more likely to offer information in the conversations. Most importantly, mothers and securely attached children showed
long-term links between their reminiscing styles over time, whereas mothers and insecurely attached children showed no long-term relations with each other’s reminiscing styles. These findings suggest that memory socialization is taking place to a greater extent in dyads with securely attached children (see Reese & Farrant, in press, for further discussion).

Attachment security does appear to play a role in maternal reminiscing style and in children’s autobiographical memory, but a great deal more research needs to be conducted in this area. Most studies to date have used maternal sorts of the Attachment Q-set to measure attachment security (Waters, 1987/1995) as the attachment measure. In one notable exception, Etzion-Carasso and Oppenheim (2000) did find a link between children’s attachment security as measured in the Strange Situation (Ainsworth et al., 1978) and their reunion conversations with mothers at age 4-1/2 years. Focusing specifically on reminiscing style for attachment-related narratives is another possible direction (see Main, Kaplan, & Cassidy, 1985; Oppenheim & Waters, 1995). The research so far suggests that children’s attachment security is related to mother-child reminiscing about both positive and negative events, but the link may be particularly strong for reminiscing about separation events. Further specification in theory and method is also in order to ascertain when maternal elaborations are a sensitive strategy. Koren-Karie et al. (in press) point out that maternal elaboration on a negative event is not necessarily a sensitive strategy if mothers are not also helping children to resolve the negative emotion, nor can elaboration that focuses on the mother’s rather than the child’s subjective states be considered sensitive. It is also desirable to further specify the mechanism by which attachment security relates to maternal reminiscing style. One possibility is that adult attachment orientation leads to a more elaborative reminiscing style for mothers (Fivush & Reese, in press; Pillemer, 1998). Mothers who are classified as secure/autonomous on the Adult Attachment Interview (George, Kaplan, & Main, 1996) are predicted to have a more open and elaborative style when reminiscing with their children about past events, resulting in intergenerational transmission of both reminiscing style and attachment security (Reese & Farrant, in press).

Interactions Between Social, Cognitive, and Linguistic Factors

With such a host of potential contributors to autobiographical memory, a critical task for researchers is to attempt to identify the independent and interacting predictors of autobiographical memory skill. Some studies have controlled for the role of language development, but only one study to date has examined the simultaneous contribution of social, cognitive, and linguistic factors to autobiographical memory. Reese (in press) tested the independent contributions during infancy of self-recognition in the mirror task, productive language skill, attachment security, initial interest in participating in memory conversations, and maternal reminiscing to children’s later autobiographical memory skill. All of these variables except for self-recognition contributed independently to children’s memory reports with their mothers by age 2- to 2-1/2 years. Self-recognition was also related to children’s later memory reports, but only indirectly through a link with maternal reminiscing style. Children who had high language skills, were securely attached, showed initial interest in participating in memory conversations, and had highly elaborate mothers reported the greatest amount of memory information with mothers at age 2- to 2-1/2 years. Children’s memory reports with their mothers at age 2-1/2 years then generalized to their independent memory
reports with experimenters at age 3-1/2 years. Thus, social, linguistic, and to a lesser extent cognitive factors played a role in initiating children into the autobiographical memory system, which then progressed in a fairly continuous fashion to age 3-1/2 years. This longitudinal sample is currently being followed past the 3-1/2 year age mark to determine the additional role of children’s theory of mind and extended self development to autobiographical memory. It is possible that these cognitive developments will result in qualitative changes to children’s verbal memory reports, but given the results of the concurrent studies conducted thus far, these effects will most likely interact with maternal reminiscing style.

Conclusions

We know a great deal more now about the conditions affecting children’s autobiographical memory than we did 10 or even 5 years ago, when the burst in theorizing about infantile amnesia occurred. Still, the data are far behind the theories. A picture of autobiographical memory that is influenced by children’s social interactions, their language skill, and to a lesser extent their cognitive capabilities is beginning to form, but the influence of these factors in relation to each other over time is still largely unknown.

There may be enough data at present, however, to warrant a preliminary revision of the initial theories of the process. In particular, we must take a more global view of the entire autobiographical memory system, instead of proposing that one or another development is necessary or primary (see Reese, in press). This new theory of autobiographical memory has much in common with a dynamic systems approach to development (see Thelen & Smith, 1998 for a review; see Howe & Rabinowitz, 1994 and Nelson, in press b for applications to cognitive development). With a dynamic systems approach, the task is to characterize the process of development in an attempt to discover how change in the system as a whole is taking place as a result of at times minute changes at a particular age or level. Change may be relatively continuous during certain periods of development, but then a small disruption to one aspect of the system may result in a more dramatic qualitative shift. A dynamic systems approach would enable us to integrate biological, social, linguistic, and cognitive influences on autobiographical memory and would encompass different levels of explanation. In the process, a dynamic systems approach would help us to escape from the tired old dichotomies of whether change is due to endogenous or exogenous factors, or whether the nature of change is essentially continuous or discontinuous. For example, the relatively continuous changes in autobiographical memory wrought by children’s self understanding, expressive language, attachment security, and maternal reminiscing style may come together in early childhood to result in a qualitative shift in autobiographical memory development past age 3-1/2 years, especially as children develop theory of mind and extended self understanding.

Thelen and Smith (1994; 1998, pp. 601–602) have outlined the steps to take in a dynamic systems approach to conducting research. The first step is to define the ‘collective variable of interest’: in the case of children’s autobiographical memory, their memory reports with various conversational partners. Step 2 in the process is to isolate the ‘preferred state’ of this outcome variable at various ages and under various conditions. We know quite a bit about the general course of verbal memory development, but we could still address more attention to the question of what qualitative changes in verbal memory development would look like. Would we know qualitative change
if we saw it, or are we only viewing it in retrospect, from the point of view of adults recalling their earliest memories? Step 3 is to conduct intensive longitudinal studies of the variable of interest, especially over periods of rapid transition. Only a few such longitudinal studies have been conducted to date (e.g., McCabe & Peterson, 1991; Farrant & Reese, 2000; Haden et al., in press; Reese, Haden, & Fivush, 1993), but no single study has spanned the gap from 1-1/2 to 5 years of age. This gap must be filled if we are to map out periods of continuity and discontinuity in autobiographical memory in the same children over time and identify ‘transition points,’ which constitutes Step 4. Step 5 is to then discover ‘potential control parameters’ affecting autobiographical memory. This review has focused on various social, cognitive, and linguistic factors affecting children’s verbal memory reports. Step 6, finally, is to test our hypotheses about these parameters experimentally through the use of training and enrichment studies. Researchers have made some progress on all of these fronts, but in my view we should know quite a bit more about the process of change and the conditions for change in autobiographical memory before we attempt large-scale experimental studies. In other words, there’s still a long(itudinal) way to go. The sometimes herculean effort involved in such intensive longitudinal studies would be worth it, however, to gain a fuller picture of this complex and intriguing skill.

References


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