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11 **False Memories: What the Hell are They For?** 
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19 SUMMARY

20 Recollecting the past is often accompanied by a sense of veracity—a subjective feeling that we are
21 reencountering fragments of an episode as it occurred. Yet years of research suggest that we can be
22 surprisingly inaccurate in what we recall. People can make relatively minor memory errors such as
23 misremembering attributes of past selves and misremembering details of shocking public events. But
24 sometimes these errors are more extreme, such as experiencing illusory recollections of entire
25 childhood events that did not really happen. Why would the memory system fail us, sometimes very
26 dramatically? We examine various false memory phenomena by first considering them to be a by-
27 product of a powerful and flexible memory system. We then explore the idea that a system that is
28 capable of mentally revising the past serves a predictive function for the future. Finally, we consider
29 the possibility that false memories meet self-image and social needs. Copyright © 2009 John Wiley
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32 Recalling an event from one's personal past has a unique kind of phenomenological
33 quality—a partial re-experiencing of fragments of one's own history. Tulving (1983, 2002)
34 referred to this as *mental time travel*, the capacity to travel back in time and have a sense of
35 subjectively re-encountering the past. This quality of being transported back in time to a
36 past event likely contributes to the realism of our recollections. Yet, contrary to intuition,
37 our autobiographies are subject to reconstruction rather than remaining as intact
38 representations accurately depicting our past. Recalling an autobiographical experience
39 involves piecing together activated memorial information while at the same time making
40 inferences based on other information available to us. Biases, stereotypes and expectations
41 that act on our current thinking also act on inferences we make about mental events arising
42 from the past (Henkel & Mather, 2007; Jacoby, Kelley, & Dywan, 1989; Johnson,
43 Hashtroudi, & Lindsay, 1993; Lindsay, 2008; Ross, 1989). These cognitive acts help to
44 shape mental experiences and the conclusions we draw from them, for example, whether
45 we classify a mental event as a perception, a fantasy or a memory. These inferential
46 processes usually serve us well, leading to correct classifications of mental events. But any
47 system relying on inferences about partially available information will fail occasionally—
48 especially when those inferences are influenced by biases, stereotypes and expectations.
49 We sometimes mistake memory-based cognitions as new ideas (Brown & Murphy, 1989;
50 Stark & Perfect, 2006, see also Defeldre, 2005, for examples of cryptomnesia in real life
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settings) and sometimes misattribute products of inference, fantasy or suggestion to memory, thereby giving rise to false beliefs and false memories of our own past.

The term false memory can describe a wide variety of memory errors ranging from misremembered word lists to erroneous reports of details in stories to false memories of dramatic life events. In this paper, our emphasis is on autobiographical memory errors. These errors include misremembering minor details of past events and more dramatic departures from reality such as remembering entirely false events. More than three decades of scientific research have documented that people make a variety of autobiographical memory errors, such as misremembering what they used to be like, misremembering details of momentous events, mistakenly believing they experienced events that they did not, and, in some cases, developing full-blown false memories of events that never happened (Garry & Hayne, 2006; Schacter, 2001).

In this paper, we will first briefly summarize early research on schema-driven reconstructive processes in memory for narratives and innocuous laboratory events, and then describe various autobiographical false memory phenomena. Thereafter we turn our focus to the functions false memories serve. Our functional analysis will honour Baddeley's (1988) article calling on researchers to examine phenomena with the intention to describe, but also question—what is the phenomena for?

SCHEMATA ^{Q1} RECONSTRUCTIVE MEMORY FOR NARRATIVES AND INNOCUOUS LABORATORY EVENTS

If the study of false memory has a grandfather, it is Sir Frederick Bartlett, whose 1932 book *Remembering* had tremendous impact (see Ceci & Bruck, 1993 and Goodman, 1984, for reviews of other early scholars of memory's fallibility). In some of his research, Bartlett told Cambridge denizens a Native North American story and asked them to retell it from memory after substantial delays. Bartlett noted that retellings tended to omit unusual or illogical elements of the story, or to replace them with more familiar and sensible things (e.g. a canoe in the story might become a rowboat  the retelling). He proposed that remembering was a matter of reconstructing the past ~~based~~ largely on 'schemata', generic knowledge structures describing the expected elements and relations in particular kinds of situations. Thus we tend to remember past events in ways that conform to our general beliefs and expectations.

Bartlett's ideas about schema and reconstructive processes in remembering went through a renaissance of influence in the 1970s, as cognitive psychologists explored the dynamic interactions between knowledge, belief and memory. John Bransford and Marcia Johnson collaborated on a series of studies that showed that remembering is highly reliant on comprehension and that people are prone to 'remember' details that were not really present but that were likely to be inferred (e.g. that a man drove his car to work when the presence of a car was implied but not mentioned in a fictional story) (e.g. Bransford & Johnson, 1972; Johnson, Bransford, & Solomon, 1973). Sulin and Dooling (1974) observed that subjects often intruded details from their general knowledge about a famous person (e.g. that Helen Keller was blind) when recalling a prose passage about that person that had not mentioned those particular details. Similarly, Anderson and Pitchert (1978) found that the perspective auditors took on a story profoundly affected their memory reports of the contents of that story (e.g. those taking on the perspective of a burglar remembered more burglar-relevant details in the story), and Snyder and Uranowitz (1978) reported

evidence that stereotypes can distort subjects' recall of a story protagonist's behaviour (but see Clark & Woll, 1981, for a failure to replicate Snyder & Uranowitz, 1978, and Bellezza & Bower, 1981, for evidence that the effect of stereotype labels was mediated by biased guessing rather than false memories *per se*). Bower, Black, and Turner (1979) obtained evidence that subjects' recollections of narratives describing highly scripted events (e.g. eating in a restaurant) often include script-typical details not mentioned in the narrative. Making the same point with naturalistic scenes rather than narratives, Brewer and Treyens (1981) showed that subjects' memories of a university office tended to conform to their schema of such offices, such that they often 'remembered' expected-but-not-present objects such as books and failed to report present-but-not-expected objects such as a picnic basket. Alba and Hasher (1983) brought these and other studies of this period together in an integrative Psychological Bulletin article in which they argued that remembering entails schema-driven reconstructive processes (*cf.* Johnson & Raye, 1981).

Evidence consistent with the idea that remembering is often heavily influenced by knowledge and beliefs continued to mount through the 1980s and 1990s. For example, Bergman and Roediger (1999) reported a conceptual replication of the classic Bartlett study described above, with findings converging with Bartlett's claims. As another, more recent example, Dodson, Darragh, and Williams (2008) described new evidence that social stereotypes can distort recollections (e.g. receiving career information about a speaker led people to have illusory recollections that they had heard career-consistent information from that person). In sum, a wealth of evidence demonstrates that prior knowledge, beliefs and expectations dramatically influence reports of narratives and innocuous laboratory events.



BIASED GUESSES, KNOWN ERRORS, FALSE BELIEFS AND FALSE MEMORIES

There are a number of different routes to false reports of past autobiographical events. One major branch of false reports consists of cases in which persons say things that they know are false, what might be termed a 'Known Error' (e.g. lying to protect one's interests or complying to the demand characteristics of a study by knowingly making false reports). The mechanisms and functions of deliberate false reports are likely different from those of false memories. We note in passing, however, that in some instances intentional false reports may eventually ironically develop into false memories (Polage, 2004; Zaragoza, Payment, Ackil, Drivdahl, & Beck, 2001, see also literature on the sleeper effect; e.g. Hovland & Weiss, 1951; Kumkale & Albarracin, 2004; Pratkanis, Greenwald, Leippe, & Baumgardner, 1988).

There is another kind of false report that can arise in the absence of remembering or even believing that an event occurred: Biased Guesses. Rather than intentionally misreporting an event, in this instance, people who are unsure about a target event make their best guess about how or if the event occurred, and those guesses may be influenced by various biases (e.g. Jacoby, 1999; see also Bargh & Morsella, 2008). 'Known Errors' and 'Biased Guesses' are functionally distinct phenomena from false beliefs and memories and will not be reviewed for their function here. However we suggest that false beliefs and memories do share similar functions and they will be the focus of our functional analysis.

When people falsely report an event and believe their report, it could be because they believe it happened but have no recollection of it, whereas other times they report an event

because they have the subjective experience of remembering that event—an illusory memory. This is the false-event equivalent to Tulving's (1985) distinction between knowing and remembering. A number of researchers have emphasized the distinction between false beliefs and false memories (Hyman & Kleinknecht, 1999; Scoboria, Lynn, Hessen, & Fisco, 2007; Scoboria, Mazzoni, Irving, & Mark, 2004; Smeets, Merkelbach, Horselenberg, & Jelicic, 2005). For example, Scoboria and colleagues noted that although autobiographical beliefs and memory are likely influenced by similar factors, people can hold autobiographical beliefs without having a subjective experience of memory for an event. Similarly, Hyman and Kleinknecht noted that subjects who accept a suggested event as plausible are more likely than those who reject the event as implausible to develop false memories (see also Hart & Schooler, 2006; Pezdek, Blandon-Gitlin, Lam, Hart, & Schooler, 2006; Rubin & Berntsen, 2007).

Although belief and memory are theoretically distinct concepts and the two differ in their subjective phenomenology, functionally they likely overlap. Whether people hold a false belief about an autobiographical event or experience a compelling illusory memory, the consequences for the rememberer may be functionally similar. Within the literature on false memories it is not always clear whether responses classified as false memories indeed involved illusory recollections as opposed to false beliefs. For the purposes of this paper, we discuss these two kinds of autobiographical errors collectively—briefly reviewing three areas in which these errors have been documented: Memory for the self, memory for public events and the creation of full-blown false memories of personal events.

BIASED REMEMBERING OF OUR PAST SELVES

We do not always remember our past selves accurately—as we once were. Research suggests that people can falsely recall aspects of their past selves in line with current beliefs and expectations of who they think they once were and who they are now (Conway & Pleydell-Pearce, 2000; Lindsay & Read, 2006; Ross, 1989; see Wilson & Ross, 2003, for a review). This literature focuses on false autobiographical remembering centred around systematically miss-recalling attributes relevant to the self rather than attributes of events.

Ross (1989) emphasized the role of beliefs about self-consistency and self-change in modulating reconstructions of past selves. For example, people often falsely report their personal values and opinions as being more enduring than they really are (Goethals & Reckman, 1973; McFarland & Ross, 1987; Sharman, Garry, Jacobsen, Loftus, & Ditto, 2008). Sharman et al. (2008) examined people's memory for their attitudes towards various life-preserving medical treatments. At time 1, participants rated whether they would want treatments such as CPR or a feeding tube in the instance they fell seriously ill. At time 2, up to 1 year later, participants made the same ratings and then tried to recall their original decision. People changed approximately one quarter of their decisions at time 2. Interestingly, the majority (between 69 and 75%) of people who changed a decision at time 2 falsely remembered that their time 1 decision was consistent. Similarly, Lindsay and Read (2006) describe an unpublished study conducted in collaboration with Jonathan Schooler and Ira Hyman, in which participants re-read their 7–60-year-old diaries. Many participants expressed surprise at the content of their diaries, often in ways that emphasized beliefs about self-consistency over time. For example one participant volunteered 'I was 14 when I wrote these entries. . . I was a monarchist. I'm not now, and it's embarrassing. I thought I never was'. Another participant offered, 'I can't believe I suffered from and

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6 apparently was treated for depression—at that age! If I had been asked whether I have ever
7 been depressed, I would have said NO’.

8 Whereas people are inclined to exaggerate self-consistency in some of their attributes,
9 they are prone to exaggerate the degree of change over time in attributes they believe are
10 malleable—especially if doing so enhances their self-evaluation. More specifically, people
11 tend to mistakenly recall some attributes as having improved over time when they have not,
12 thereby misremembering their past selves in a negatively biased way (Conway & Ross,
13 1984; Wilson & Ross, 2003). As Arthur Koestler wrote, ‘One cannot help being a traitor to
14 one’s past’ (1961, p. 96, as cited in Wilson & Ross, 2003, p. 139). In one experiment
15 investigating the relationship between current and past selves, participants rated their
16 studying competency and then took part in a training exercise on study skills (Conway &
17 Ross, 1984). Following the study skills training, participants rated their competency for a
18 second time and then tried to recall their original ratings. The study program completers
19 recalled their initial competency ratings as worse than they really were—creating an
20 illusion of improvement. Similarly, Karney and Coombs (2000) found an illusion of
21 improvement in people’s assessments of their marriages. A sample of wives rated
22 emotional aspects of their marriage initially at time 1 and then again at times 2 and 3, 10
23 and 20 years later, respectively. At times 2 and 3 participants showed a negative bias when
24 recalling their prior ratings—participants recalled their ratings as worse than they really
25 were, at time 2 in particular, producing an illusion of improvement.
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28 MISREMEMBERING MOMENTOUS EVENTS

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30 Memory for emotionally laden events is also susceptible to distortion. Yet the notion of
31 vulnerability to distortion sharply contrasts with the subjective experience that typically
32 accompanies the recollection of these memories. The Challenger disaster and other
33 shocking events such as 9/11 often have a peculiar phenomenological quality—a poignant
34 memory of learning of the horrifying event. Brown and Kulik (1977) described these kinds
35 of memories as flashbulb memories; a photograph-like memory for the context and events
36 that occurred at the time the event was learnt about. Although people are unlikely to forget
37 that these events happened, research suggests that people can misremember significant
38 aspects of their flashbulb memories (e.g. Neisser & Harsch, 1992; Schmolck, Buffalo, &
39 Squire, 2000; Talarico & Rubin, 2007). Schmolck and colleagues provided examples of
40 how flashbulb memories can change over time. They documented people’s flashbulb
41 recollections of the O.J. Simpson verdict just 3 days after the event and up to 32 months
42 later. In one dramatic example of distortion one subject initially reported that ‘I was in the
43 commuter lounge at Revelle (College) and I saw it on T.V. . . .’ and the same subject,
44 32 months later, reported that ‘I first heard it while I was watching T.V. at home in my living
45 room. . . .’ (Schmolck et al., 2000, p. 41). Of course, some subjects in the Schmolck et al.
46 study did recall their flashbulbs consistently (29% at 32 months), but over time, more and
47 more people reported inconsistent details (40% had major distortions at 32 months) (*cf.*
48 Hirst et al., 2009).
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50 There is also evidence that misleading suggestions can give rise to illusory recollections
51 of pseudo-events within flashbulb memories. For example, following a 1992 accident in
52 which a jet flew into an Amsterdam apartment building, Cronbag, Wagenaar, and van
53 Koppen (1996) asked Amsterdammers if they had seen the television footage of the crash.
In one study, 55% reported that they had seen the video; in the other study, 66% made that

claim. There was no video of the accident. This suggests that individuals created their own mental images of the event from reading or hearing about it, which they later mistakenly attributed to having seen a video of the accident.

In false memories of flashbulb events, the core event (e.g. that Kennedy was shot, that a jet flew into the World Trade Center) is unlikely to be fundamentally distorted. It is the details that change. But what is the consequence of this kind of false remembering? It is mere details that have changed and in these circumstances false remembering is unlikely to have any significant impact. As discussed in the next section, when not only details are changed but also full-blown memories of events are constructed, the consequences can be life changing.

FALSE MEMORIES FOR ENTIRE EVENTS

In the early 1990s false memory research turned to a phenomenon that had severe repercussions for the rememberer—the subjective experience of recovering memories of child sexual abuse (CSA). Of particular concern was that some CSA-memory-oriented therapists advocated techniques for fostering memory recovery that critics viewed as highly suggestive. Critics argued that these memory-recovery techniques might lead some clients to construct false memories of CSA (Lindsay & Read, 1994; Loftus, 1993). When the controversy first emerged, there was ample evidence that suggestive influences could lead individuals to report false memories of peripheral details in inconsequential events (e.g. believe that they had seen a stop sign in a slide show that had really included only a yield sign), but there was room for doubt as to whether or not suggestions could lead to false memories of traumatic childhood events.

Some researchers focused on the impact of suggestive techniques such as imagination, dream interpretation and guided imagery. For example, Garry, Manning, Loftus, and Sherman (1996) were interested in whether the act of imagination could lead people to be more confident that they experienced a childhood event. At time 1, subjects rated how confident they were that they had experienced a range of childhood events (e.g. that they broke a window with their hand). At time 2, subjects imagined some events but not others and then rated their confidence in childhood events for a second time. Relative to non-imagined target items, imagination increased people's confidence that they had experienced childhood events. Other techniques that engage subjects in various forms of elaboration and suggestion such as explaining how an event might have occurred, paraphrasing details about a target event, dream interpretation and guided imagery can also lead people to be more willing to believe events happened to them in their childhood (Garry et al., 1996; Hyman & Pentland, 1996; Mazzoni, Loftus, Seitz, & Lynn, 1999; Sharman, Garry, & Beuke, 2004; Sharman, Manning, & Garry, 2005).

Although the imagination inflation research indicated that suggestive techniques can lead people to be more willing to believe events happened to them, it does not demonstrate that these techniques can lead to fully fledged false memories of entire events. More persuasive evidence for that claim comes from a number of studies employing a familial-informant false-narrative paradigm (e.g. Hyman & Billings, 1998; Hyman & Pentland, 1996; Lindsay, Hagen, Read, Wade, & Garry, 2004; Loftus & Pickrell, 1995; Pezdek, Finger, & Hodge, 1997; Porter, Yuille, & Lehman, 1999; Wade, Garry, Read, & Lindsay, 2002). In this procedure, adult participants are exposed to descriptions of true childhood events (solicited from family members) along with a description of a target false event

developed by the researchers that is presented as though it were just another one of the family descriptions. Over a number of sessions, the participant is exposed to various suggestive techniques such as encouraging lax response criteria, guided imagery exercises and reviewing childhood photographs. Lindsay et al. (2004) noted that across eight studies employing similar procedures, approximately 30% of participants were classified as having developed either partial or complete false memories of the target pseudo-event.

The rate of false-memory reports has varied widely across familial-informant false-narrative studies, likely due largely to differences in (a) the perceived plausibility of the suggested event and (b) the strength of the suggestive influences brought to bear. For example, Pezdek et al. (1997) exposed subjects to relatively weak suggestions regarding a childhood rectal enema, and found that none of their subjects met criteria for having developed a false memory of the suggested event. At the opposite extreme, Lindsay et al. (2004) used a prolonged and multifaceted suggestive procedure to foster false memories of a childhood prank, and found that 65% of participants met fairly stringent criteria for having developed a false memory of that event. Variations across studies in the criteria used to determine if subjects had developed false memories may also contribute to variability in the rates of false-memory reports (Fisico, Scoboria, Wade, & Lindsay, 2008). Together, these studies suggest that techniques ranging from imagination to more elaborate mental imagery strategies can affect people's confidence that they experienced childhood events they did not and in some cases result in entirely false memories of these events.

BUT WHAT THE HELL ARE FALSE MEMORIES FOR?

Why do we have a memory system that can lull us into error? To address this question, we consider various functions of false memories, in keeping with Baddeley's (1988) functional approach to memory. Our functional analysis covers minor errors in autobiographical memory as well as more dramatic full-blown false memories of past events. We also explore functions of both positive and negative false memories. We begin by considering the possibility that false memories are not necessarily themselves functional, but rather are by-products of a powerful and flexible memory system. We then explore the idea that a system that is capable of mentally revising the past serves a predictive function for the future—but to predict the future we must by definition alter memory (see also counterfactual thinking, Byrne, 2002). Finally, we turn to the possibility that false memories meet self-image and social needs.

False memories as a natural by-product of a flexible memory system

Even if false memories had no functional value we would still be heir to them because they are an inescapable by-product of a powerfully flexible memory system. Remembering is an inherently reconstructive, inferential process (Bartlett, 1932; Jacoby et al., 1989; Johnson et al., 1993; Ross, 1989; Whittlesea, 1993). It has to be. Many details of events are not attended to in ways that support long-term memory (e.g. as suggested by change blindness; Simons & Levin, 1998). Even details that are well attended are subsequently subject to various kinds of interference (Wixted, 2004). Thus even given ideal cues our recollections would be extremely sparse if they were restricted to direct retrieval of episodic records (even as it is, the vast majority of our experiences are never recollected; see Lindsay & Read, 2006). We suggest that the way our memory system works is adaptive and that false

memories fall out of an otherwise functional system that typically leads to more comprehensive memory for events that may not be well encoded to start off with, are poorly cued at the time of recall, and/or are susceptible to interference effects. First we describe memory as an inferential system using the source monitoring framework (SMF), then we explore the functions of a flexible and adaptive memory system.

Bartlett (1932) suggested that we retain only relatively abstract schemas that we utilise to reconstruct past events. Yet the memory system can retain exquisitely detailed and faithful records of prior processing. For example, Kolers and Roediger (1984) showed that people can display very long-term retention for typographical font transformations (see also Masson, 1986). How can we reconcile such evidence with arguments like Bartlett's?

As in connectionist models of memory (e.g. McClelland & Rumelhart, 1985), the SMF assumes that memory 'traces' (influences) are the consequence of numerous cognitive operations employed as an event is experienced (Johnson et al., 1993; Lindsay, 2008). For example, reading a word in a particular context invites a range of cognitive processes—figure/ground discrimination, perceptual identification of letter features, accessing phonological and semantic information, relating current experience to other knowledge and events, etc. These processes vary in cognitive complexity from relatively rapid, data-driven, perceptual, automatic and generic procedures (which typically yield memory records low in distinctiveness) to more temporally extended, resource-driven, conceptual, effortful and unique processes. Thus a memory trace for an event is assumed to be distributed across multiple processing systems, rather than located as a singular unit. As we discuss in more depth later on, the distributed nature of memory provides us with a more flexible memory system—allowing us to recombine, rather than search and retrieve a unitary episode (Schacter & Addis, 2007).

The SMF assumes that revival of past experiences rests on the degree of unique similarity between current cognitive processing and prior cognitive processing. Thus the revival and remembering of an autobiographical event depends in part on the cognitive operations performed at the time of the event—whether the cognitive operations employed were relatively automatic, generic, etc. (which tend to lead to less distinctive memory traces) or more effortful, unique, etc. (Gruppuso, Lindsay, & Kelley, 1997; Lindsay, 2008). This assumption follows Morris, Bransford, and Franks (1977) Transfer Appropriate Processing (TAP) principle along with Tulving's Encoding Specificity Principle (Tulving & Thomson, 1973).

Cues that are sufficiently similar yet distinct enough to revive records of a particular prior experience are unlikely to revive all aspects of that event. The different features of the event are rarely so tightly bound in memory (Chalfonte & Johnson, 1996; Lyle, Bloise, & Johnson, 2006), and cues by their nature are partial and incomplete. Thus cues are likely to revive some aspects of a particular event and not others. For example, a cue may evoke memory for spatial details of an event such as where you encountered a friend on the street without also eliciting memory for what clothes the person was wearing. Also, cues rarely uniquely revive aspects of just one to-be-remembered event. Rather, cues tend to revive memories of aspects of multiple similar or associated events, which are often difficult to distinguish between—as per Neisser's (1981) concept of repisodes (e.g. the cue 'last time you went to the dentist' may produce thoughts and images drawn from several different dental visits). In addition to event details from multiple episodes, cues typically also evoke knowledge, beliefs, thoughts, schemas and biases. Cues often call forth chords rather than single notes.

To make sense of revived information we must make inferences about the origins and sources of that information. According to the SMF, we assess various qualities of activated

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6 memorial information to make judgments about the origins of the various components of a
7 particular mental experience (Johnson et al., 1993; Johnson & Raye, 1981; Lindsay, 2008).
8 For example, people may infer that mental experiences that are particularly rich with
9 perceptual details are the result of a memory of a past experience rather than products of a
10 past fantasy. Or they may attribute recollection of an utterance that ‘sounds,’ in their mind’s
11 ear, like a particular person to that person. Such inferences are generally made quickly and
12 without conscious reflection. Yet source monitoring (SM) can also encompass more
13 complex mental operations such as reasoning. For example, people may conclude that
14 mental experiences that seem implausible or that are incongruent with their expectations
15 are the products of fantasy rather than reality.

16 Most SM attributions are accurate—mental events that have the characteristics of
17 memories usually are memories, those that have the characteristics of new ideas usually are
18 new ideas, etc. But often we experience uncertainty about particular dimensions of source
19 (e.g. did I lock the door or did I only think about locking the door), and sometimes a mental
20 event from one source will have the characteristics of a mental event from another source
21 (e.g. an unusually vivid fantasy image) leading to a SM error.

22 This sort of inferential memory system may serve multiple functions. First, making
23 attributions about revived information may lead to a subjectively more complete
24 autobiographical memory—if we did not make these inferences our autobiographies
25 would be more disjointed. Second, as we discuss in more depth later on, biases,
26 expectations and stereotypes engaged during SM provide mechanisms for self-serving
27 memory errors (see also Ross, 1989). Conversely, the same mechanisms can contribute to
28 self-undermining memory errors in individuals who suffer from psychological distress. For
29 example, Hertel, Brozovich, Joormann, and Gotlib (2006) asked controls and people with
30 generalized social phobia (GSP) to read short narratives about social encounters and then
31 generate an ending to the encounter. GSP participants were more likely to produce negative
32 endings to social narratives and when they made errors in recall, they were more likely to
33 make errors that were consistent with their negative endings. Thus biases engaged during
34 SM can also work to maintain psychological distress.

35 With such a flexible cognitive system one might expect that any ties to reality would be
36 weak. As Johnson and Sherman (1990) pointed out, however, our memory system has
37 numerous checks and balances that usually operate well and typically protect us from SM
38 errors (see also Johnson, 2006; Johnson & Raye, 1981). It is only when mental events from
39 one source have many characteristics of those from another source, and when current goals
40 encourage lax SM, that illusory memories are likely.

41 42 **Revising the past and imagining the future**

43 The function of false memories could also be approached from another level of analysis
44 and that is to ask why false memories fall out of an otherwise adaptive system—why do we
45 have the capacity to develop false memories? To address this question, it is helpful to
46 consider what our cognitive system would be like if we could not produce illusory
47 memories. Two cognitive operations that rely on a flexible memory system are imagining
48 the future and reconsidering our pasts (as in counterfactual thinking; Byrne, 2002). A
49 number of researchers have endorsed the notion that episodic memory is employed for
50 these cognitive acts (e.g. Johnson & Sherman, 1990; Neisser, 1988; Schacter & Addis,
51 2007; Tulving, 1983, 2002). There is neurological evidence for this claim. For example,
52 Addis, Wong, and Schacter (2007) showed that recalling past and imagining future events
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recruited similar neurological regions—this neurological overlap was especially apparent when participants elaborated, adding details to their constructions.

To perform these cognitive acts we must have the capacity to recombine elements of episodic and semantic memory flexibly to produce illusory episodes—whether situated in the future or past. Schacter and Addis (2007) suggested that if we could not do that, that is, if our memories were recalled only as whole factual episodes, then our ability to imagine new events and reconsider the past would be less flexible and rather limited. Having the dynamic capacity to reintegrate our recollections endows us with the mental flexibility to travel forward and backward in time. The illusory episodes we construct while reconsidering our pasts and imagining our futures can sometimes subsequently result in memory distortion. In fact, mental imagery skills have been shown to relate to people's tendency to develop false memories (e.g. Dobson & Markham, 1993; Hyman & Billings, 1998; Hyman & Pentland, 1996).

The capacity to produce and project a counterfactual past equips us with temporal flexibility in our memory system—but to what end? Many researchers have suggested that autobiographical memory serves a directive function that we can employ to guide us in current and future episodes (Bluck, 2003; Bluck, Alea, Habermas, & Rubin, 2005; Pillemer, 2001, 2003). Referring back to life experiences can guide current behaviour, for example by motivating people to attain goals relating to a past event (e.g. using a high school experience to motivate career aspirations) and other times aiding people to avoid situations that did not bode well in the past (e.g. referring to a negative event as a directive to avoid similar experiences in the future). The majority of this literature focuses on the directive function of veridical experiences; here we suggest that false autobiographical memories may have similar functions.

Using the past for direction in the present and future requires us to recombine and reconstruct memory rather than recollect intact event replays. Life events rarely occur as direct replications of prior episodes. Fortunately, a flexible memory system facilitates the application of directives more broadly—a lesson learnt in one context carrying a certain theme can be integrated into a new episode rather than only applying in one situation (see also Pillemer, 2001).

The self and social functions of false memories

We have discussed how false memories occur as a by-product of a functional memory system, but in some instances, false memories may also serve specific functions themselves. When we reconsider our own pasts, false memories seem to have systematic themes—they relate to self and social needs (see also Wilson, Gunn, & Ross, this issue).

Self-functions

Many researchers have suggested a reciprocal link between memory and identity (Conway & Pleydell-Pearce, 2000; [James](#)^{Q2}, 1890/1950; Neisser, 1988; Wilson & Ross, 2003). The memory/identity link is strikingly revealed in the effects of dysfunction in either of these constructs on the other. When people lose their memories it can disrupt their identity. For example, brain damaged individuals and those suffering from Alzheimer's disease who suffer a loss of autobiographical memory can also suffer a loss of self-identity (Addis & Tippett, 2004; Schacter, 1996; see Stuss, Rosenbaum, Malcom, Christiana, & Keenan, 2005, for a discussion of self-awareness and brain damage). Similarly, when people suffer from disorders that alter self-aspects such as mood or anxiety, their memories also show a

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6 similar dysfunction. For example, individuals suffering from depression tend to recall more
7 negative than positive memories (Bradley, Mogg, & Williams, 1995; Eich, Macaulay, &
8 Lam, 1997; Ridout, Astell, Reid, Glen, & O'Carroll, 2003; for a review see Mineka &
9 Nugent 1995; see also Hertel et al., 2008, for an example of memory distortions in GSP).

10 There is also a wealth of evidence of a memory/identity link in cognitively intact
11 individuals. As we have already mentioned, people tend to distort aspects of their pasts,
12 misreporting past self-attributes in the direction of self-enhancement. Although a negative
13 memory bias (as observed in depression) seems inherently different from self-enhancing
14 memory distortions (observed in non-depressed individuals), they may serve the function
15 of maintaining current self-identity (see also Oakes & Hyman, 2001).

16 Ross and colleagues (Ross & Wilson, 2003; Wilson & Ross, 2003) demonstrated how
17 systematic revisions of our pasts can serve our current selves. Falsely recalling our attitudes
18 as being enduring and remembering ourselves as worse than we really were in the past can
19 lead to more positive, albeit falsely grounded, evaluations of our current selves. Ross
20 (1989) suggested that people reconstruct aspects of themselves in the past by searching
21 memory utilising current-self cues while being guided by expectations about self-
22 consistency. A notion similar to that of Ross has also been discussed by Johnson and co-
23 authors (Johnson et al., 1993; Johnson & Sherman, 1990; Lindsay, 2008); that beliefs and
24 biases affect how we interpret mental events. These beliefs and biases affect all kinds of
25 memory reports (as discussed previously) but they are likely to have a unique function
26 when applied to self-oriented recollections. These systematic biases and reconstructions of
27 our own personal past appear to serve a healthy function—providing a springboard that
28 facilitates positive self-evaluation. Moreover, it may be necessary to revise our past self-
29 attributes—if our current beliefs, expectations and motivations were incompatible with our
30 autobiographies then it may result in a rather disjointed sense of self-identity.

31 It is easy to see how distortions of our pasts that make us appear better than we were, or
32 are, serve the self. But what about other distortions that would appear to be harmful to the
33 self such as false memories of CSA, what function might they serve? One way in which
34 negative false memories could serve the self is that they may provide relief in the form of a
35 diagnosis for psychological distress. It is likely that the typical person seeking
36 psychological therapy is dissatisfied with aspects of his or her psychological affairs.
37 For some clients, the possibility that they have a repressed history of CSA may serve the
38 function of explaining their problems, and perhaps allow them to externalize concerns
39 about the cause of their symptoms. Ironically, a desire to resolve psychological conflict can
40 make people more vulnerable to developing false memories in the first place. More
41 specifically, Sharman and Calacouris (in press) showed that people's motivations can make
42 them more susceptible to source misattributions (see also Sharman & Barnier, 2008).
43 Sharman and Calacouris measured participants' motivation to achieve before they
44 took part in an imagination inflation procedure similar to Garry et al. (1996), in which
45 imagining a childhood event increases subsequent ratings of the likelihood that the event
46 was experienced during childhood. They found that people's orientation towards
47 achievement was positively related to the magnitude of imagination inflation people
48 showed for false events that were themed with the notion of achievement. In a similar vein,
49 and as Sharman and Calacouris implied, patients entering CSA-memory-oriented therapy
50 particularly motivated to find an answer might be more susceptible to suggestive
51 influences.

52 As mentioned previously, although misremembering negative events seem inherently
53 different from self-enhancing memory distortions; they may serve a similar function by

maintaining current self-identity—in some instances (for particularly negative memories) resolving confusion about the self (see Oakes & Hyman, 2001).

Social functions

Comparable biases that lead to self-oriented false memories can also lead to socially oriented false memories that serve various social functions. For example, [Berntsen^{Q3}](#) (2008) emphasised that social factors play an important role in flashbulb memory phenomenon, noting that an event will have a differential impact on memory depending on social group significance (see Brown & Kulik, 1977). Similarly social factors may also contribute to the content of flashbulb memory reports (see also Berntsen & Thomsen, 2005). In other words, biases present in the media, social groups and individuals may contribute to flashbulb memory distortion (see also Hirst et al., 2009). In a recent study, Coman, Manier, and Hirst (2009) showed that discussing flashbulb memories affected what people could recall later—non-discussed aspects of their memories that were related to the conversation were less accessible than non-discussed aspects that were unrelated to the conversation. Thus recollections can be sculpted by social influences such as group membership and the dynamics of social interactions.

Socially driven distortions in memory may serve specific adaptive functions. Sharing personal memories with others in socially sensitive ways can facilitate social relationships (Alea & Bluck, 2003; Bluck et al., 2005). The role of the veracity of such reminiscences has not been emphasized in functional accounts of the social roles of remembering, perhaps because, in the context of enhancing intimacy, empathy and social relationships, accuracy may be of secondary importance (Edwards & Middleton, 1987, *cf.* (Cuc, Koppel, & Hirst, 2007).

In parallel to self-enhancing distortions discussed by Ross (1989), socially driven distortions may also facilitate positive group evaluation. Evidence of remembering in the direction of social group enhancement is evident in Lewandowsky, Stritzke, Oberauer, and Morales (2005) investigation into people's memories for the Iraq war. When queried, more American participants falsely remembered there being evidence of weapons of mass destruction than their Australian and German counterparts. Perhaps this allowed US participants to feel their country's actions were justified. It is possible that adopting beliefs about the past in line with a social group's perspective may serve to increase social relations and social group coherence—having a shared sense of reality (For a more in depth discussion see Hyman, 1994, 1999).

CONCLUSIONS

Most of the time our memory systems serve us well. Given sufficiently specific cues, we can remember vast amounts of information. Usually, mental events we experience as memories are more or less accurate echoes of past events. But this is never a matter of simply locating, retrieving and playing back a unified memory record of a moment of our histories. Rather, remembering—and especially recollecting autobiographical events—always involves the integration of multiple kinds and sources of information *via* (often unconscious) inferential processes. This is a tremendously flexible and powerful system that usually works just fine but sometimes leads to various kinds of errors, including false memories. Such errors seem to 'fall out' of basic nature of a memorial system that can guide us into the future and allow us to reconsider the past. More directly, in healthy

individuals false memories may also serve the needs of the self and a variety of social functions. It would not be much fun, we suspect, to sit around reminiscing with a person incapable of false memories.

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