2.46 Autobiographical Memory
M. A. Conway and H. L. Williams, University of Leeds, Leeds, UK
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2.46.1 Introduction

The term autobiographical memory refers to our memory for specific episodes, episodic memory, and to our conceptual, generic, and schematic knowledge of our lives, autobiographical knowledge. Typically these two types of long-term memory representation are brought together in an act of remembering where they form a specific memory. Consider the following example:

My earliest memories relate to a time in my childhood when we were living in Malta. I was about four years old. We lived in the most glorious Italian house on the sea which had a great big flagstone hall and shutters looking out to the sea and a sweeping staircase that led up to the first floor and, I think this is true, but it seems wrong somehow because my parents were very kind to me. I remember having to stand looking at the wall halfway up the stairs because I couldn’t remember the days of the week and I was taught them with reference to the gods, you know, Thor’s day, Woden’s day and so forth, and that I remember very vividly. One lunchtime I was asked to repeat them and I couldn’t remember them and my father told me to go and stand halfway up this great big sweeping staircase and just look at the wall. (Taken from the BBC Radio 4 Memory Survey, July 2006, which collected 11,000 memories from the general public.)

There are various segments of autobiographical knowledge in this memory, e.g., when we lived in Malta, my parents were kind to me, some generic visual imagery, e.g., how various features of the house looked, and some highly specific knowledge of time, locations, and actions. Autobiographical memories very frequently come to mind as these compilations of different types of knowledge are configured into a memory in a specific act of remembering. As such they clearly illustrate the highly constructive nature of autobiographical remembering. We will return to memory construction in a later section, but now that we have some idea of what is meant by the term autobiographical memory, we might ask about how it has been studied. After all, autobiographical memories are personally important memory representations. They are the content of the self and define who we are, who we have been, and, importantly, who we can yet become. They enable us to have a past, present, and future in which we exist as individuals. They are, therefore, one of our most important bodies of knowledge and because of that would have been, it might be thought, the focus of memory research for many decades.

2.46.2 A Brief Biography of Autobiographical Memory Research

Remarkably, however, the study of autobiographical memory has mainly taken place over the last 2 decades, whereas as the formal scientific study of memory itself is at least over a century old, dating, arguably, to the seminal work of Herman Ebbinghaus (1885). Ebbinghaus famously studied memory for relatively meaningless items, such as short lists of constant-vowel-constant (CVC) letter strings. Less well known is that he also studied memory for meaningful materials such as passages of prose, poetry, etc. Ebbinghaus concluded that memory for these latter
materials was influenced by too many factors beyond
the experimenter's control and because of this the
scientific or experimental study of memory would be
more surely advanced using materials that the
experimenter had powerful control over, such as
CVC strings. Ebbinghaus's view held sway and the
experimental study of memory in the laboratory
has generally used to-be-remembered materials gen-
erated and controlled by the experimenter. Almost
by definition this excludes autobiographical mem-
ories, as these are formed outside the laboratory in
our everyday lives in response to complicated mean-
ingful experiences – experiences over which the
experimenter has no control.

Given the dominance of experimental studies of
memory, it is perhaps not so surprising that it is only
in relatively recent times that autobiographical mem-
ory has received any attention at all. According to
one view, science moves from the simple to the
complex and perhaps it was the case that some
understanding of memory, deriving from experimen-
tal studies, had to be attained before the field could
grapple with the complexities of autobiographical
memory and the inevitable role in memory of mys-
terious entities such as the self, goals, and emotion.
There is no doubt some truth in this but, as with all
history including personal history, the story is more
complicated. So, for instance, at the time Ebbinghaus
was writing his field-defining book, another great
nineteenth-century scientist, Sir Francis Galton
(1883), was reporting his seminal work into memory.
One aspect of this research focused on the recall of
autobiographical memories. Galton was interested in
how many memories we have and developed a tech-
nique that 100 years later became known as the cue
word technique. In this procedure, Galton revealed
to himself, one at a time, words he had previously
arranged into an alphabetical list. In response to each
word, he noted what thoughts passed through his
mind. So when reading abasement, abhorrence, etc.
(remember this was Victorian England), he would
write out his thoughts. He carried out this procedure
for the fairly long list of words on several separate
occasions. There were a wide range of findings but
one striking outcome was that many of his thoughts
were (autobiographical) memories and they often
came to mind in the form of visual mental images.
Galton was rather disappointed to discover that there
was not an endless variety in his thoughts or mem-
ories and that he often recalled the same thoughts/
memories on subsequent occasions of testing. He
concluded that we probably have far fewer memories
than we imagine we have – about 6500 according to
one researcher who tried to recall all her memories
(Smith, 1952).

An obvious problem with Galton’s method is that
once a subject has recalled a memory, then that
memory became associated with the cue word and
as such was much more likely to be recalled on
subsequent occasions. If so, then Galton may well
have underestimated the extent of his autobiographi-
cal memories. Nonetheless, the cue word method has
proved especially useful in more contemporary stud-
ies of autobiographical memory and Galton's original
work remains a rewarding read for memory research-
ers, as does Ebbinghaus's important book.

Another book from this period that remains sig-
nificant is Theodore Ribot’s (1882) classic case
studies of memory distortions and malfunction fol-
lowing brain injury. This work also contains one of
the first theories of autobiographical memory and is
worth consulting for that alone. Other memory
researchers from the late nineteenth century also
studied autobiographical memory (see Conway,
1990, 2004, for reviews), and among them Henri
and Henri (1896, 1898) conducted the first autobio-
 graphical memory survey. However, psychology
came to be dominated by behaviorism, at the heart
of which was the belief that all psychological theory
should be built upon that which was observable. As
memories are internal mental states, they cannot be
studied by direct observation but can only be inferred
by their effects upon behavior, i.e., upon what can be
recalled in an experiment where the conditions of
learning, retention, and remembering are highly con-
trolled. This approach became known as verbal
learning. Indeed, the dominant journal in the area
was called the Journal of Verbal Learning and Verbal
Behavior (renamed in the 1980s the Journal of Memory
and Language). For many decades, verbal learning
dominated memory research and in many respects
still does. A lone voice during this period was the
British researcher Sir Fredrick Bartlett, whose
famous book Remembering: A Study in Experimental
and Social Psychology (1932) is generally credited with
having created and maintained a different tradition
in memory research. In this tradition, the concept of a
schema (some sort of general representation of simi-
lar experiences, narrative, and cultural conventions)
was central and social interactions and culture played
important roles in remembering. Bartlett was, how-
ever, largely uninterested in detailed memories of
specific experiences – what we now call episodic
memories. Because of this, his work did not rein-
vigorate the study of autobiographical memory.

Instead the reemergence of the study of autobi-
ographical memory after 100 years of silence (Cohen,
1989) started to take place in the 1970s and gathered
pace in the 1980s. Figure 1 shows the cumulative
frequency of papers, by year since 1970, that have
used the phrase autobiographical memory. This
admittedly is a crude index of research activity into
the topic, but as crude as it is, it nonetheless
depicts very strikingly how autobiographical memory
research has rapidly increased and developed in the
last 35 years. So what happened to end the century of
silence? There were, arguably, two main forces that
led to renewed interest in this important aspect of
memory. The first was the gradual emergence of neu-
ropsychology as a distinct research area and within it
the study of malfunctions of human memory following
brain damage. One of the striking symptoms of
patients with memory impairments caused by brain
damage is that they virtually always have disrupted
autobiographical memory. In a particularly important
paper Crovitz and Schiffman (1974) reintroduced the
Galton cue word method as a way of eliciting auto-
biographical memories in normal populations and
later in patients with closed head injuries suffering
from various degrees of amnesia, thus simultaneously
rediscovering both Galton and Ribot. The second
force was the developing interest within cognitive
science in how to model and represent stories and
memories. An important paper here that demonstrated
how autobiographical memory might be studied under
laboratory conditions was that of Robinson (1976),
who also used the cue word method to investigate
differences between memories with different types of
affect. Add to this Brown and Kulik’s (1977) original
survey of flashbulb memories, a rather timely remin-
der from Neisser (1978) about the narrowness of
memory research in the 1970s and preceding decades,
and the highly significant volume edited by Neisser
(1982), Memory Observed, which reprinted many of the
papers of earlier researchers on autobiographical
memory and other then-neglected areas of memory,
and a strong impetus was in place to rejuvenate
research into autobiographical memory. It is, perhaps,
important to note that the renewed interest, reflected
in Figure 1, had its roots in a rediscovery of the
original work of Galton, Ribot, and others (see too
Rapaport, 1950, for an especially interesting review of
emotion and memory). It might be noted that the
methods used by these early researchers – studying
one’s own memory, investigating malfunctions and
distortions of memories, and surveying memories –
also re-emerged in the contemporary study of auto-
biographical memory, and it is to the findings of these
more recent studies we now turn.

2.46.3 The Representation of
Autobiographical Knowledge in
Long-Term Memory

This section reviews current thinking about the
nature of autobiographical knowledge. It is important

![Figure 1](image-url)
to note that a full review of findings is not undertaken here and instead only main findings and their implications are considered. One current model proposes that autobiographical memories are generated in the self-memory system or SMS (Conway and Pleydell-Pearce, 2000). Very briefly, the SMS is considered to be a virtual memory system consisting of a temporary interaction between control or executive processing systems with a complex multilayered long-term memory knowledge base. Another way to conceive of this is as an interaction between currently active, dynamic, or fluid aspects of the self with more permanent, long-term, or crystallized representations of the self and attributes of the self. The dynamic or executive aspect of the self is termed the working self. The working self consists of a complex hierarchy of currently active goals (Conway and Pleydell-Pearce, 2000) through which memories are encoded and retrieved. The working self also contains what Conway et al. (2004) termed the conceptual self, which in turn consists of beliefs, evaluations, and currently active self-images of what the self has been in the past, currently is considered to be, and what it may become in the future.

The working self regulates the construction of new memories in the SMS, at both encoding and during retrieval, by controlling access to the autobiographical memory knowledge base. Figure 2 illustrates this relation between the working self and the knowledge base. The working self modulates memory by controlling the cues that are used to activate knowledge in the knowledge base. This is achieved by shaping cues so that particular types of information are activated. For example, a person asked to recall a memory of childhood might recall their earliest memory. Thus, elaborating the cue from 'recall a memory from childhood' into the cue 'recall my earliest memory.' This elaboration may take place several times as a cue is fine-tuned to access the information sought. An idea central to the SMS model is that specific autobiographical memories are formed when stable patterns of activation exist over interconnected representations of autobiographical knowledge and associated episodic memories. Thus, when conceptual and generic knowledge of the attributes of a house one lived in as a child, the relationship one had with one’s parents, and a specific (episodic) memory of a moment in time are all activated together and interlinked, then the rememberer has the experience of remembering and their consciousness is dominated by a specific memory – as in the example we started with. It is these different types of autobiographical knowledge and their organization in long-term memory that we are concerned with next and we return to considering the process of constructing memories in a subsequent section.

According to the SMS model, long-term memory contains two distinct types of autobiographical representation: autobiographical knowledge and episodic memories. Autobiographical knowledge is organized in partonomic hierarchical knowledge structures (Conway and Bekerian, 1987; Barsalou, 1988; Conway, 1993, 1996; Lancaster and Barsalou, 1997; Burt et al. 2003) that range from highly abstract and conceptual knowledge (such as that contained in the conceptual self) to conceptual knowledge that is event-specific and experience-near. Autobiographical memory knowledge structures terminate in episodic memories, the second type of autobiographical representation contained in the autobiographical knowledge base. Figure 3 illustrates how these complex autobiographical memory knowledge structures might be represented in long-term memory.

The upper part of Figure 3 focuses on autobiographical knowledge and specifically on the life story, lifetime periods, and general events (Conway, 2005). These divisions of autobiographical knowledge are on a dimension of specificity, and at the most abstract level is a structure termed the life story.
(Pillemer, 1998; Bluck and Habermas, 2001; Bluck, 2003). The life story contains general factual and evaluative knowledge about the individual. It may also contain self-images that divide and separate the self into several different selves. It is represented in more or less coherent sets of themes that characterize, identify, and give meaning to a whole life (Bluck and Habermas, 2000, 2001). Divisions in the life story may be supported by the way in which different self-images contain cues that differentially access other knowledge in the autobiographical knowledge base. For example, a self that accesses a particular lifetime period (see Figure 3) will have cues that are channeled by knowledge represented as part of the lifetime period, which in turn can be used to access particular sets of general events that contain cues to

specific episodic memories. It in this way that a memory can be gradually formed or constructed.

Lifetime periods contain representations of locations, people, activities, feelings, and goals common to the period they represent. They effectively encapsulate a period in memory and in so doing provide further ways in which access to autobiographical knowledge is channeled, or directed. Lifetime periods have been found to contain evaluative knowledge, negative and positive, of progress in goal attainment (Beike and Landoll, 2000), and lifetime periods may play an important role in the life story. For instance, lifetime periods may provide autobiographical knowledge that can be used to form life story schema and thus support the generation of themes. Lifetime periods may be particularly appropriate for this because of the goal-evaluative information they contain. For example, a lifetime period such as ‘when I was at university,’ will consist of representations of people, locations, activities, feelings, and goals common to the period but will also contain some general evaluation of the period, i.e., this was an anxious time for me, living away from home was difficult, I was lonely, I found the work too difficult, etc. (see Cantor and Kihlstrom, 1985).

The life story 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 autobiographical knowledge base. General events, on the other hand, are more clearly part of the knowledge base itself and have been found to play important roles in organizing personal knowledge. General events are more strongly event-specific than lifetime periods but not as event-specific as sensory-perceptual episodic memories, which are directly derived from actual experience (Conway, 2001, 2005). General events refer to a variety of autobiographical knowledge structures such as single events, e.g., the day we went to London; repeated events, e.g., work meetings; and extended events, e.g., our holiday in Spain (Barsalou, 1988). General events are organized in several different ways. For example, they can take the form of mini-histories structured around detailed and sometimes vivid episodic memories of goal attainment in developing skills, knowledge, and personal relationships (Robinson, 1992). Some general events may be of experiences of particular significance for the self and act as reference points for other associated general events (Singer and Salovey, 1993; Pillemer, 1998). Yet other general events may be grouped together because of their emotional similarity (McAdams et al., 2001), and it is likely that there are yet other forms of organization at this level which await investigation (see for example, Brown and Schopflocher, 1998). However, the research currently available indicates that organization of autobiographical knowledge at the level of general events is extensive and it appears to virtually always refer to progress in the attainment of highly self-relevant goals. General event knowledge then represents information highly relevant to the goal hierarchy of the working self.

In one study of this type of knowledge, Robinson (1992) examined people’s memories for the acquisition of skills, e.g., riding a bicycle, driving a car, and for aspects of personal relationships. These general events were found to be organized around sets of vivid memories relating to goal attainment. Consider two examples from Robinson’s study:

Ever agreeable, and eager to do anything that would get me out of the doldrums of inferiority, my father rented a bike and undertook to help me to learn to ride it. I shall always remember those first few glorious seconds when I realized I was riding on my own. . . . (Quinn, 1990, cited in Robinson, 1992: 224.)

The first time I flew an airplane was one of the best firsts. It marked a sense of accomplishment for myself, and it also started me on the career path I have always wanted to follow. The day was warm and hazy, much as summer days in Louisville are. My nervousness didn’t help the situation, as I perspired profusely. But as we took off from runway 6 the feeling of total euphoria took over, and I was no longer nervous or afraid. We cruised at 2500 feet and I worked on some basic manoeuvres for approximately 45 minutes. We then returned to the airport, where I realized that this will soon be a career. (Robinson, 1992: 226.)

These first-time memories cue other related memories and the whole general event carries powerful self-defining evaluations that persist over long periods of time.

Relatively recent experiences, particularly those occurring during the current lifetime period, that give rise to sets of multiply related general events and associated episodic memories must be represented in terms of the currently active goals of the working self that dominate at the time. Burt et al. (2003) investigated this for several extended events, e.g., Christmas shopping. In these studies, events were sorted into groups by participants, and from these groupings currently active themes were identified. Figure 4 shows the organization of a series of episodic memories associated
with the general event of buying a house (Burt et al., 2003). The themes shown in Figure 4 are all associated with other memories as well and with lifetime periods in which the themes were present. The findings of Burt et al. (2003) demonstrate that general events typically access groups of episodic memories that connect the general event to unique and specific moments in time. One important property of this organization is that when goals change and new themes and lifetime periods become central to the working self, a record of the past concerns of an older version of the working self exists in the form of general events and the colonies of episodic memories they access. Thus, even if no goal information is explicitly encoded, it can, to at least some extent, be inferred from the groupings of general events and the associated episodic memories. Indeed, Robinson found that many memories featured goal-related evaluative knowledge or self-defining memories (Singer and Salovey, 1993) along with more general knowledge and specific episodic memories. General events provide, then, records of complicated and extended goal-related activities. These have powerful implications for the self, especially the conceptual self, and how a person evaluates their self.

### 2.46.4 Episodic Memory

So far we have been concerned with autobiographical knowledge, but specific autobiographical memories
Table 1  Eight characteristics of episodic memory

<table>
<thead>
<tr>
<th></th>
<th>They retain summary records of sensory-perceptual-conceptual-affective processing derived from working memory.</th>
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<tr>
<td>II</td>
<td>They are predominantly represented in the form of (visual) images.</td>
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<tr>
<td>III</td>
<td>They represent short time slices, determined by changes in goal processing.</td>
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<td>IV</td>
<td>They are only retained in a durable form if they become linked to conceptual autobiographical knowledge. Otherwise they are rapidly forgotten.</td>
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<tr>
<td>V</td>
<td>Their main function is to provide a short-term record of progress in current goal processing.</td>
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<tr>
<td>VI</td>
<td>They are recollectively experienced when accessed.</td>
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<tr>
<td>VII</td>
<td>When included as part of an autobiographical memory construction, they provide specificity.</td>
</tr>
<tr>
<td>VIII</td>
<td>Neuroanatomically they may be represented in brain regions separate from other (conceptual) autobiographical knowledge networks.</td>
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Episodic memories are, however, rather different types of representations. Table 1 lists eight characteristics of episodic memories (from Conway, 2005, Table 4), and each of these is now considered in turn. The first three characteristics of episodic memories (numbered I, II, and III) in Table 1 concern properties of episodic memories. First, the content of episodic memories is highly event-related and consists of detailed records of sensory-perceptual and conceptual-affective processing that was prominent during the original experience. Note that these are summary rather than literal representations, although they may occasionally contain some exact representations of processing that occurred during an experience (see the last paragraph of this section). Second, although they can, and indeed do, contain information from all the sensory modalities, they have been found to be predominantly visual in nature (see Brewer, 1988, for an interesting early study of the content of episodic memories). Finally they represent short time-slices of experience highly related to the moment-by-moment segmentation of experience into events (Williams et al., 2007b; Zacks et al., 2007).

Clearly, many episodic memories will be formed every day and simply casting one’s mind back over the events of the day will bring to mind many highly detailed and specific episodic memories of events which occurred earlier in the day (see Williams et al., 2007b). In subsequent days, however, as the retention interval lengthens, many of these episodic memories, which are often of rather low self-relevance, routine events, become inaccessible. Even those that are retained over longer retention intervals are often not as detailed as they were close to the point of their formation. It has been suggested that only those episodic memories that are linked in some way to currently active goals become integrated with autobiographical knowledge in long-term memory. Episodic memories that become integrated in this way are retained over long retention intervals measured in months, years, decades, and even a lifetime (point IV in Table 1). Relatedly, the SMS model posits that one of the main functions of episodic memories is to provide a record of recent goal-processing episodes. Episodic memories provide a way in which to rapidly and effectively check that goal-related actions have been executed. They let the rememberer know that they did, for instance, lock the door, post the letter, have a coffee, and so on. If one of these routine events mapped onto an important goal or set of goals, then the episodic memory might become integrated with other knowledge in the autobiographical knowledge base and so become an enduring episodic memory. The study of self-defining experiences, the experience of trauma, and vivid memories generally provide many examples of how episodic memories become important parts of the autobiographical knowledge base, where they endure for many years (see Pillemer, 1998; Ehlers and Clark, 2000; Singer, 2005).

Points VI and VII in Table 1 focus on another important aspect of episodic memories — that they are very highly associated with the experience of remembering. This is often referred to as recollective experience, and this and other forms of memory awareness have been the focus of many contemporary memory studies (see Tulving, 1985; Gardiner and Richardson-Klavehn, 2000, for reviews). Memory awareness in autobiographical remembering appears to be triggered or activated when an episodic memory enters conscious awareness (Conway, 2001, 2005), although it can also occur in other ways (cf. Moulin et al., 2005). Episodic memories, when they enter the construction of an autobiographical memory, cause the experience of remembering and also provided the constructed memory with specificity. As we will
see, the specificity of the memory is important and is a quality that can be lost when memory malfunctions in, for example, psychological illness. Specificity provides a link to the experience of the world, and episodic memories are experience-near representations and stand in contrast to autobiographical and other conceptual knowledge which is experience-distant. Thus, the experience of remembering and memory specificity are important qualities of episodic memories. Finally, in Table 1 (see VII), it is suggested that episodic memories might be represented in a separate brain region from more autobiographical conceptual knowledge (this is elaborated in Conway, 2005). We will return to this issue in the closing section of this chapter, but we might note here one general and intriguing finding that seems to support it: patients who suffer brain damage which has led to amnesia for much of their preinjury life, and especially amnesia for preinjury episodic memories, have nonetheless been found to retain often extensive autobiographical knowledge (Conway and Fthenaki, 2000).

### 2.46.5 Self-Defining Memories

The autobiographical knowledge base is complex and represents the personal history of an individual in different ways, i.e., as knowledge and as specific memories. Because of this complexity, the knowledge base is highly organized and some parts are more accessible than other parts. Generally, those autobiographical knowledge structures that are strongly associated with current goals and current images of the self are in a more accessible state than knowledge structures that are currently less self-relevant. In this section, we consider how the relation to the self can shape and organize autobiographical memory.

One important type of personal knowledge that appears to be highly accessible to the self is that of self-defining memories (SDMs). An SDM is a specific type of autobiographical memory that has the following attributes: affective intensity, vividness, high levels of rehearsal, linkage to similar memories, and connection to an enduring concern or unresolved conflict (Singer and Moffitt, 1991/1992; Singer and Salovey, 1993; Singer, 2005). Self-defining memories can be distinguished from other types of vivid memories. For example, flashbulb memories, as originally defined by Brown and Kulik (1977), are a particularly vivid and affective form of personal event memory (Pillemer, 1998), often about important public events. They have been found to be associated with four interrelated variables: surprise, consequentiality, importance, and emotion (Conway, 1995). Having these qualities does not necessarily indicate, however, that the memory is central to enduring goals of the self, and it is certainly possible to have highly vivid memories of events that are low in self-relevance (Conway et al., 2004). Importantly then, the two distinguishing criteria for self-defining memories that differentiate them from other vivid memories are, first, their linkage to other memories within the individual that share similar personal themes and, second, their relevance to the individual’s enduring concerns or unresolved conflicts.

Both of these features – linkage of similar memories and relevance to concerns and conflicts – have been investigated in research into individuals’ motivations and goals. For example, Thorne et al. (1998) looked at young adults’ important relationship memories generated in two interviews over a 6-month period of time. Participants had freedom to describe similar or different relationship episodes in the second interview. Thorne et al. scored the memories for social motives for the memories that varied from time 1 to time 2, as well as the points of emphasis in the twice-told memories. For both unique memories and repeated memories, the authors found “moderate thematic consistency” (Thorne et al., 1998: 258), indicating that these memories, even when varying in content, reflected similar motivational themes and narrative structures. In a related study, Demorest and Alexander (1992) had raters code individuals’ significant personal memories for overarching interpersonal scripts. A month later, these same individuals generated a set of fictional scenarios. Raters coded the themes of these scenarios and found striking overlap in terms of thematic continuity between the original memories and the imaginary stories. These results, along with those of Thorne et al. (1998), suggest that individuals link remembered and imagined experiences through personally significant themes. These themes originate, according to the SMS model, from the goals of the working self, but later can also serve to influence its ongoing goal processing.

Further evidence of the relationship of self-defining memories to individuals’ enduring conflicts and concerns comes from the work of Singer and colleagues (Singer, 1990; Moffitt and Singer, 1994; Singer, 2005). These researchers found the affective quality of self-defining memories to be a function of the relevance of the memories to the attainment of a person’s most desired goals. Moreover, this was found
to be the case not only for memories relevant to the attainment of approach goals (desired goals), but also for memories about active efforts to avoid the consequences of undesired outcomes (Moffitt and Singer, 1994). Singer et al. (2002) additionally reported that the more personal growth students attributed to memories that grew out of community service experiences, the more likely these students were to place an overall emphasis on generative goal pursuits in their lives (see also de St. Aubin and McAdams, 1995). Similarly, in examining the relationship of turning-point and other significant personal memories to overall themes of the personality, McAdams (McAdams, 1982; McAdams et al., 1996) has consistently found power-oriented memories to be linked to agentic or individualistic motives, while intimacy-oriented memories reflected communal, social, and relationship motives. Jardine (1999) found that women counselors who experienced life transitions during their clinical training associated themes from their self-defining memories with their set of possible selves (Markus and Nurius, 1986). In a series of clinical case studies involving both individual and couples in psychotherapy, Singer found self-defining memories to be linked to critical relationship themes which were expressed in both clients’ intimate relationships and in the transference dynamics of the therapy (Singer and Singer, 1992, 1994; Singer and Salovey, 1996; Singer, 2001; Singer and Blagov, 2004).

In addition to their linkage to goals, SDMs also can play directive and mood regulatory functions for the self (Pillemer, 1998, 2003; Bluck, 2003). For example, SDMs have been found to play a role in providing life lessons or integrative meanings that help individuals in optimal adjustment and personal growth. This is what Bluck (2003) termed the directive function of autobiographical memories. Blagov and Singer (2004) demonstrated that individuals with larger numbers of SDMs that contained reflective themes or messages, as reliably coded by three raters (see Singer and Blagov (2000) for an SDM coding manual), displayed optimal levels of self-restraint and emotional expression, as measured by the Weinberger Adjustment Inventory Short Form (Weinberger, 1997, 1998). Thorne et al. (2004) found that, compared to other types of personal memories, individuals were more likely to rely on SDMs involving tension or goal conflict to provide insights and life lessons.

SDMs provide information that can guide and direct the individual in everyday life. One specific form of directive function is the regulation of mood. Josephson et al. (1996) found that nondepressed individuals enlisted positive memories to repair negative moods, while mildly depressed individuals were less likely to recruit positive memories after a negative mood had been induced. Similarly, Moffitt et al. (1994) found that depressed individuals were less likely to recall SDMs when asked to retrieve a positive memory, while they did not differ in memory specificity for negative memories. Williams (1996), though not specifically addressing SDMs, has argued that a lack of memory specificity in depressed and suicidal individuals reflects a cognitive deficit generalized from a learned defense against encoding and retrieving affectively threatening self-relevant experiences. In summary, the findings from a broad range of studies converge on the view that SDMs are central to goals and conflicts within the individual (see Singer, 2005); they provide important integrative lessons, insights, or directives for the working self (see especially Pillemer, 1998); and they may regulate mood in important ways.

### 2.46.6 Self-Images

Conway et al. (2004) describe what they termed the conceptual self: One important knowledge structure in the conceptual self are self-images. It is proposed that self-images are knowledge structures that summarize complex sets of interlinked autobiographical knowledge and episodic memories that cumulatively support a particular view or version of the self. (Note that self-images can be permanent stable representations or more transitory, fleeting mental representations.) Conway (2005) proposes that these summary representations may often be experienced as images and hence the term self-images. A question of some interest here is how self-images are related to selective sets of memories. Rathbone et al. (2006; described in Conway, 2005) studied this by having a group of middle-aged participants complete a short questionnaire in which they completed six ‘I am...’ statements (Kuhn and McPartland, 1954). An ‘I am...’ could be anything, for example, I am bad, I am sociable, I am a banker, I am a mother, etc. Later each person recalled specific autobiographical memories to each of their ‘I am...’ statements. The dates of the memories, expressed in age at encoding, and the dates of the emergence of the ‘I am...’ statement were then compared; Figure 5 shows the distribution of age at encoding of the memories relative to age of emergence of the ‘I am...’.

Figure 5 strikingly shows that age at encoding clusters around the date of emergence of the ‘I am...’, strongly
suggesting that ‘I am...’ or self-images are grounded in sets of memories of formative experiences.

Further work found that the ‘I am...’ could be categorized into two broad classes: roles and traits, e.g., I am a student versus I am charming. However, both types of ‘I am...’ role and trait, gave rise to the same distribution as that shown for ‘I am...’ overall in Figure 5. Both role and trait ‘I am...’ seem then to be marked in memory by highly accessible specific memories that come first to mind when the ‘I am...’ is processed. This may reflect the grounding of these aspects of the conceptual self, self-images, in subsets of memories and knowledge that define and provide the content for that self-image. This differentiation of the self, supported by the organization of autobiographical memory into self-images, might be particularly important in the development of the self – a point we return to after considering the distribution of memories over the life span and the significance of this for the self.

2.46.7 The Life Span Distribution of Autobiographical Memories

Important periods of development of the self are reflected in the life span retrieval curve which is observed when older adults (about 35 years and older) recall autobiographical memories in free recall or in a variety of cued recall conditions (Franklin and Holding, 1977; Fitzgerald and Lawrence, 1984; Rubin et al., 1986, 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 6 (this is an
idealized representation derived from many studies and not based on specific data).

As Figure 6 shows, the life span retrieval curve consists of three components: the period of childhood amnesia (from birth to approximately 5 years of age), the period of the reminiscence bump (from 10 to 30 years), and the period of recency (from the present declining back to the period of the reminiscence bump). The pattern of the life span retrieval curve is extremely robust and has been observed in many studies — to such an extent that it led Rubin to conclude that it was one of the most reliable phenomena of contemporary memory research (Conway and Rubin, 1993). This reliability is remarkably striking.

In a recent study, Conway et al. (2005) sampled groups from five different countries: the United States, the United Kingdom, Bangladesh, Japan, and China. Figure 7 shows the life span retrieval curves for each of these countries. (Note that participants were instructed not to recall events from the previous year to eliminate the recency portion of the curve.)

It can be seen from Figure 7 that there were highly similar periods of childhood amnesia and reminiscence bump across countries. This further demonstrates the robustness of the life span retrieval curve and perhaps its universality. If the data for the five countries are collapsed together and an overall life span retrieval curve plotted, then the remarkably consistent distribution shown in the idealized curve of Figure 6 is observed.

There are many theoretical explanations of the period of childhood amnesia (see Pillemer and White 1989; Wang, 2003, for reviews), but most flounder on the fact that children below the age of 5 years have a wide range of specific and detailed autobiographical memories (Fivush et al., 1996; Bauer, 1997). Explanations that postulate childhood amnesia to be related to general developmental changes in intellect, language, emotion, etc., 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 previously accessible memories. From the SMS perspective, this period is seen as reflecting changes in the working self goal hierarchy, the idea being that the goals of the infant and young child, through which experience is encoded into memory, are so different, so disjunct, from those of the adult that the adult working self is unable to access those memories (see also Howe and Courage, 1997, for a particularly interesting account of childhood amnesia in terms of development of the self). Other accounts emphasize mother/child interactions, the role of language development, and emergence of narrative abilities (Fivush and Nelson, 2004).

Socialization and culture must play some role in the development of memory, although it seems that the infant/child capacity to actually have episodic memories may predate these developments (Rovee-Collier, 1997). If this is the case, then presumably the effects of socialization, culture, and language are largely on the organization of memory and perhaps on memory content as well, rather than on the processes that mediate the actual formation of episodic memories. For instance, the finding of Conway et al. (2005) that U.S. participants retrieved earlier earliest memories than all other groups might relate to the

![Figure 7](Life span retrieval curves from five countries. From Conway MA (2005) Memory and the self. J. Mem. Lang. 53(4): 594–628.)
observation that U.S. mothers undertake more memory talk with their children than mothers from other countries. Moreover, Wang and her colleagues (e.g. Wang, 2001) have found powerful cross-cultural differences in the focus and content of memories. Childhood memories from people in cultures with interdependent self-focus (Markus and Kitayama, 1991) such as China tend to be less oriented to the individual, less emotional, and more socially oriented than the childhood memories of people from cultures with independent self-focus, for example, Northern European or North American cultures (see Wang, 2001). Thus, socialization experiences and the self-focus that predominates in a culture may influence the accessibility of earliest memories and their content.

The second component of the life span retrieval curve is the period when rememberers were aged 10 to 30 years, known as the reminiscence bump (Rubin et al., 1986). The reminiscence bump is distinguished by an increase in recall of memories relative to the periods that precede and follow it. The reminiscence bump is present not just in the recall of specific autobiographical memories but also emerges in a range of different types of autobiographical knowledge. For example, the reminiscence bump has been observed in the recall of films (Sehulster, 1996), music (cf. Rubin et al., 1998), books (Larsen, 1998), and public events (Schuman et al., 1997; Holmes and Conway, 1999). Memories recalled from the period of the reminiscence bump are more accurate (Rubin et al., 1998), are judged more important than memories from other time periods, and are rated as highly likely to be included in one’s autobiography (Fitzgerald, 1988; Fromholt and Larsen, 1991, 1992; Fitzgerald, 1996; Rubin and Schulkind, 1997). The reminiscence bump is only observed in people over the age of about 35 years and some recent findings suggest that it might only be present, or is much more prominent, in memories of positive experiences (Rubin and Bernsten, 2003).

Many of the more obvious explanations of the reminiscence bump have been rejected, e.g., that the memories are of first-time experiences and that is why they are memorable, as in fact it has been found that less than 20% are typically of first-time experiences (Fitzgerald, 1988). Rubin et al. (1998) reviewed a series of potential explanations and argued in favor of an explanation in terms of novelty. According to this view, the period when people are aged 10–30 years, and especially 15–25 years, is distinguished by novel experiences, occurring during a period of rapid change that gives way to a period of stability. It is assumed that memories from the period of rapid change are more distinct than those from the period of stability and this is why they are comparatively more frequently accessed. By this account, a period of rapid change taking place at some other point in the life cycle should also lead to raised accessibility of memories from that period relative to more stable periods, and there is some evidence that this is the case (Conway and Haque, 1999). However, periods of (goal) change and experiences of novelty always involve the self and a related but alternative explanation is that the high accessibility of memories from this period (and other periods as well) may be related to their enduring relation to the self (Conway and Pleydell-Pearce, 2000). Possibly, many memories from the period of the reminiscence bump are memories of self-defining experiences (see Fitzgerald, 1988) and have a powerful effect in cohering the working self into a particular form. The novelty of reminiscence bump experiences lies in their newness and uniqueness for the self and they may play a crucial role in the final formation of a stable self system and identity formation during late adolescence and early adulthood. The raised accessibility of these memories might then serve processes relating to the coherence of self through time.

Thus, the period of the reminiscence bump might be a period in which a sole ‘I am...’ or self-image, develops into multiple ‘I am...’, e.g., I am a son, I am a student, I am a boyfriend, etc. Also, at this point multiple ‘I will becomes...’ may be formed, supported by the differentiation of ‘I am...’ and the final emergence of a complete working self goal hierarchy and conceptual self grounded in autobiographical knowledge and memories (the SMS). Finally it might be noted that older patients with schizophrenia have been found to show an early and disorganized reminiscence bump, with an impairment of conscious recollection associated with memories highly relevant to personal identity (Cuevo-Lombard et al., 2007). This suggests that a developmental failure present in schizophrenia is the consolidation of personal identity in late adolescence/early adulthood. Possibly, one of the features of the abnormal SMS associated with this is a failure or weakening of the grounding of conceptual autobiographical knowledge in episodic memories of formative experiences, further demonstrating the importance of an integrated self with self-images strongly embedded in sets of defining episodic memories.
2.46.8 Closing Section: Why Do We Have Autobiographical Memory?

In many respects this may seem a pointless or rhetorical question; after all, if we did not have autobiographical memory there would be little in the way of individuality, personality, culture, society, literature, etc. Much that differentiates humanity from other species would be absent (see Tulving, 1983). At the level of the individual, disruption to or loss of autobiographical memory leads to people who typically cannot function in society. For example, clinically depressed patients often have severely impaired autobiographical memories in which they can no longer generate specific memories, their memories lack detail, they are overly general (Williams, 1996). Such patients cannot operate in the social world and, moreover, have unspecific futures in which they cannot visualize specific plans and goals (Williams et al., 2007a). Similarly, with amnesic patients whose memory disorders arise from organic brain damage, having multiple self-images in a specific future in which goals and plans originating from memories of the past are realized is no longer possible. Thus, one good reason to have an intact and functioning autobiographical memory is that it allows the individual to have a future in which a continuous self operates.

But what does this mean? The future is, of course, a time where new experiences, some anticipated, will take place. But we cannot know we have arrived at the future without a memory — that is, without knowledge of a past. The concept of future makes no sense, conceptually or psychologically, without a past. One way to think about this is to conceive of the future as a place where new goal processing will take place and the past as some sort of record of previous episodes of goal processing. To achieve future goals it is essential to have a record of how one has progressed with the same or related goals in the past. Consider very recent goals. In order to know that one locked the car after parking it this morning, we simply remember that episode. The events of the current day can typically be recalled (on that day) at length and in highly specific detail. Thus, checking on progress with goals, locking the car, making a call, mailing a paper, etc., can be verified. However, within a few days, access to these sorts of detailed memories is lost. No doubt this is useful as retaining a highly detailed record of every action would lead to an overloaded and unworkable memory.

Nonetheless, keeping a detailed record in the short term is highly adaptive and prevents the repetition of actions and the adoption of courses of actions that have a high probability of failing.

Conway (2005) argues that episodic memory is the memory system that keeps a record of very recent goal-related activities. It is a system that has evolved highly specific memory representations that facilitate the type of short-term goal processing that can keep goals focused and environmentally relevant. It is suggested that this is a species-wide adaptation and, consequently, episodic memory is common to many species. As such it is probably a phylogenetically older memory system and may be represented in neural networks located toward the middle and posterior of the brain (a temporal-occipital network; see Conway, 2005). In contrast, humans have developed conceptual knowledge that forms complex knowledge structures that endure over long periods of time, even over a lifetime. This, it is suggested, is a more recent evolutionary development and is mediated by neural networks toward the front of the brain: fronto-temporal regions. The conceptual memory system supports long-term goal processing, for example, relationships, work projects, etc. Episodic memories that are retained become attached to conceptual knowledge and provide highly specific instances of goal processing related to the more general or generic goals of the conceptual self and self-images. Autobiographical memory then allows us to have both short- and long-term goals and to integrate these in coherent ways that facilitate goal processing in the future.

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