Memories From the Cradle

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Abstract

How far back can we, as adults, remember details of our life experiences? Current popular and scientific beliefs are contradictory, with the latter stipulating that personal memories do not begin until the late preschool years (age 4–5 years) and the former claiming that we not only remember being born, but can also remember *in utero* experiences. In this review, these beliefs are examined in a scientific context and evaluated in terms of empirical data about the development of early memory. The theory proposed here is that memories for personal experiences are not possible until the advent of the cognitive self, around the age of 18 to 24 months. This age is much earlier than that proposed as the age of the earliest memories in other scientific accounts and much later than that proposed in popular beliefs about early memory. New data from a cross-sectional and longitudinal study of early memory development and the emergence of the self clearly show the origins of personal memory coincide with the emergence of the early self.

Keywords

autobiographical memory; early memory; self and memory

The debate concerning whether memories from our earliest days persist dates back to the early philosophers and, in psychology, to the beginnings of the 20th century (e.g., Freud, 1916–1917/1963; Rank, 1924/1994; Thorndike, 1905). Today, our courtrooms provide a new venue for this debate, particularly as it concerns memories of traumatic childhood experiences. The residue of very early experiences is said to affect our later behavior regardless of whether we consciously recollect these memories. Indeed, such memories, including those of intrauterine life and of being born, are said to shape a child's future psychological health. Like repressed memories of sexual abuse before them, memories of birth and intrauterine life are said to lie hidden in the recesses of the unconscious, but to sometimes spontaneously or intentionally become conscious (e.g., Chamberlain, 1998; Janov, 2000).

Despite the growing number of reports of memories of life in the womb and the birth experience, there is no scientific evidence to substantiate these claims. Indeed, scientists have suggested that our personal histories do not enter memory until a much later age (e.g., 4 or 5 years), and that the emergence of personal memories is associated with the development of sophisticated language-based representational skills. Here, too, the evidence is found wanting: Although language may be an important concomitant of memory more generally, it is not a key to the beginning of autobiographical memory (i.e., the ability to recollect specific events that happened to oneself; see Howe, 2000).

THE DEVELOPMENTAL SCIENCE OF EARLY MEMORY

So, when does memory for personally experienced events begin? In order to answer this question, we need to know (a) when it is possible to encode, store, and retrieve information from experience (after all, if it is not possible to encrypt information at the time events occur, how could it be possible to retrieve that information later?) and (b) when it is possible to know these events are ones that happened to "me." In what follows, I summarize what developmental science has to say about these two issues.

Early Memory

There is evidence of habituation (a decrement in responding following repeated presentation of the same stimulus), classical conditioning, and "exposure" learning *in utero*. In this latter case, the fetus is exposed to a stimulus (e.g., a sound, the mother's voice) and later, following birth, exhibits a preference for that same stimulus. Although this research on the shaping of stimulus preferences *in utero* is interesting, it is not clear that such "memories" constitute what is normally referred to as autobiographical memory. Indeed, it is not clear that memory for personal experiences exists early in infancy, despite evidence that both implicit and explicit recollective capacities[2] are present and operational in very young infants (Rovee-Collier, Hayne, & Colombo, 2001). Infants exhibit memory for acts they have seen even once, as indicated by their ability to imitate them (see Howe, 2000). As well, very young infants (e.g., 3-month-olds) show memory for a variety of complex associations and visual sequences, and such memories sometimes last for 3 months or more (see Howe, 2000; Rovee-Collier et al., 2001). Indeed, with certain experimental procedures (e.g., elicited imitation), some infants have exhibited memory lasting for a period of 9 months or more.

Thus, studies have demon-

strated remarkable memorial accomplishments in fetuses and young infants, whose memory skills have traditionally been considered severely impoverished. However, these studies do not demonstrate the longevity of these early learned events in memory, nor do they establish that these memories are of the same caliber as those that we normally refer to as autobiographical. For example, there is little or no evidence that 6-month-olds can retain event sequences for periods longer than 9 to 12 months. Those few studies that have been conducted in this area show that very long-term retention of early experiences is the exception rather than the rule. Moreover, when infants and toddlers do exhibit long-term retention over protracted periods of time, what is retained is quite fragmentary, poorly integrated, and frequently recalled incorrectly and inconsistently (see Howe, 2000). Thus, despite popular claims about the prodigious nature of early memory for birth and prebirth experiences, what evidence exists indicates that quite the opposite is true. Although it could be argued that these "memories" need not be consciously recollected in order for them to influence our current behaviors and psychological profile (although they are said to become conscious with the right effort), this would seem to be a moot point given that memories even in the first year of life are not very stable in the first place.

Autobiographical Memory and the Self

So, when does autobiographical memory begin? The earliest scientifically documented childhood memories recalled by adults happened to them when they were around 2 years of age (see Howe, 2000). That we cannot recall events that happened to us prior to that age is bothersome given that researchers now know that memory is functioning prior to the onset of autobiographical memory. Indeed, as any review of the scientific literature makes clear, it is not the child's ability to remember events per se that suddenly changes, making possible the first autobiographical memories. What changes are two interrelated components: the integrity or quality of memory traces and the durability of memory traces. Both of these changes occur because of developments in another domain, namely, the advent of the cognitive self.

Memories for personal experiences behave much like memory in general. One tenet of memory is that it benefits in both quality and durability from organization. For example, children's ability to categorize information (e.g., dogs and cats as animals) helps them remember information about exemplars from that category. Similarly, it is not until one has a self to whom events occur that there can be autobiographical memory. Prior to the articulation and recognition of an independent self, there is no referent around which personally experienced events can be organized, and memories for such events may be no better organized than memories for other experiences in domains in which there is no referent or organizational structure available.

Coincidentally, the advent of an independent, recognizable self occurs around the age of 18 to 24 months. Although conjecture about the nature and function of the self has a long tradition, and the nature and course of its early development is still the focus of intense research, there is agreement concerning two key facts: (a) At birth, infants are most likely not aware of their separateness from the environment, and they acquire this awareness following a gradual process of individuation that starts at birth. (b) There are at least two fundamental aspects of the self, the "I," which is a subjective sense of the self, and a "me," which is an objective sense of the self that includes the unique and recognizable features and characteristics that constitute the self concept (see Howe, 2000). It is this cognitive self that is critical to autobiographical memory because it is this sense of the self that contains the features necessary for encoding events as personal in memory.

The cognitive self has been measured using mirror self-recognition tasks in which, for example, infants show full self-recognition by touching their own nose rather than pointing to the mirror following the surreptitious application of a spot of rouge to their nose. It is at this point in their development that children also start to show signs of self-consciousness (e.g., shy smiling, gaze aversion, self-touching) when confronted with their images. Collectively, these behaviors provide a consistent picture of infants who recognize themselves as independent beings with unique features, an achievement that most people agree is a developmental milestone indicating the ability to represent oneself as an object of knowledge and imagination.

Because it is at this age when the cognitive self has recognizable features that can serve to organize memories of personally experienced events, it is now when autobiographical memory begins. Although a number of other factors contribute to the stability of autobiographical memory (e.g., changes in attention, strategy use, knowledge), as they do to all memories, it is this emergence of the independent self that is pivotal to the onset of autobiographical remembering. It is at this point that (a) there is a self to which events happen that can be encoded along with the features of the events themselves, and (b) events take on personal signifi-

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cance, something that is key to the longevity of autobiographical memories no matter when they are formed. As is the case with other categories, it is because the self is a viable cognitive entity with recognizable features that the encoding of such features into functional memory traces becomes possible. Although the advent of this cognitive self means that its features are *potentially encodable*, there is no guarantee that they will be encoded. Whether they will be encoded is determined probabilistically and is contingent on the same variables controlling the encoding of any other feature (e.g., salience, attention, centrality to the event). Such fluctuations in what is encoded can also explain individual differences in the age of the earliest autobiographical memories (see Howe, 2000). Thus, having a viable cognitive self sets the lower limit of when autobiographical memories can be formed, but does not mandate that such memories will be formed.

Interestingly, the changes that conspire to bring about this cognitive self are maturationally driven rather than socially and experientially driven. That is, although age differences exist in the timing of this acquisition, neither the child's sex nor social experiences (e.g., socioeconomic status, birth order, number of siblings) are related to the onset of self-recognition. Moreover, maltreated infants whose aberrant caretaking environments result in delays or deviations in their emotional development as it relates to the self are not delayed in mirror self-recognition. By contrast, infants who have delayed maturation (e.g., Down syndrome, familial mental retardation, autism) do show delays in visual self-recognition, and their eventual success at self-recognition is contingent on reaching a mental age comparable to that of nondelayed infants who succeed at the task. Finally, there is mounting evidence for a link between the establishment of the self and constitutional factors such as stress reactivity (a higher reactivity to stressors is correlated with earlier self-recognition) and temperament (more difficult temperament is associated with earlier self-recognition).

Although they may not control the timing of self-recognition, social and experiential factors do contribute to children's mirror-image reactions. For example, normally developing children frequently react positively toward their mirror images, whereas children from adverse environments show more neutral or even negative reactions to their images. This raises the interesting possibility that social and experiential factors contribute to the featural content of early autobiographical memories. Regardless, the achievement of this "critical mass" of awareness of, and knowledge about, the self serves to provide a new organizer and regulator of experience and the foundation of autobiographical memory.

Evidence

What evidence is there to support this claim? To begin, as already noted, the earliest scientifically reliable autobiographical recollections by adults are from around the age of 18 to 24 months (see Howe, 2000). This is the same time that the cognitive self appears. Of course, simply because two events co-occur does not mean that one causes the other. A stronger case for the importance of the self to the onset of autobiographical memory comes from experimental evidence that the attainment of a recognizable, cognitive self is linked in some way to changes in event memory.

To date, there have been only two studies that have directly examined the link between the self and early autobiographical memory while controlling for extraneous variables. In the first (Harley & Reese, 1999), a series of regression analyses controlled for vocabulary growth, parental conversational style (high vs. low in elaboration), and nonverbal (deferred imitation) memory abilities. The results showed that mirror self-recognition was directly related to the presence of memories for specific events in young children (19 months old at the beginning of the study and 32 months old at the termination of the study). The second study (Howe, Courage, & Edison, in press) also found that mirror self-recognition was directly related to memory for personal events. This study incorporated both cross-sectional and longitudinal measures of language development, mirror self-recognition, and memory for specific events; the participants were 15, 16, 17, 18, 19, 20, 21, 22, and 23 months old in the cross-sectional portion of the study, and a separate sample of 15-month-olds was recruited for the longitudinal portion of the study and tested every 2 weeks until they were 23 months old. Children who were self-recognizers had better event memory than those who were not self-recognizers regardless of language ability and length of the retention interval (up to 12 months). In the group whose abilities were tracked longitudinally, no child was successful on the event memory task prior to achieving self-recognition. Overall, these results provide strong support for the claim that self-recognition is the organizational mechanism that ushers in the personalization of event memory.

CONCLUSIONS AND FUTURE DIRECTIONS

Although a strong logical, theoretical, and empirical case has been made concerning the origins of personal memory at the age of 18

to 24 months, a number of questions remain. First, what is the role of language in this transition? Are experiences that are encoded prior to the use of language easy to translate into words once children become verbally facile? Second, does the ability to verbally recall preverbal events vary as a function of the distinctiveness of the experience in memory, whether it is traumatic, and whether it has continued personal significance? Current evidence indicates that memory for traumatic experiences and memory for other distinctive events behave similarly (Howe, 2000). Third, are there changes in storage that militate against retention of early experiences? For example, does the acquisition of knowledge transform what is already in storage? Do changes in knowledge, particularly about the self, alter the personal significance of experiences, transforming them from ones that were once personally significant to events that are simply an interesting curiosity and are now more likely to be forgotten? Finally, do we need to have conscious access to past memories for them to exert their influence on us? Given what we know about implicit memory, the answer is no. But questions concerning implicit memory may be moot because implicit memories (a) are not autobiographical in nature and (b) can be made explicit with a little introspection.

Although a number of questions remain, it is clear that memories for experiences prior to the age of 24 months are not likely to survive intact into adulthood. Certainly, such recollections would be vague, fragmentary, and disorganized relative to what we normally think of as autobiographical memory. Herein lies the potential problem with trying to extract so-called hidden memories from early in life—first, there is no scientific evidence that they exist and, second, trying to recollect memories that do not exist invariably results in false memories, ones that portray an earlier event in a manner consistent with our current needs and desires. For now, it is safe to say that we do not remember being born or our *in utero* experiences. We do, however, have excellent imaginations, ones that can not only create "memories" but also affect the memories we do carry with us from childhood. Which ones are real and which ones are false is not always easy to tell apart; but memories thought to originate before the age of 2 are very likely *not* to be true.

Recommended Reading

Howe, M.L. (2000). (See References)
Rovee-Collier, C., Hayne, H., & Colombo, M. (2001). (See References)

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Notes

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2. Explicit memory involves a conscious attempt to recollect specific experiences or prior learning episodes. In tests of explicit memory, individuals are specifically instructed to remember information. Implicit memory does not require a conscious attempt to remember specific information. Rather, memory is inferred from changes in performance on tasks that do not demand recall or recognition of the prior learned event itself.

References

Chamberlain, D.B. (1998). *The mind of your newborn baby.* Berkeley, CA: North Atlantic Books.

Freud, S. (1963). Introductory lectures on psychoanalysis. In J. Strachey (Ed.), *The standard edition of the complete psychological works of Sigmund Freud* (Vols. 15–16, pp. 243–496). London: Hogarth Press. (Original work published 1916–1917)

Harley, K., & Reese, E. (1999). Origins of autobiographical memory. *Developmental Psychology, 35*, 1338–1348.

Howe, M.L. (2000). *The fate of early memories: Developmental science and the retention of childhood experiences.* Washington, DC: American Psychological Association.

Howe, M.L., Courage, M.L., & Edison, S.C. (in press). When autobiographical memory begins. In S. Algarabel, A. Pitarque, T. Bajo, S.E. Gathercole, & M.A. Conway (Eds.), *Theories of memory: Vol. 3.* New York: Psychology Press.

Janov, A. (2000). *The biology of love.* Amherst, NY: Prometheus Books.

Rank, O. (1994). *The trauma of birth.* New York: Dover Publications. (Original work published 1924)

Rovee-Collier, C., Hayne, H., & Colombo, M. (2001). *The development of implicit and explicit memory.* Philadelphia: John Benjamins.

Thorndike, E.L. (1905). *The elements of psychology.* New York: Seiler.

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