How Do Memories Construct Our Past?

A standard example is priming, whereby a previous experience (e.g., seeing the picture of an apple) makes further performance easier or quicker (e.g., completing the word “__ P L E”). Although priming is easy to produce, its explanation is far from simple – but it is also crucial, as the phenomenon gives us access to the way memory works. Priming reveals what kinds of mental representations and processes are activated, such that they could transfer to the further test (Roediger, Weldon, & Challis, 1989; Schacter, this volume) and therefore how memories are constructed on the hoof, as it were. In the course of investigating specificity in memory, Schacter and his colleagues also take us back to the domain of self-representation – as the richest and most specific information domain accessible to memory.

REFERENCES


Networks of Autobiographical Memories

HELEN L. WILLIAMS & MARTIN A. CONWAY

An individual’s autobiographical memory is made up of their episodic memory, memory for specific episodes of their lives, and their conceptual, generic, and schematic knowledge of their personal history: their autobiographical knowledge. In a typical act of remembering, these two types are brought together and a specific memory from one’s life is recalled. These autobiographical memories are the content of the self. They locate us in sociohistorical time, they locate us in our societies and in our social groups, they define the self. In important ways, autobiographical memories allow the self to develop and at the same time they constrain what we can become. In this chapter we outline a little of what is known about the representation of autobiographical memories in the mind and how they are constructed in consciousness. With this in mind, we then turn to the function that autobiographical memories have in defining the self by making certain networks of memories that ground the self in making a specific experienced reality highly accessible.

AN INTRODUCTION TO AUTOBIOGRAPHICAL MEMORY RESEARCH

Although the formal scientific study of memory has been in existence for at least a century, since the early work of scientists such as Ebbinghaus (1885/1964), Galton (1883), and Ribot (1882), the study of autobiographical memory was neglected during much of this period as a result of the complexities associated with this type of recall. In his experimental studies, Herman Ebbinghaus tested the learning, forgetting, and relearning of relatively meaningless items, such as short lists of constant-vowel-constant (CVC) letter strings. Through these studies, Ebbinghaus was able, in precise terms, to communicate to others a great variety of aspects of memory for the
first time, such as the forgetting curve. In addition to carrying out experimental studies using simple to-be-remembered materials, Ebbinghaus also attempted the study of memory for meaningful materials such as passages of prose and poetry. However, he found that memory for such materials could be influenced by too many extraneous factors that lay beyond the experimenter's control. He came to the conclusion that the study of materials over which the experimenter had powerful control, such as CVC strings, was preferential for the advancement of the scientific study of memory. This shift, from philosophical speculation to rigorous scientific methodologies, enabled researchers to communicate about their research findings and facilitated development of new research areas and approaches to memory research (Ohta, 2006). The preference for rigorous testing methods in the study of memory and the use of to-be-remembered materials selected and controlled by the experimenter led to autobiographical memories being excluded from this research domain for almost an entire century. This is because autobiographical memories are formed outside the laboratory in an individual's everyday life and their formation is in no way under the control of the experimenter.

One contemporary of Ebbinghaus did, however, attempt to study autobiographical memories in a systematic way at the end of the nineteenth century. Sir Francis Galton (1883) was interested in how many memories an individual has and developed a technique that one hundred years later became known as the cue word technique. In this procedure, Galton revealed words to himself, one at a time. He then noted the thoughts that passed through his mind. He repeated this procedure for his long list of words on several separate occasions. One of Galton's most interesting findings from this repeated testing was that many of the thoughts that came to mind when he presented himself with the words were (autobiographical) memories and that these memories often included an aspect of visual imagery. A related finding that disappointed Galton was that he did not seem to possess endless variety in his thoughts or memories, as he found that he often recalled the same thoughts/memories on subsequent occasions of testing. In response to this finding, he concluded that we probably have far fewer memories than we imagine we have. It is likely, however, that Galton underestimated the extent and variety of his autobiographical memories. One clear problem with the methodology that he employed is that once having recalled a memory to a cue-word, that memory is likely to have become associated with the cue-word. Therefore, it was much more likely to be recalled during subsequent testing. Despite this issue, the cue-word method remains a particularly useful technique and is still used in contemporary studies of autobiographical memory (Conway & Williams, 2008).

In addition to the texts produced by Ebbinghaus and Galton near the turn of the twentieth century, the French psychologist Theodore Ribot also studied memory at this time. His 1882 text provided psychology with one of the first theories of autobiographical memory as well as providing detailed descriptions of case studies of memory distortions and malfunction following brain injury. Other late-nineteenth-century memory researchers studied autobiographical memory (see Conway, 1990 and 2004, for reviews); however, behaviorism came to dominate psychology.

As behaviorism is based on the argument that all psychological theory should be built on that which is observable, memories became much more difficult to study. Memories cannot be directly observed, as they are internal mental states. They only can be inferred by how they influence a person's behavior, that is how they influence what an individual is able to recall in an experiment in which the conditions of encoding, retention, and retrieval are highly controlled. This type of approach became known as verbal learning and it dominated memory research for decades; in many respects, it still does. During this period, one researcher, Sir Fredrick Bartlett (1932), took a different standpoint on memory research. His approach holds central the concept of a schema (defined as a general representation of similar experiences, narrative, and cultural conventions), and social interactions and culture are also viewed as playing important roles in remembering. Detailed memories of specific experiences, what we now call episodic memories, were of little interest to Bartlett, however, and because of this his work did not reinvigorate the study of autobiographical memory.

It was not until the 1970s that the study of autobiographical memory reemerged after one hundred years of silence (Cohen, 1989), and interest from the research community accelerated from the 1980s to the present day. Until the 1970s, autobiographical memory was studied almost exclusively from a psychoanalytic or clinical orientation. The aim of such study was only diagnostic or therapeutic. There were two central factors that led to reinterest in this important aspect of memory in the 1970s. The first was the growth of neuropsychology as a distinct research area and within it research into malfunctions of human memory following brain damage. After traumatic injury to the brain, one remarkable finding is that virtually all impairments to memory experienced by patients include some disruption to autobiographical memory. The second factor, cognitive science, was becoming interested in how to model and represent stories and memories. Two important papers, by Robinson (1976) and Crovitz and Shiffman (1974),
employed a cue word method similar to Galton's to investigate differences between memories. This research demonstrated an effective way in which autobiographical memory could be studied under laboratory conditions. In addition to this, papers such as Brown and Kulik's (1977) survey of flashbulb memories, and the highly significant volume edited by Neisser (1982), Memory Observed, which reprinted many earlier papers on autobiographical memory and other areas of memory that at that time were suffering from neglect, all helped rejuvenate autobiographical memory as a research area. These were also some of the first papers that began to show the links between autobiographical memory networks (AMNs) and culture; this interplay will be discussed in detail later. It is interesting to note that this rejuvenation employed similar methods and became interested in the same areas that, since the work of Galton, Ribot, and others, had been forgotten: studying one's own memory, investigating malfunctions and distortions of memories, and surveying memories. In the last thirty-five years, psychologists interested in memory have primarily adopted a cognitive approach and seek to interpret autobiographical memory within the theoretical framework of mainstream memory research. This undertaking has been fraught with difficulty because of the great quantity and variability of the data. It is a daunting task to try to discover the general principles that govern the encoding, storage, and retrieval of personal experiences accumulated over their lifetimes by different individuals with different personal histories. Nevertheless, some progress has been made, and in the current chapter we aim to present a broad review of how cognitive psychology has come to understand the interplay that exists between memory, self, and culture within an individual's networks of autobiographical memories. First, we briefly discuss the manner in which autobiographical memories are constructed within AMNs and, second, we turn our attention to how these networks are influenced by, and in turn have influence over, the self.

MEMORY NETWORKS

Autobiographical Memory Networks consist of multiple cross-coded memories. Individual autobiographical memories may be indexed by several networks; and this is a form of "overdetermination," as described by Freud (1938). For example, recalling a specific episodic memory of meeting a girlfriend for the first time could be cued through discussion of that girlfriend, discussion of girlfriends in general, discussion of the town in which you met, or discussion of the particular bar in that town where you were working on the night that you met her. Each network of autobiographical memories will have areas of crossover with other networks. Some networks are neural, whereas others will extend beyond the neural and are self networks. Within these networks, memories are networked by their relation to a person's sense of self — more precisely, the particular version of the person's working self, which was active when that memory was formed. As selves only exist in social groups, self-networks are networks that extend beyond the neural. The working self and the autobiographical knowledge base are two significant concepts introduced to the area of memory in the last decade. They form the basis of the Self-Memory System (SMS) as proposed by Conway and Pleydell-Pearce (2000), a complex neural system that mediates autobiographical remembering (also see Conway [2005, 2007] for further explanation). The relationship between the working self and the autobiographical knowledge base is shown in Figure 2.1.

The working self functions to maintain coherence among current goals. It coordinates, manages, and prioritizes goals by modulating the construction of specific memories, determining which memories are accessible and
inaccessible, and which current events are encoded and consolidated into memory (see Conway & Pleydell-Pearce [2000] and Conway [2005, 2007] for further explanation of the SMS and its components). The highly complex goal-subgoal hierarchy is hypothesized as being part of the working memory system (Baddeley, 1986, 2000), and its purpose is to regulate behavior by reducing conflict between desired goals and the current state (Conway, 2005; Conway & Pleydell-Pearce, 2000).

CONSTRUCTING A MEMORY

The construction of autobiographical memories in the SMS is based on the premise that autobiographical memories are transitory dynamic mental constructions generated from the underlying knowledge base. It is through the working self that preexisting knowledge is accessed from the autobiographical knowledge base in long-term memory and specific memories are constructed. The autobiographical knowledge base contains two distinct types of representation: autobiographical knowledge and episodic memories. Autobiographical knowledge is organized in partonomic hierarchical knowledge structures (Barsalou, 1988; Burt, Kemp, & Conway, 2003; Conway, 1996; Conway & Bekerian, 1987; & Lancaster & Barsalou, 1997), which range from highly abstract and conceptual knowledge, for example, one’s “life story” (see Bluck [2003]; Bluck & Habermas [2001]; and Pillemer [1998] for more on the concept of a life story), to conceptual knowledge that is event-specific and experience-near. At a highly conceptual level lie a person’s self-images, which divide the individual into different selves, as discussed earlier. These various self-images may have differential links to particular AMNs as they relate to a particular lifetime period, the goals that were prioritized within that lifetime period, and the episodic memories that provide evidence of goal-related progress within that lifetime period (Conway, 2005; Conway & Pleydell-Pearce, 2000). Highly accessible memories and knowledge from across the life span are thought to provide a more or less coherent story of the individual and their achievements; however, knowledge about goals that were abandoned or which the individual failed to achieve also may remain highly accessible in the memory network, as they provide directive or instructive information (Bluck, 2003; Pillemer, 1998) or provide a confirmatory context for the achievement of other goals, for example, “I wasn’t a success at college and I left to earn money” (see Csikszentmihalyi & Beattie, 1979). Memories of knowledge or experiences that contradict or undermine central facets of the working self may, however, be assigned low levels of accessibility or may be actively inhibited (Conway, 2005; Conway & Pleydell-Pearce, 2000).

So within AMNs, how is a specific episodic memory constructed? When a part of the autobiographical knowledge base is activated by a cue, this knowledge becomes available to evaluative control processes. Search can either be terminated or a new search cycle can be activated from the results of the previous search. When searching for a specific memory — for example, concerning whether you paid a bill yesterday — when you retrieve the memory of putting the bill in the mailbox your memory search may terminate. However, the result of this search may initiate another search, for example, for memories concerning what other bills you have received recently. This iterative model of memory construction called search-evaluate-elaborate (originally proposed by Norman & Bobrow [1979]; developed further by Williams & Santos-Williams [1980], Conway & Pleydell-Pearce [2000], and Burgess & Shallice [1996]), or generative retrieval, can be contrasted with direct retrieval, although the two are intimately linked, as will be explained later in this chapter. Generative retrieval involves iterative retrieval cycles of elaboration and verification. These cycles are linked to central control process and modulated by supervisory executive processes, most probably located in networks in the frontal cortex. In any memory construction situation, a crucial component is an analysis of what are the demands of the task.

It is assumed that the analysis of a task or the demands a task places on a rememberer are conducted largely by nonconscous processes. The aim of these processes is to specify the context in which the memory is to be retrieved. This is especially important because, for any given memory, there will be a wide range of information available that potentially could be brought to mind. However, not all of this information will be relevant to a particular task and some of it may be antithetical. To give a rather trivial but nonetheless important example, if one recalls where one parked one’s car yesterday while trying to recall where one parked one’s car today, then that might block the attempt to locate the car in the present. It is clearly important that the task demands are fulfilled or satisfied by the knowledge that is brought to mind. It is the purpose of nonconscious processes that analyze task demands to set the criteria that have to be met by the retrieval of information from long-term memory.

The resulting mental model of these task demands determines the criteria against which the accessed knowledge will be evaluated. Verification criteria will vary with the task demands, and the types of memories constructed will be determined by different sets of criteria on different occasions. For example, recalling memories with intimate others, ruminating over the past, constructing memories in order to make strategic self-disclosures in a social interaction, and even recalling specific memories at the request of

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How Do Memories Construct Our Past?

An experimenter entail the generation of criteria that fit the goals of the self in each context. For example, in a social situation in which you are required to offer advice to a close friend, the goals of your current self in this situation presumably will be along the lines of being caring and supportive and the task demands will be for you to offer helpful advice. In this situation, you may need to draw on memories of being in similar advice-giving situations—what you said in those past situations, how that advice was received, and so on, as well as memories of being in a similar dilemma to the one about which your friend wishes to get advice. The memories you retrieve have to meet the criteria set by the goals of the current self, which are related to what are deemed to be the demands of the task. The verification criteria that evolve may have facilitative effects so that when any knowledge accessed in the knowledge base corresponds within some preset tolerance to the criteria, then that knowledge immediately enters into current control-processing sequences. By contrast, verification criteria may, as we have seen, have a very different purpose, namely, the inhibition of irrelevant knowledge and inhibition of access to knowledge that is prohibited by self-goals (i.e., knowledge that would result in unacceptable increases in self-discrepancies; see Conway & Pleydell-Pearce [2000] for a fuller description of this).

Within an AMN, an elaborated cue or memory description is thought to activate pathways through the knowledge base, and this activation is channeled by the indexes of the knowledge structures. As knowledge is activated, it becomes available to control processes and to the retrieval model, where it is continuously monitored and evaluated. By rapidly generating new memory descriptions and entering these into the knowledge base, a pattern of activation can be shaped that matches the criteria set down by the retrieval model. As soon as this pattern of activation is established, a memory has been constructed. Thus, by this view, a specific autobiographical memory is a pattern of activation across the indexes of the autobiographical memory knowledge base conjoined with the retrieval model used to shape that pattern.

In contrast to generative retrieval, direct retrieval does not involve any iterative search processes, although the close relationship between the two processes is shown by the fact that the endpoint in generative retrieval, when the sought-for information or memory is retrieved, is a form of direct retrieval. The most well-known account of an experience of direct retrieval comes from Proust's (1925/1981) account of how the taste of a madeleine cake dipped in warm tea suddenly brought to mind a whole section of his life he had previously thought lost to recollective experience (also see Salaman [1970] for many other examples from literature, and Berntsen [1996], and see Chu and Downes [2002] for experimental evidence relating to this). Such experiences of recall from distant autobiographical experiences, however, are rare in everyday life, and direct retrieval is most evident in cases of post-traumatic stress disorder (PTSD) or for very recent experiences. In PTSD, direct retrieval manifests itself in the form of intrusive highly detailed memories often triggered by specific cues. Examples from PTSD case studies (see Ehlers et al. [2002] for case study examples, some of which are briefly discussed in Conway [2005]) illustrate that this direct retrieval is a form of the encoding specificity principle (Tulving & Thomson, 1983), that is, the idea that during retrieval some item of knowledge in the search set must correspond to an item of knowledge in the sought-for knowledge in long-term memory. Within the SMS approach, instances of direct retrieval should be most frequent in recent memory because the objects, actions, feelings, and thoughts occurring in the recent past (perhaps twenty-four hours or less) are closely associated with current highly active and accessible goals. As these working self-goals continue to be processed, then it would seem inevitable that, by encoding specificity alone, knowledge would be processed, forming an effective cue to recent episodic memories; direct retrieval would then occur. Little is known about how the current environment, internal and external, drives direct retrieval in daily life, and this is an area that awaits investigation (but see Schank [1982] for some interesting examples). It is perhaps one of the strengths of the SMS approach that these questions concerning aspects of memory in everyday life come into a clearer perspective.

Without an appreciation of the complexity of the process of appropriately creating memories in the mind, largely by unconscious means, and then acting on the conscious outputs of the processes, that is, a memory, we cannot come to have a broader appreciation of the complexity and beauty of human remembering. The SMS approach tends to explore a model of the complexity of human remembering at the same time as relating it to the goals of the individual and the social group in which the individual exists. This latter aspect of the model is currently being worked on and it is our intention to try to link individual memories into collective memories more generally.

**Autobiographical Memory Networks**

The array of networks that link autobiographical memories together is infinite and can be idiosyncratic, but a number of overarching themes exist. Below the level of the life story where networks of memories may be formed...
around different self-images, conceptual lifetime periods also modulate the accessibility and inaccessibility of autobiographical knowledge and episodic memories. Lifetime periods contain representations of locations, people, activities, feelings, and goals common to the period they represent. Some examples of lifetime periods are when I worked in Birmingham, or when I lived on Grimthorpe Place. The networks of memories associated with these two lifetime periods may overlap, that is, if I lived on Grimthorpe Place while working in Birmingham. However, one period also may provide access to memories to which the other period does not have access as the overarching life themes: work and home, to which these periods relate, are different.

Lifetime periods are found to contain evaluative knowledge, negative and positive, of progress in goal attainment (Beike & Landoll, 2000), and lifetime periods may play an important role in the life story. Lifetime periods may be particularly appropriate for the generation of themes within a life story because of the goal-evaluative information they contain. For example, a lifetime period such as when I was at graduate school will consist of representations of people, locations, activities, feelings, and goals common to the period, but also will contain some general evaluative reflections on the period, that is, this was a particularly anxious time for me, living on my own was difficult, I was lonely, I found the work very difficult, and so on (see Cantor & Kihlstrom, 1985). Research has found that these types of evaluative themes related to the self also can be consistent across individuals for particular lifetime periods (Conway & Holmes, 2004), and will be discussed later in this chapter.

The life story, the themes within it, and lifetime periods are part of the conceptual self where they represent a summary account of the self and its history and where they can be used to initiate and focus searches of the networks of information held in the autobiographical knowledge base (Conway, 2005). Conversely, general events are more clearly part of the knowledge base itself and have an important role in organizing personal knowledge. They are a form of AMN. General events may refer to a variety of autobiographical knowledge structures such as single events, for example, the day we went to see the Statue of Liberty; repeated events, for example, work meetings; and extended events, for example, our holiday in Australia (Barsalou, 1988). Networks of general events can be structured in several different ways. For example, they can resemble “mini-histories” organized around detailed and sometimes vivid episodic memories of goal attainment in developing skills, knowledge, and personal relationships (Robinson, 1992). Networks of autobiographical memories also may exist on the basis of the memories’ emotional similarity (e.g., McAdams, Reynolds, Lewis, Patten, & Bowman, 2001) or can be organized around experiences of particular significance for the self (see Pillemer [1998], Singer & Salovey [1993], and Singer [2005] for detailed discussion on this).

THE SELF FUNCTION OF AUTOBIOGRAPHICAL MEMORY

Three functions of autobiographical memory are commonly discussed in the literature: a directive function, a social function, and a self function. The directive function of autobiographical memory involves using memories of past events to guide and shape current and future behavior as an aid to problem solving and as a means for predicting future behavior (Baddeley, 1987). Knowing how to conduct yourself in social and professional situations or how to deal with practical problems such as changing a fuse or booking a vacation on the Internet can be performed because we remember how it worked last time a similar experience occurred. This directive advice can then be passed on to others, eliciting the social function of autobiographical memory. Many conversations involve the sharing of personal memories. This facilitates social interaction and friendships advance by the exchange of personal narratives. Social bonding and intimacy can be heightened through reminiscing with someone who was present at the original event (Fivush, Haden & Reese, 1996; Bluck, 2003) or through discussion of autobiographical memories with someone who was not there when the event originally took place. This also can be a means of pooling experiences, of giving and receiving sympathy and understanding, and of “placing ourselves” in a given context and culture (see also Williams, Conway, & Cohen, 2007).

To be in coherence with the appropriate context and culture, the self function of memory takes over. Central aspects of the self are conceptualized as working with memory in an interdependent system in which memories can be altered, distorted, and fabricated in order that beliefs and knowledge about the self may be confirmed and supported by specific autobiographical memories (Conway, 2005). The importance of memories to the concept of the self is highlighted by patients who have experienced loss of memory through trauma or disease. Because these patients cannot recall their own personal history, in a very real sense they lose their sense of self (Williams et al., 2007). Autobiographical memories are intimately related to the self. They are important for interpretation of one’s past selves, current self, and possible future selves (Conway, 2005). Bluck and colleagues recently explored the three functions of memory by asking participants to what extent they thought about their life experiences in certain situations. They found that
the social function was deemed to actually reflect two different functions: developing relationships and nurturing relationships. The self function was found to be narrower than previously thought, solely reflecting the idea of self-continuity across the life span, but the directive function appeared to include making sense of the past so as to have a coherent view of the self with which to direct future behavior and thus was broader than originally conceptualized (Black, Alex, Habermas, & Rubin, 2005).

The connection between the self and memory is perhaps most obvious from the literature on “self-defining” memories that are proposed to contain critical knowledge of progress on the attainment of long-term goals (Singer, 2005; Singer & Salovey, 1993). For example, both alumnae and students have been found to be able to recall very detailed vivid memories of exchanges with professors and other teachers that they perceived as having significantly influenced their own academic careers (Pillemer, Picariello, Law, & Reichman, 1996). Self-defining memories are characterized by affective intensity, vividness, rehearsal, and links to other memories (Singer, 2005; Singer & Salovey, 1993). The central node of an AMN may well be the self-defining memory related to that particular self. In times of crisis or uncertainty, self-defining memories have been proposed as being a landmark that can remind an individual of his/her identity (Blagov & Singer, 2004).

One area that has received particular attention from researchers is the development of the self in late adolescence. In general, one of the main existential problems that faces the adolescent is how to integrate an emerging self with larger social groups, culture, and society generally (Erikson, 1950, 1997) or the problem of the formation of a generation identity (Conway, 1997; Mannheim, 1952). Investigating this, Thorne (1995) found that the content of memories freely recalled across the life span by twenty-year-olds conformed to what she termed “developmental truths.” Memories from childhood tended to refer to situations in which the child wanted help, approval, and love, usually from parents, whereas memories from late adolescence and early adulthood very frequently referred to events in which the rememberer wanted reciprocal love, was assertive, or helped another. In further studies in which young adults have been asked how they had made meaning out of peer- and parent-relationship experiences – how they had gained insight or learned lessons from these events that were now self-defining memories – experiences involving conflict were found to be most strongly associated with both gaining insight and learning lessons and often were accompanied by insight relating to issues such as beginning to understand one’s own independence or a greater need for self-sufficiency (McLean & Thorne, 2003; Thorne, McLean & Lawrence, 2004).

In examining students’ memories related to community service experiences, studies also have found that the more personal growth students attributed to these memories, the more likely these students were to place an overall emphasis on “generative” goal pursuits in their lives (Singer, King, Green, & Barr, 2002; see also de St. Aubin & McAdams, 1995). The relationship between the initial event, memories of those events, and the lessons and insights that have come forth as a result, links one’s past to one’s present, giving an individual the capacity to monitor the coherence of their psychological self-identity via this network of autobiographical memories and autobiographical knowledge. Memories of adolescence are often of events in which identity formation is preeminent, either at the group or societal level or in individual personal relationships. Such memories clearly relate to the pursuit of important goals that mark the emergence of an independent self-system in late adolescence. Assuming that the goals that occupy the individual at this point do not change in kind, then the memories that ground them in remembered reality should remain highly accessible across the life span. This is, indeed, exactly what a broad range of research has found.

Recently, Conway and Holmes (2004) asked older adults to freely recall events from each decade of their lives and then content-analyzed these memories on the basis of the psychosocial stages of life as proposed by Erikson (1950, 1997). In Erikson’s theory of development, an individual is confronted with different psychosocial problems during different lifetime periods. In childhood, these problems are concerned with trust and mistrust. In adolescence, problems are centered on identity-identity confusion. In adulthood, the issue is intimacy versus isolation. Middle age is associated with generativity versus stagnation, and old age is concerned with integrity versus despair. In the study by Conway and Holmes, the most memorable or most easily accessible events recalled by older adults from each decade of their lives were found to be those memories that were related to the psychosocial concern associated with that lifetime period (Conway & Holmes, 2004). As shown in Figure 2.2, those memories classified as being strongly related to a particular psychosocial stage tended to predominate at the point in the life span when the stage would have been dominant. This is not an all-or-none effect but, rather, one of degree, as at any given psychosocial stage memories relating to a variety of psychosocial themes are present. The network of memories associated with each decade of life was found to be indexed in part by the appropriate psychosocial concern. This, and other findings from Conway and Holmes (2004), suggests that (self) networks of memories of events that were once of high relevance to the self remain
How Do Memories Construct Our Past?

- Child Identity
- Intimacy
- Generativity
- Integrity

Figure 2.2. Life span memory distribution curves for memories classified by psychosocial theme (redrawn from data presented in Conway and Holmes, 2004, Experiment 1).

in a state of high accessibility and are among the first memories to come to mind when a period in the past is freely sampled.

Childhood Amnesia and the Reminiscence Bump

The development of the self in childhood and late adolescence/early adulthood is reflected in the life span retrieval curve, which is a distribution of memories frequently observed when older adults (about thirty-five years and older) recall autobiographical memories in free recall or in a variety of cued recall conditions (e.g., Franklin & Holding [1977]; Fitzgerald & Lawrence [1984]; Rubin, Wetzler, & Nebes [1986]; Rubin, Rahhal, & Poon [1998]). Memories are plotted in terms of age at encoding of the remembered experiences and the resulting life span retrieval curve typically takes a form similar to that shown in Figure 2.3 (this is an idealized representation).

As Figure 2.3 shows, the life span retrieval curve consists of three components: the period of childhood amnesia (from birth to approximately five years of age), the period of the reminiscence bump (from ten to thirty years), and the period of recency (from the present declining back to the period of the reminiscence bump).

Childhood amnesia (originally called infantile amnesia by Freud [1905/1953]) refers to the phenomenon that people are typically unable to recall autobiographical events from the earliest years of life. The pattern of the life span retrieval curve is extremely robust and has been observed in many studies, to such an extent that it has become one of the most reliable phenomena of contemporary memory research (Conway & Rubin, 1993). This reliability is remarkably striking and a recent study examining life span memory retrieval curves from participants in China, Japan, England, Bangladesh, and the United States found very similar periods of childhood amnesia and reminiscence bump across these cultures (Conway, Wang, Hanyu, & Haque, 2005). Figure 2.4 shows the life span curves for each of these countries. Note that participants were asked to free recall memories from their life and additionally were instructed not to recall events from the previous year (to eliminate the recency portion of the curve). It can be seen in Figure 2.4 that there were striking periods of childhood amnesia and the reminiscence bump across countries and that these were statistically reliable. This further suggests a certain universality to the two phenomena of childhood amnesia and the reminiscence bump.

There are many theoretical explanations of the period of childhood amnesia (see Pillemer & White, 1989; Peterson, 2002; and Wang, 2003), but most flounder on the fact that children who are younger than five years...
How Do Memories Construct Our Past?

Old have a wide range of specific and detailed autobiographical memories (Bauer, 1997; Fivush et al. 1996). Explanations that postulate childhood amnesia to be related to general developmental changes in intellect, language, emotion, and so on fail simply because apparently normal autobiographical memories were in fact accessible when the individual was in the period of childhood amnesia. It seems unlikely that an increase in general functioning would make unavailable already accessible memories. From the SMS perspective, this period in infancy and early childhood is seen as reflecting changes in the goals of the working self. The goals of the maturing, seven-plus-year-old child, are very different from those of the child younger than five years old. Because of this, these networks of early memories become progressively less accessible as we age.

There are, too, many explanations of the reminiscence bump (see Conway, 2005, for a review). Some explanations emphasize the novelty of experiences occurring during this period, some suggest that perhaps memory functions more efficiently during this period, others focus on affect, vividness, and distinctiveness. But none of these have received unequivocal support, and for each there are findings that they cannot explain. For example, less than 30 percent of memories from the reminiscence bump have been found to be of first-time experiences (Fitzgerald, 1988). Instead, what is clearly central to memories from this time is that they have an enduring and important relation to the self that persists long after the experiences are past. Memories from the reminiscence bump tend to be self-defining; they ground the self in a network of important moments from a period when a stable and persisting self finally emerged from the long period of development through infancy, childhood, adolescence, and into young adulthood.

**AUTOBIOGRAPHICAL MEMORIES, THE SELF, AND SOCIETY**

Self-defining memories are typically memories of highly personal experiences that are unique to or idiosyncratic of the individual. There are, however, other self-defining memories that in a sense are more public than private, which can form nodal points of a memory network that extends into culture and society. These memories were originally termed flashbulb memories (Brown & Kulik, 1977, 1982), and they generally refer to memories for learning of surprising, shocking, or consequential items of public (national and international) news. For example, how many adults in the United States or the United Kingdom do not have a memory of where they were, who they were with, or what they were doing when they found out that the World Trade Center (WTC) had been attacked by terrorists on September 11, 2001? This special type of witness memory is the detailed recollection that people often have of the occasion when they first heard about some very surprising, dramatic, important, and emotionally arousing event. Other events for which people's flashbulb memories have been studied are hearing the news that President John F. Kennedy had been shot, that Pearl Harbor had been bombed, that man had successfully landed on the moon, or that Princess Diana had been killed in a car crash. Flashbulb memories are memories of the "reception event" – the encoding of the circumstances in which the person first received the news rather than the event itself. This encoding typically includes the place, who was present at the time, what activities were going on, the affect occasioned by the event, and the source of the news. They also have a "live quality" (Brown & Kulik, 1982) and tend to include seemingly irrelevant and trivial details. Once encoded, flashbulb memories appear to be long-lasting and remain unchanged over time. However, considerable controversy exists concerning whether so-called flashbulb memories are different from other memories of events that are highly distinctive and personally significant.
Some researchers argue that a special neural mechanism exists that is triggered by high levels of emotion, surprise, and consequentiality (Brown & Kulik, 1982). However, other researchers challenge this and argue in favor of a reconstructive theory, in which flashbulb memories are the same as memories for other experiences but are preserved by frequent rehearsal and retelling after the event, rather than special processes activated during the initial experience (Neisser, 1982; McCloskey, Wible, & Cohen, 1988). This account posits that flashbulb memories are not necessarily true or accurate because they are the product of successive reconstructions. Much of the debate has centered on whether flashbulb memories can be shown to be unusually accurate; however, Neisser has suggested that the primary importance of flashbulb memories relates to their associations with society and culture and that they function as "benchmarks" in one's personal history. They mark a point where the individual can state with authority "I was there!" (Neisser, 1982) and as such are part of a self network of memories that locate us in specific epochs of sociohistorical time. As for ordinary autobiographical memories, sharing of flashbulb memories allows individuals to bond over a common theme in their self-networks, increasing intimacy and understanding of the event(s) in question.

The importance of cultural context to flashbulb memory recall was highlighted in a number of studies in a special issue of the journal Applied Cognitive Psychology in 2003. In one study, British participants demonstrated few differences in the phenomenological characteristics of their memories relating to learning about the WTC attacks and their memories for the death of Princess Diana, although for the WTC attacks level of detail in memory descriptions declined over time. By contrast, for Italian participants memories of September 11 were much more detailed than memories of learning about the death of Diana (Kravulashvili, Mirani, Schlagman & Kornbrot, 2003). This fits with earlier findings that indicated that whereas 86 percent of British participants' memories for the resignation of Margaret Thatcher as prime minister could be deemed to have flashbulb memory quality, only 29 percent of non-British participants had flashbulb memories of this event (Cohen, Conway, & Maylor, 1994). Utilizing a new methodology, a recent study carried out in Denmark found a similarly powerful role for social identity in the recall of long-lasting personal memories (Bernsen & Thomsen, 2005). This study compared memory accuracy for the reception of important news by comparing memory reports against objective records and a baseline obtained from participants who were too young to have experienced the original event – the invasion, and subsequent liberation, of Denmark in World War II. In this study, older adults' memories for details of learning the news of these momentous events (e.g., weather, time, day of the week) were found to be generally accurate, with 55 percent of answers being correctly answered. Accuracy was higher, however, among participants who reported ties to the Danish resistance movement, the descriptions provided by these participants had higher clarity than those of individuals who reported no ties to a specific, and important, group within the society. The number of intrusive memories stemming from the time of the German occupation also was found to correlate positively with the degree to which the individual regarded the time of the occupation as central to their life story and identity, illustrating how the influence have self-concepts over both voluntary and involuntary memory retrieval can be pervasive and long-lasting.

Societal or generational identities are both reflected in the flashbulb memory data collected as part of the BBC Radio 4 Memory Survey, an online survey of over twelve thousand memories collected from the general public. Table 2.1 displays preliminary data on the percentage of flashbulb memories for which over 10 percent of one age group reported having a flashbulb memory for that event. Effects of culture and age at encoding are clearly evident. For example, the eleven-to-fifteen age group is the only age group for which over 10 percent of the memories reported were of the London Underground and bus bombings that occurred on July 7, 2005. Although this event occurred most recently, it was not mentioned by the majority of participants. The attacks on the WTC on 9/11 were recalled most frequently (n = 377), followed by the death of Princess Diana (n = 289) and the assassination of JFK (n = 277). This reflects cultural biases, as 85.9 percent of memories were provided by people in the United Kingdom. It fits with the data concerning the quality of memories of the death of Diana held by British and Italian samples mentioned earlier. It also concurs with data on the reminiscence bump as a greater percentage of participants reported having a flashbulb memory for an event if it occurred when they were between the ages of ten and thirty, although events such as the moon landing and the assassination of JFK also were recalled by people who were less than ten years old at the time of the event. This probably reflects the significance of these events on a worldwide level. These types of flashbulb events help define generation identities; they place individual selves within a sociocultural context that is distinct from the cultural and social contexts experienced by those generations who precede and follow. Our final comment on flashbulb memory highlights the way in which a relationship to
social context at the time of the terrorist attack can even be considered
important at the time of a news event:

I was on holiday in Italy with my boyfriend. We were at Lake Como, stay-
ing in a simple tourist guest room above a cafe with a view over the lake. I
remember the promenade and the side street exactly, even though I have
forgotten the name of the town. We slept badly because the local youths
met up below our window on their scooters. There was no TV, so we were
oblivious to the news as it broke. We only found out second-hand when
my boyfriend phoned his elderly mother. It was a phone-card conversation,
so he only got snippets of information. I stood nearby wondering
what was so important. When he told me, the idea seemed preposter-
ous. I remember exactly where I was standing. It was evening, but not
dark. I remember reflecting on how we had spent that day in complete
oblivion, simply enjoying our holiday. In retrospect it felt almost like we
had cheated and failed to engage in the collective concern and dismay ...

*Flashbulb memory of learning of the WTC attacks on September 11, 2001,
from female, aged thirty-five, BBC Memory data.*

The findings discussed here reflect the influence that wider contexts such
as social identity and culture have over encoding and retrieval of memories.
In line with this, researchers have recently begun to focus on the function
that remembering serves with regard to coherence of goals, beliefs, self-
identities, and memory for personal events within a cultural context.

### CULTURAL INFLUENCES ON THE SELF-MEMORY RELATIONSHIP

Traditionally, Asian societies place emphasis on social rules, group har-
mony, interconnectedness, solidarity, and personal humility. This emphasis
fosters the development of a more *interdependently oriented* sense of self.
The members of these societies tend to view themselves as part of a hier-
archical social network of kinship. In contrast, in Western cultures societal
emphasis is on being *independently oriented* and such societies promote the
development and expression of individual autonomy, self-expression, and
personal capability (e.g., Wang & Conway, 2006). These cultural differences
in how the self is conceptualized have led to research into the interactions
among culture, the self, and autobiographical memory. This bridge between
the cognitive study of memory and research stemming from other disci-
plines such as sociology and anthropology is what makes this network of
autobiographical memories, those that intertwine the individual in their
culture and time, extremely interesting for a much wider audience than

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#### Table 2.1: Percentage of flashbulb memories referring to each public event by age group of participant (excluding events for which fewer than 10 percent reported a memory).

<table>
<thead>
<tr>
<th>Event Type</th>
<th>Percentage of Memory</th>
</tr>
</thead>
<tbody>
<tr>
<td>London bombings</td>
<td>46.3</td>
</tr>
<tr>
<td>September 11</td>
<td>34.5</td>
</tr>
<tr>
<td>Death of Diana's Moon landing</td>
<td>3.1</td>
</tr>
<tr>
<td>Death of John Lennon</td>
<td>2.1</td>
</tr>
<tr>
<td>Assassination of JFK</td>
<td>1.5</td>
</tr>
<tr>
<td>Death of King George VI</td>
<td>1.4</td>
</tr>
<tr>
<td>World War II</td>
<td>0.6</td>
</tr>
<tr>
<td>Total</td>
<td>79.8</td>
</tr>
</tbody>
</table>

*The remainder of events were either unable to be classified, referred to personal instead of public events, or were mentioned by fewer than 10 percent of participants.*
just psychologists. Cross-cultural variations in autobiographical memory have been observed by a number of authors (e.g., Pillemer, 1998; Röttger-Rössler, 1993; Weintraub, 1978; and Han, Leichtman, & Wang, 1998). Wang (2001) studied the interactions among culture, self-concepts, and autobiographical memories by asking American and Chinese college students to recall their first memory from childhood, rate it on a number of measures (e.g., rehearsal of this memory), and then complete 10 “I am...” statements. These statements were coded as either being private self-descriptions, for example, “I am friendly, conscientious, intelligent”; collective self-descriptions, for example, “I am a brother, a footballer, a Protestant”; or public self-descriptions, for example, “I am in love with my girlfriend.” The earliest memories provided by the Chinese sample came from an average age of four years, whereas the Americans’ earliest childhood memories were found to come from approximately six months earlier. Chinese participants’ memories were more centered on collective activities, routines, and emotionally neutral events, whereas Americans tended to write emotionally elaborate, self-focused memories referring to specific one-off events. This finding was also replicated by Wang and Conway (2004). Americans’ memory descriptions were also longer than those written by the Chinese participants. Also, in the I am statements, American participants were found to emphasize individual attributes to a greater extent than the Chinese participants, who tended to describe themselves more in terms of social roles. However, across both cultures, participants who used more positive and self-focused terms also were found to provide more specific and self-focused memories. These results highlight the dynamic and reciprocal nature of the relationship between individual and cultural influences on the construction and retrieval of autobiographical memories.

Traditional cultural influences on patterns of AMNs also may be changing over time as a result of the impact of other cultures. As shown in Figure 2.4, Conway, Wang, and colleagues observed very similar periods of childhood amnesia and reminiscence bump across five cultures (Conway et al., 2005). However, these authors had expected to find a later reminiscence bump in Asian participants, as in some Asian societies adulthood is not considered to start until the age of about thirty, when a stable social network is formed. The authors suggested that one of the reasons that they may not have found the expected later reminiscence bump in Asian participants could be a result of the increased Westernization of Asian cultures over the last fifty years. Increased Westernization may have led to changes in cultural norms concerning the timing of movement into adolescence and adulthood. An alternate explanation could be that there is universality in memory retrieval curves, as in all cultures neurodevelopmental changes occur in the frontal lobes throughout childhood and into adolescence.

Networks of memories around different themes also have been found to differ across cultures (Wang, 2006). For earliest childhood memories cued by the words self, mother, family, friend, and surrounding, memory for mother was found to come from the youngest age (American = 3.8 years, Taiwanese = 5.4 years), and memory for surroundings came from about the same age, suggesting early development of knowledge about the physical environment. Earliest memory for self came from approximately six to eight months later. Memory for friend was the latest memory retrieved in both cultures (American = 5 years, Taiwanese = 6.33 years), which supports previous findings that the social self in relation to friendships develops in the late preschool years. This indicates that networks of memories linked to the social self, and particularly the self in relation to mother, are able to be formed before memories relating to the self as an individual. Across conditions, European Americans’ earliest memories were again found to be from a younger age than were Taiwanese memories, and European Americans tended to recall more specific events and focus on individual roles and autonomy than did Taiwanese participants.

The interactions that occur between mother and child and their influence on autobiographical memory styles have been studied both within and between cultures, and it has been found that Western mothers talk about the past in more elaborate and emotional ways than mothers from Eastern cultures (Leichtman, Wang, & Pillemer, 2003). In conversations with their children, mothers from Western cultures focus on the child’s own abilities and emotions. When discussing past events, they also provide rich and embellished information about the events being discussed and elaborate and augment children’s responses. Conversely, Eastern mothers tend to place the child in a more collective setting, minimize emotions such as anger that may divide the child from the group, and instead highlight moral emotions and lessons. Eastern mothers also have been found to not use embellishment in conversations with their children, instead just repeating questions to try to elicit more information about the event being discussed (Wang & Brockmeier, 2002). These styles of reminiscing have been termed “high-elaborative” and “low-elaborative,” respectively, and have been shown to influence the elaborative style adopted by the child and the amount of detail elicited in memory sharing conversations. Simple sharing of past experiences between mother and child thus perpetuates cultural styles of memory content, memory retrieval, which in turn will have influence over the types of associations, and themes that link memories together in individual’s AMNs.
A further aspect of cognition that can influence retrieval of memories from different networks is language. In a study of middle-aged immigrants who had fled from Poland to Denmark thirty years previously, when asked to recall memories to word cues (of which half were given in Danish and half in Polish), participants judged memories of events that had taken place in Poland as being retrieved from memory in Polish, whereas events that occurred after immigration were retrieved in Danish (Larsen, Schrauf, Fromholt, & Rubin, 2002). Participants who had immigrated at a younger age (average age twenty-four years) also reported experiencing more inner speech behaviors in Danish than those who had immigrated later late in their lives (average thirty-four years). This indicates that those in the first group were thinking in Danish. These results suggest that some element of autobiographical memory encoding takes into account language, or at least some linguistic elements feature in encoding specificity and subsequent retrieval. This implies that memories encoded in one language are stored in separate AMNs from memories encoded in another language and that the links or overlaps between these networks are either weak or limited.

The way in which we talk about our memories may not always reflect what we remember about our memories, however. Wang and Ross (2005) studied earliest childhood memories in Caucasian and Asian Americans and found that priming of private self-concepts (e.g., I am clever) or collective self-concepts (e.g., I am a Christian) before recall influenced the focus of memories retrieved (privately focused or collectively focused) and the number of social interactions reported in memories. However, the effects of culture were found to be stronger and to have separate influence over memory content. These findings indicate that the cognitive frame activated at the time of retrieval was not the only influence over recall and that encoding of representations in memory is also critical. This relates to changes in goals of the working self, as discussed earlier. As time passes between encoding and retrieval, changes in the goals of the working self may influence the attention paid to different aspects of a representation in memory or reinterpretation of the event information. Therefore, when recounting a memory to different people at different points in time, the narrative that we provide may differ greatly (Wang & Ross, 2005).

CONCLUSIONS: MEMORY SELF NETWORKS

In this chapter, we have argued for a concept that we call self networks. A critically important component of these networks is networks of specific autobiographical memories that ground the self in a remembered reality. One important self network represents, in highly accessible form, the emerging self in late adolescence and early adulthood. This network is undoubtedly of enduring significance for the self and central in defining who we are and, importantly, who we can become. Another network of memories links the self into society and history; this network consists of flashbulb memories — vivid memories of learning of highly consequential items of public news. These two self networks may then be interlinked in an overriding memory network as the most easily accessible memories both from one's own personal experiences and from one's flashbulb memories relating to public events date from the period of the reminiscence bump, between the ages of fifteen and twenty-five (see Figures 2.3 and 2.4, and Table 2.1). Perhaps then, both our personal identity and our cultural or generational identity are formed at this time and endure over the life span.

REFERENCES

How Do Memories Construct Our Past?


