



Putting the Social Back into Human Memory

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Since their initial foray into the experimental study of human memory, psychologists have been perplexed about how to come to terms with the obvious influence social interactions can have on memory. Consider the widely disparate stances taken by some of the founding figures of experimental psychology. Wundt (1912/1973), for instance, despaired at the deeply socially encrusted nature of memory and felt that psychologists could not study it, at least experimentally. He assigned the study of memory to the realm of *Volkpsychologie*. Ebbinghaus (1885/1913), on the other hand, saw a possibility for an experimental psychology of memory, made tractable, he thought, by stripping away the influence that meaning, associations, and social interactions have on memory and studying what one reviewer of his book *Memory* referred to as its “raw material.” Taking a different tack, Bartlett (1932) acknowledged the social nature of memory, but, in a move quite different from both Wundt’s and Ebbinghaus’s, insisted that psychologists both investigate memory experimentally and do so in a social context. Indeed, he thought that little would be learned about memory unless one explored it in the context in which it occurs. Finally, there was Vygotsky, who, like Bartlett, acknowledged the social – and,

in Vygotsky’s case, historical – influences on memory (Vygotsky, 1972). He focused his efforts largely on understanding how these influences mediate memorizing and remembering.

This chapter is about recent research that has begun to unravel how to study social influences on memory. This research essentially seeks to put the social back in social cognition, to use the memorable title of a book published 16 years ago (Nye & Brower, 1996). To a large extent, while acknowledging that memory is socially influenced, since the mid-1950s, with the introduction of an information-processing approach to the study of memory, psychology has mainly followed the lead of Ebbinghaus. For those espousing this approach, the place for a study of social influences seemed, at best, a side-bar affair, especially if, as Johnson-Laird (1988) admirably and boldly stated, that theories of mental processes should be expressed in forms that can be modeled in a computer program. But this modeling tool has certain limitations. Computer programs do not have social lives, and they do not, by and large, interact with each other. In some ways, they seem the wrong medium through which to model mentation. In his classic articulation of the at-the-time budding

field of cognitive psychology, Neisser (1967) assigned to cognitive psychologists the job of tracing the flow of information from input through the “information-processing machine” to output. Following the lead of philosophers advancing computational functionalism, he dismissed the importance of studying the hardware of the machine. And although he ended his book by discussing Bartlett, he did so without fully acknowledging the social concerns animating Bartlett’s exploration of memory. To be sure, social influences could be viewed as retrieval cues or embedded in the schemata out of which memories were reconstructed, but what ultimately needed to be investigated were the structures of memory, the way memories were represented “in the head,” and the processes that worked on these representations. A clear line was drawn between what was out there in the world and what took place in the mind. Psychologists, by and large, study the latter and treat the former merely as input into the system.

EXTENDED MIND AND DISTRIBUTED COGNITION

The computational functionalism driving Neisser’s manifesto for a cognitive psychology now seems quaint, for at least two reasons. First, few would claim today that the hardware does not matter. But, more importantly, by insisting that the mind *is* a Turing machine, those adopting this approach seem blind, or at least, indifferent, to the social nature of humans. People interact with each other constantly, build communities, and have long histories of traditions and rituals. Sociologists, anthropologists, and other social scientists have long recognized that one cannot take the social out of the humans (e.g., Geertz, 1973). If people did not live in a social world, then, they would argue, human intelligence, linguistic facility, and mnemonic abilities would probably not be fully manifest. From this perspective, it

seems futile to build a psychology that does not acknowledge the importance of the social. Some recent work by philosophers of cognitive science seems to agree. These philosophers argue that mind must be extended beyond the surface of the skin, viewing cognition as distributed across a network of individuals and environment rather than resting within the head of an individual person.

If external resources, such as media, cultural institutions, or social networks continuously scaffold cognition, the argument goes, then scholars cannot easily separate the individual from these resources (Clark, 2010; Hutchins, 1995; Sutton, Harris, Keil, & Barnier, 2010; Wilson, 2005). Scaffolds are as much a part of the mind as what happens inside the head.

Consider Bateson’s (1979) blind man navigating through the world with a cane. To explain the blind man’s navigation, cognitive neuroscientists might investigate cortical activity and treat any input from the outside world in terms of cortical input. Some researchers might want to go beyond an exclusive focus on cortical activity and include in their explanations the origins of cortical inputs, for instance, the activation occurring at the nerve endings of the fingers holding the cane. The configuration of these nerve endings might be important, for instance, inasmuch as different configurations might produce different patterns of cortical input. A proponent of an extended mind would ask: Why not go beyond the surface of the skin and include the cane? Unquestionably, the nature of the cane – for instance, its rigidity – is as much a factor in the blind man’s ease of navigation as the configuration of nerve endings or the processing in the cortex. There is no a priori reason to exclude the cane from explanations. For proponents of an extended mind, the most principled approach would include the cortex, the fingertips, and the cane.

In a similar way, those postulating an extended mind want to include external influence in their explanations (Wilson & Clark, 2009). Even the simple presence

of a similar other can affect (specifically increase) the accessibility of memories (Shteynberg, 2010). Consider the conversations in which remembering often takes place (Hirst & Echterhoff, 2012). Although one can, in some instances, distinguish between the retrieval of a memory and its conversion into an expression of this memory, often in the form of some type of verbal communication (Tulving, 1983), in many instances, it is impossible to separate the memory from its expression (Barnier, Sutton, Harris, & Wilson, 2008; Echterhoff & Hirst, 2012). Jane's conversation with her mother about her date might differ in content from her conversation with her girlfriend about the same date. Jane may sometimes intentionally censor what she says to her mother, but in many instances, she may simply talk to her mother in a free-flowing manner, without any sense of censoring herself. The nuances of the ending of the date may simply not come to mind because that is not what her mother is interested in or asks her about. On the other hand, details about the end of the date may figure centrally in Jane's conversation with her girlfriend. These details may be what the girlfriend is interested in and what she asks Jane about. In her conversations, Jane is simply tuning her remembering to her audience. From this perspective, what is remembered is governed by what is communicated. Remembering is, if you like, communicating.

SCHEMATA

To the extent that psychological theories incorporated social influences into their modeling, they do so mainly by building on Bartlett's discussion of *schemata*, the organized representation of knowledge. According to Bartlett, memories grow out of schemata, and social influence acts on memorizing and remembering through schemata. Bartlett illustrated this point by discussing how the Swazis, a small group of Bantu who raise

cattle, possessed extraordinary memories for past cattle auctions, even though, when tested on other material, their memory seemed to be quite ordinary. Moreover, as psychologists have repeatedly shown, these schemata do not simply buttress memories, as in the case of the Swazis, but can also distort them. In an early study, for instance, Allport and Postman (1947) showed that, after seeing a picture of a crowded subway, people will falsely remember that the black man in the picture was wielding a switch blade, when in truth it was a white man (see Figure 16.1).

Wertsch (2002, 2008) has explored the schemata that communities possess, what he calls schematic narrative templates. He is interested in the way that they shape what community members remember about their collective, historical past. Wertsch has shown through careful interviewing, for instance, that Russians often render historical episodes employing the following template: 1) Russia is peaceful and does not interfere with others; (2) A foreign enemy treacherously attacks Russia without provocation; (3) Russia is almost fully defeated as it suffers from the enemy's attempts to destroy it as a civilization; (4) Through heroism, and against all odds, Russia and its people triumph and succeed in expelling the foreign enemy, thus justifying its status as a great nation. The Russian rendering of the Napoleonic invasion and defeat, for instance, nicely reflects this template. Other nations have different templates. For instance, as Wertsch also documented, the US has several, quite different templates, for example, "the mystique of Manifest Destiny" and the "reluctant hegemon."

SOCIAL INTERACTION

Schemata no doubt provide a means of understanding, at least in part, how social influences shape memory. They do not, however, provide the theoretical tools needed to address the insights of those espousing an extended mind. Schemata safely rest within



Figure 16.1 Subway picture from Allport and Postman (1947).

the head. Those interested in the extended mind want to understand how others – and external objects – can scaffold remembering.

Sociologists have nicely articulated many of the social influences of material culture on memorizing and remembering, examining, for instance, memorials and commemorations (Olick & Robbins, 1998), or urban geography (Nora, 1992). In both instances, material artifacts – the physicality of the memorial, the parades that mark the commemoration, or the streets and buildings of the city – guide memorizing and remembering. In other instances, it is the social practices, such as the rituals of speeches and the placements of wreaths on Memorial Day, that serve as vehicles for shaping memory.

We want to focus here on an ephemeral social practice, that is, conversations about the past. We will take up the issue of social practices more generally toward the end of this chapter, but, at present, it is probably best to focus on a single, widespread means by which external influences can shape memory. Conversations are ephemeral social influences because they are gone as

soon as they happen. When broadly conceived, so that one includes one-directional exchanges as well as dialogic ones, they are undoubtedly ubiquitous. Moreover, they are unquestionably social in nature. A conversational participant's interaction with another is guided by the social conventions surrounding conversations (Grice, 1975), by the social relationships among conversational participants, and by expectations and goals negotiated by the conversational participants. Clearly, their effect on memory is worth studying. In addressing the study of conversational remembering, we want to focus on three sets of questions:

1. How does conversational remembering differ from remembering in isolation? Does one remember more, less, and in either case, how does what is remembered differ from what might be remembered in isolation?
2. What is the effect of speaking about the past in a conversation on one's own memory? We include this question because what one says is determined in large part by the audience one is addressing. Consequently, although the effect is "internal" to the speaker, it is inevitably social,

because what the speaker says is, in part, socially determined.

3. What is the effect of speaking about the past in a conversation on the memories of other conversational participants?

REMEMBERING WITHIN A CONVERSATION

Conversations are usually collaborative efforts, and, to a large extent, the remembering that occurs within a conversation can also be conceived as collaborative. To be sure, one participant in a conversation could intentionally mislead others or work to disrupt the successful retrieval of a memory, but in most instances, people work together to reconstruct the past.

Collaborative facilitation

As a collaborative effort, one might expect that more is remembered within a conversation than is remembered separately, what is often referred to as *collaborative facilitation*. And indeed, in studies contrasting the amount recalled as a group with how much people recall individually, collaborative facilitation is usually found (Meudell, Hitch, & Kirby, 2006). It obviously arises in part because not all the original material is equally memorable across participants, and hence, some of the participants may contribute to the group recounting something that would not appear in other members' recall. But there are other reasons as well.

Transactive memory

People will often divide a memory task among themselves so as to distribute the burden of memorizing and remembering, thereby forming a *transactive memory system* (Wegner, 1987). Participants often divide responsibility according to perceived expertise. Transactive memory systems can be found in close relationships, work teams, and professional relationships (see Hollingshead & Brandon,

2003). For instance, because of their use of transactive memory systems, dating couples, which presumably have exquisite knowledge about each other, exhibit better aggregate memory than do pairs of unacquainted individuals (Hollingshead, 1998). When people know that information will be accessible at a future date, they appear not to make the same effort at memorizing the material than if they feel its future accessibility is not ensured. As a result, people will have more difficulty subsequently remembering studied information if they believe it will be available on the World Wide Web than if they believe that it will be erased as soon as it is read (Sparrow, Liu, & Wegner, 2011)

Cross-cueing

One might expect that what one person in a conversation says might cue the memory of another person, thereby offering an aid to memory that would not exist when remembering in isolation. Surprisingly, such cross-cueing is not easily observed (e.g., Meudell, Hitch, & Boyle, 1995). Experimenters, however, may have failed to uncover evidence for cross-cueing because it is masked by disruptions occurring while participants collaboratively remember rather than because it does not occur (Congleton & Rajaram, 2011).

Collaborative inhibition

Just because a group may remember more than an individual would remember in isolation, it does not follow that the group will remember all that individuals in the group are capable of remembering. That is, group recounting is not the sum of the individual capacities of the group members, what is known as *collaborative inhibition*. The explanations for collaborative inhibition are many. It could, for instance, be attributed to social loafing or "free-riding." However, when personal accountability and motivation are manipulated to control for social loafing, collaborative inhibition still remains robust (Weldon, Blair, & Huebsch, 2000).

A more universally applicable explanation, the *retrieval disruption hypothesis*, asserts that collaborative inhibition occurs, at least in part, because one group member's pursuit of an effective retrieval strategy disrupts the use of retrieval strategies that may be more effective for other group members (Basden, Basden, Bryner, & Thomas, 1997). As a result, some group members may not be able to undertake their most effective retrieval strategy. In such an instance, they may recall less during the group recounting than they would if recalling by themselves.

Tests of retrieval disruption often contrast conditions in which the organizational representation of the to-be-remembered material is more or less likely to be shared across group members. The more organizational representations differ across participants, the more likely it is that different retrieval strategies will be effective for different participants, and, consequently, the more collaborative inhibition. On the other hand, with similar organizational representations across group members, collaborative inhibition should be diminished or disappear. When Finlay, Hitch, and Meudell (2000) ensured that the organizational structure was similar across group members, they failed to observe collaborative inhibition. Building on similar lines of reasoning, one would expect, and finds, that the size of the group matters (Basden, Basden, & Henry, 2000). Members of large groups are more likely to have diverse mnemonic representations than members of small groups. Moreover, groups of familiar individuals should be and are less likely to exhibit collaborative inhibition when recounting as a group than are unrelated individuals (e.g., Andersson, 2001). In addition, same-group members should be more likely to have similar mnemonic representations than different-group members. Finally, Meade, Nokes, and Morrow (2009) contrasted collaborative remembering of scenarios involving the navigation of planes. Non-expert pilots exhibited the standard collaborative inhibition, whereas expert pilots recalling with other expert pilots produced a

group recall score that was actually greater than the nominal score. Presumably, the expert pilots shared the same organization and knowledge about flying.

Selective remembering in a group recounting can also occur because group members are more likely to recollect aloud shared memories than unshared memories (Stasser & Titus, 1987). In order to document this information sampling bias, Stasser, Wittenbaum, and their colleagues taught participants about a political candidate and then assembled small groups to discuss with each other what they knew about the candidate. Whereas all participants in the group knew certain facts about the candidate, each participant also knew several unique facts, that is, facts that only they knew. Participants in the group recounting were more likely to fail to recall their uniquely held memories than their shared ones (for a review, see Wittenbaum & Park, 2001). As Stasser and colleagues reasoned (see Stasser & Titus, 1987), a group will fail to discuss an item only if all members fail to mention it. As a result, when memories are shared, there is a greater probability that they will be mentioned by at least one group member than when they are uniquely held (see Wittenbaum, Hollingshead, & Botero, 2004, for a review of alternative explanations).

Finally, selective remembering can arise because of audience tuning. Marsh (2007) has distinguished recalling from retelling. In a standard, laboratory-based recall experiment, participants are explicitly told to remember all that they can remember as accurately as possible. Marsh reserved the term *recall* for this activity. In everyday life, however, people may simply wish to retell a story about the past, without trying to be either accurate or complete. This *retelling* can be shaped by conversational goals. For instance, recollections for which the goal is to entertain contain fewer story events and more intrusions than factual retellings (Dudukovic, Marsh, & Tversky, 2004). Moreover, the entertaining stories are less accurate, more likely to be told in the present tense, contain more emotion words and fewer

disfluencies (e.g., uhs) than factual retellings (Pasupathi, Stallworth, & Murdoch, 1998). It has also been shown that speakers conveyed more, particularly more novel and more elaborated, information to an attentive as opposed to a distracted listener (Pasupathi et al., 1998). Moreover, people will recount more details, such as everything involved in a trip to the doctors, when talking to a hypothetical Martian, who presumably knows little about how things work on Earth, than when talking to a peer, who presumably knows a lot more (Vandierendonck & Van Damme, 1988). Furthermore, a story told to peers contains more interpretations about the content of the story than if told to an experimenter, when participants largely stuck to the “facts” (Hyman, 1994). There is also experimental work establishing that when helping another identify a specific person among a group of individuals, people will emphasize the target’s positive qualities if they know the listener likes the target, and the target’s negative qualities if they know the speaker dislikes the target (Echterhoff, Higgins, & Levine, 2009; also see the chapter by Fisher, Schreiber Compo, Rivard, & Hirn, Chapter 31, this volume, on cognitive interviewing, which can serve as a means of overcoming the selectivity of remembering).

THE EFFECT OF SPEAKER ON SPEAKER’S MEMORY

Saying-is-believing effect

The way speakers tune to their audience can reshape the speakers’ memory, a change known as *saying-is-believing* effect (Higgins & Rholes, 1978; for a review, see Echterhoff et al., 2009). In studies of this effect, participants are presented with a story in which a character is described in ambiguous terms (“Donald uses coupons, buys things on sale, avoids donating money or lending money to friends.” Donald could, therefore,

be labeled as either “thrifty” or “stingy”). Subsequently, they are told to describe Donald to an audience that either likes or dislikes him. The results reveal that participants described Donald as “thrifty” to the favorable audience and as “stingy” to the unfavorable audience. Importantly, in a final recall test, where participants are told to recall the *initial* description, they remember the character in a manner consistent with the tuned message. The participants will come to remember what they said to their audience rather than what they originally learned about Donald (Echterhoff et al., 2009).

An important facilitating factor for this memory bias is whether participants are motivated to create a *shared reality* with the audience. By shared reality scholars refer to the experienced commonality between one’s own and others’ representations and evaluations of the world (Echterhoff et al., 2009). To explore the relation between shared reality and the saying-is-believing effect, Echterhoff, Higgins, Kopietz, and Groll (2008) asked German participants to describe the target person to a Turkish audience (a minority out-group in Germany) or to a German audience. Both the Turkish audience and the German audience either liked the target or disliked him. Participants tuned their message to both the Turkish audience and to their German audience, thereby exhibiting audience tuning irrespective of the composition of the audience. However, whereas the Germans’ tuning to the German audience restructured their memory, as measured in the final recall, no such restructuring was observed for the Turkish audience. A key difference between the two conditions was in the motive underlying audience tuning: on the one hand, participants wanted to create a shared reality with a German in-group audience, while on the other hand they were complying with (politeness) norms with the Turkish out-group audience. This motivation is what created the conditions for the saying-is-believing effect in the German-audience condition.

Within individual retrieval induced forgetting (WIRIF)

Extant research has established that the act of retrieval – as when a speaker recounts to an audience a past event – not only strengthens the retrieved memories, but, in certain conditions, also results in the induced forgetting of related, but unmentioned, memories (for a review see, Anderson & Levy, 2009). In studies using this paradigm, participants are first asked to study category-exemplar pairs (e.g., fruit–apple, fruit–orange, clothes–dress, clothes–pants). Next, they receive selective practice through a stem completion task for half of the items from half of the categories (e.g., clothes–d_____). Finally, in a cued recall task, the participants are asked to remember the initially presented word pairs. The retrieval practice phase creates three conditions: Rp+, items that receive retrieval practice (e.g., clothes–dress); Rp–, items that are not practiced, but are related to those practiced (e.g., clothes–pants); and Nrp, items that are not practiced, nor are they related to the practiced items (e.g. fruit–apple, fruit–orange). A practice effect occurs when Rp+ items are remembered better than Nrp items, whereas induced forgetting occurs when the recall proportion of Rp– items is smaller than that of Nrp items. The mechanism putatively responsible for the induced forgetting effect is inhibition: as one attempts to retrieve an item from memory, related items compete for activation, which triggers the inhibitory processes that result in subsequent forgetting of the competitor items (Anderson & Levy, 2009). To the extent that the rememberer in this paradigm can be considered a speaker, the research suggests that selective remembering can induce forgetting for unmentioned items related to what is remembered. Indeed, in studies in which the selective practice takes the form of a speaker selectively remembering within a conversation, retrieval induced forgetting (RIF) is clearly observed (Cuc, Koppel, & Hirst, 2007). Here the person remembering in the conversation can be viewed as a speaker,

the one producing a recollection. Others in the conversation are listeners, attending to the speaker remembering. To be sure, as time passes in a conversation, a speaker can become a listener and vice versa. However, the utterance of an individual across the conversation can be viewed as tapping the effect of speakers on their own memory. The selective remembering of a participant in a conversation produces RIF to levels similar to or greater than what is found in more controlled studies (Cuc et al., 2007).

THE EFFECT OF SPEAKER ON LISTENER'S MEMORY

Social contagion

The extensive work on the postevent misinformation effect clearly demonstrates that speakers can implant memories into listeners, a phenomenon also known as *social contagion* (Loftus, 1979). In one set of experiments exploring social contagion, two participants study different versions of a story so that each version contains “misleading information,” at least as far as the other participant is concerned. In the experimental condition, the two participants jointly remember the story in a conversation, while in the control condition, each participant remembers the story by herself. Finally, in both conditions, a final recognition or recall phase follows. Participants often falsely recognize the misleading information recounted by their conversational partner. One participant, in this case, the person speaking the misleading information “contaminates” the other’s memory. These findings have been replicated with different types of stimulus materials: stories (Loftus & Palmer, 1976), pictures (Wright, Self, & Justice., 2000), and videos (Gabbert, Memon, & Allan, 2003). The possibility of social contagion is particularly worrisome in situations where false memories have serious consequences, such as eyewitness testimony (Loftus, 1993).

Social contagion is commonly explored in situations when the information that the participants study is slightly different. In this way, establishing influence is straightforward: if an item uniquely presented to participant A emerges in the conversation, and further in participant B's recollection, then social contagion is said to occur. However, this class of situations does not take into account the fact that social contagion might take more nuanced forms. For example, when groups of individuals are exposed to the same event, each individual might form slightly different memories of the event. Could communicating with one another about the event result in a shared representation among the group members? Investigating already established groups (families of four members), Cuc, Manier, Ozuru, and Hirst (2006) found that joint remembering increased the overlap between the group members' memories of a story relative to a control condition. More importantly, the emerging mnemonic consensus was shaped by the dominant narrator – the family member who introduced the most units of information in the conversation. The dominant narrator need not be perceived as an expert in order for him or her to influence this shared representation of the past (Brown, Coman, & Hirst, 2009).

Socially shared retrieval-induced forgetting (SSRIF)

In the section discussing the influence a speaker can have on the speakers' memories, we reviewed evidence that selective remembering in a conversation leads to induced forgetting for the speaker. Does it also induce forgetting in the listener? Given what a speaker says, we can classify memories as Rp+ (stated by the speaker and attended to by the listener), Rp- (not mentioned by the speaker; for speaker, related to what she said; for listener, related to what the speaker said, but not to anything the listener said) and Nrp (not mentioned and unrelated to what anyone said; see Coman, Manier, &

Hirst, 2009 for a more detailed classification). Will we find that listeners remember Rp- items worse than the Nrp items, a pattern Cuc et al. (2007) referred to as *socially shared retrieval-induced forgetting (SSRIF)*? A large number of studies have found just this pattern (for a review see Stone, Coman, Brown, Koppel, & Hirst, 2012). Cuc et al. (2007) argued that it emerges because listeners concurrently, but covertly, retrieve with the speaker. This concurrent, covert retrieval creates the conditions for Listeners to experience similar retrieval-induced forgetting as the speakers.

In support of this claim, Cuc et al. (2007) found SSRIF when listeners monitored the speaker for accuracy, but not when they monitored for the fluidity with which the speaker recollected. The former presumably requires concurrent retrieval, whereas the latter may not. Following a similar line of reasoning, Koppel, Wohl, Meksin, and Hirst (2012) showed that SSRIF was reduced when listeners perceived a speaker as an expert rather than a poorly prepared non-expert, arguing that the listener trusts the expert and hence is inclined not to make the effort to monitor for accuracy. Koppel et al. (2012) also showed the reverse effect, that is, more SSRIF when listeners were warned that the speaker was untrustworthy (e.g., possessing a "hidden agenda"). Now listeners should be inclined to monitor for accuracy. Koppel et al. (2012) also assessed social contagion, studying both RIF and social contagion as within subject factors. They replicated the finding that social contagion increases if the source of the contagion is viewed as an expert (e.g., Brown, Coman, & Hirst, 2009; Dodd & Bradshaw, 1980) and decreases when warned against (Echterhoff, Hirst, & Hussy, 2005; Echterhoff, Groll, & Hirst, 2007). The argument is that when a speaker is trusted, listeners do not make the effort to monitor for the source of a memory, and hence are susceptible to social contagion. When a speaker is not trusted, listeners will make the effort, thereby limiting social contagion. These findings speak to the complexity

and impact of social influences on people’s memory: With perceived expertise, social contagion increased, while SSRIF decreased. With a warning, social contagion decreased, while SSRIF increased.

Both WIRIF and SSRIF can be found for a wide range of stimulus materials and situations, including critical elements of a story (Stone, Barnier, Sutton, & Hirst, 2010), scientific material (Koppel et al., 2013), emotional material (Barnier, Hung, & Conway, 2004; Coman, Manier, & Hirst, 2009;) and autobiographical memories (Coman, Manier, & Hirst, 2009; Stone, Barnier, Sutton, & Hirst, 2012). Laboratories other than Hirst’s have also reported SSRIF (Barber & Mather, 2012).

individuals remember and forget. At a larger social level, the repeated conversation could lead to a convergence among interacting individuals on a shared representation of the past.

Employing a social-interactionist methodology, Coman and Hirst (2012) examined how practice effects and RIF propagate through a small sequence of social interactions. They investigated how listening to a lecture on the legalization of euthanasia reshapes memories of learned material and whether the influence of the lecture propagates into a conversation and then through the conversation to a final recall test. In the experiment (see Figure 16.2), after an initial attitude assessment, participants studied arguments for and against legalization of euthanasia, which were grouped into categories, such as, for instance, scientific implications or legal implications (Study phase). Two arguments in each category were in favor of legalization, while the other two were against legalization. In a slideshow presentation, participants were then exposed to a person arguing for legalization of euthanasia, offering half of the arguments from half of the categories presented during the study phase (Person-Pro Practice Phase; all practiced arguments were in favor

MEMORY PROPAGATION: PRACTICE EFFECTS AND INDUCED FORGETTING

Conversations that people have with one another are rarely confined to a single exchange, at a specific time and place. In the real world, people experience an event and then repeatedly talk about the event with others. At an individual level, these repeated interactions will fundamentally shape what

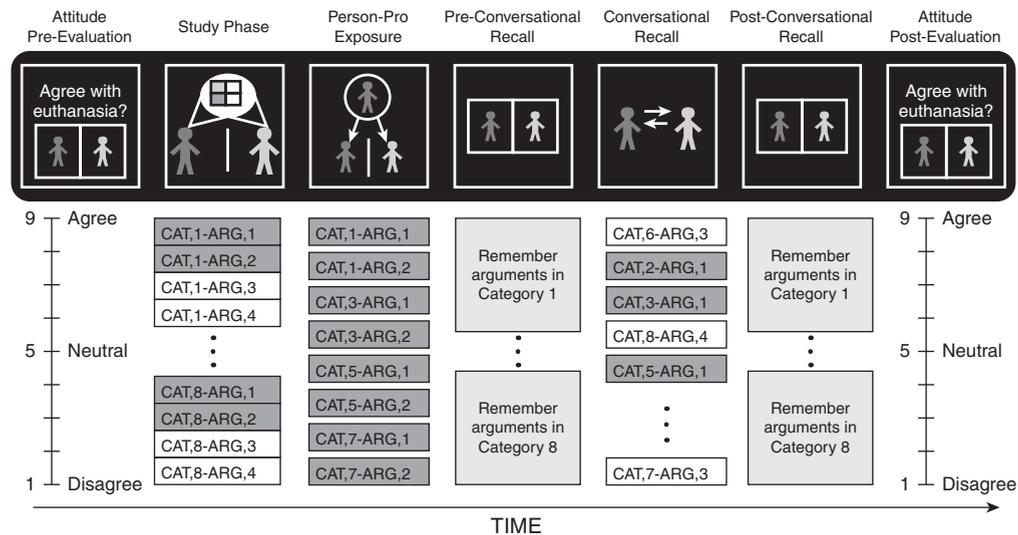


Figure 16.2 Phases of the experimental procedure in Coman and Hirst (2012).

of euthanasia). This selective presentation created the three conditions necessary to observe induced forgetting (Rp+, Rp-, and Nrp). A cued recall test then followed (Pre-conversational recall). Two participants were then paired and asked to recount the arguments they had studied in the Study phase (Conversational Recall phase). The pairs were made up so that participants had either similar attitudes toward the legalization of euthanasia (pro-pro, anti-anti), or dissimilar ones (pro-anti). Subsequent to the conversation, the participants received a final recall test (Post-conversational Recall) and a final attitude assessment.

By following the practice effects and induced forgetting effects triggered by Person-Pro in the pre-conversational recall, conversational recall, and post-conversational recall, Coman and Hirst sought to understand whether the effect of Person-Pro propagated through this small sequence of interactions. The results revealed some interesting findings, chief amongst which were:

- 1 Practice effects and SSRIF can occur even for a one-directional interaction, such as a Powerpoint presentation, in that Person-Pro induced forgetting as assessed in participants' pre-conversational recall, regardless of participants' attitudes toward the legalization of euthanasia; 2 The practice effects and SSRIF induced by Person-Pro propagated in subsequent conversations between similar (but not dissimilar) others and, through the conversation, influenced what was subsequently remembered in the final memory test; and
- 2 Practice effects and SSRIF led to increased mnemonic convergence between the two participants' memories, as assessed by the overlap in their memories in the Post-conversational recall relative to the Pre-conversational recall.

Coman and Hirst (2012) examined a small sequence of social interactions between two people, but as mentioned earlier, our social worlds involve much more complex interactions. Coman, Kolling, Lewis, and Hirst (2012) extended these empirical findings to large networks of individuals with multiple

interactions by using agent-based simulations (Axelrod, 1997; Epstein, 2006). This class of computer simulations is based on the idea that macro-scale complex dynamics could be understood as emergent phenomena that grow out of small-scale local interactions among autonomous agents. The simulation is designed to model artificial societies composed of agents that correspond to human societies composed of individuals. The model requires the specification of: (1) agent characteristics (e.g., agent's memory, and attitudes); (2) agent's interactions (e.g., networks of conversations among agents); and (3) interaction outcomes, (e.g., how agents influence one another following communication between them). Subsequent to the specification of these features, agents are allowed to interact with one another with the purpose of understanding the emergent properties of the system. For example, by employing Agent-Based Simulations (ABM), one could understand the emergence of collective violence (Lim, Metzler, & Bar-Yam, 2007; Epstein, 2006) and propagation of information (Watts, 2004). Following this methodology, Coman et al.'s strategy was to extract the principles observed in their empirical data (Coman & Hirst, 2012) and to implement these principles in ABMs.

With this in mind, Coman et al. (2012) built an ABM in which a large network of agents first "studied" material and "encoded" it in memory, then listened to Person-Pro's arguments and then "communicated" to one another repeatedly. The study phase set the level of initial activation for the agent's memory. Based on the empirical data described above, this study phase did not lead to a similar representation across agents. Coman et al. then explored whether the conditions under which subsequent agent interactions produced convergence. Interaction, either with Person-Pro or with other agents, increased the activation for items recalled during the interaction and decreased activation for other items, with a greater decrease for those more closely related to recalled items. This differential decrease captured

the induced forgetting effect. Coman et al. based activation updates on values obtained in their empirical study (Coman & Hirst, 2012). Simulations found that 1) community size and number of conversations among agents impact convergence, such that smaller networks reach greater convergence with fewer conversations compared with larger networks, and 2) the conversational network structure influences the degree of convergence, with denser networks reaching convergence faster than less dense ones (Coman et al., 2012). This framework is the first that we know of in which psychologically grounded memory models are implemented in ABMs to explore the dynamics of knowledge diffusion, with the goal of understanding the significant parameters driving the formation of shared representations.

Collective memory

Although we have so far framed our discussion in terms of the effect of communication on memory, we could easily have framed it in terms of the formation and maintenance of collective memory. Since Halbwachs (1950), the study of collective memory has mainly been undertaken by sociologists, historians, political scientists, and anthropologists. Their interest is understandable, since, just as autobiographical memories can ground individual identity, so can collective memories serve as the foundation of the identity of a community, be it as small as a couple or as large as a nation. A major reason why psychologists have rarely figured in the discussion is that social scientists, such as sociologists, tend to be interested in the way society promotes and maintains collective memory, whereas psychologists are interested in the individual mechanisms underlying the formation and promotion of collective memories (see Hirst & Manier, 2008; Olick & Robbins, 1998). This difference in emphasis can lead to different definitions of collective memories: They are either the sociologically oriented “patterns of

publicly available symbols” (Olick & Robbins, 1998) or the psychologically oriented “memories shared across individuals in a community” (Hirst & Manier, 2008). Only recently have the two different perspectives attempted to find a common ground (DiMaggio, 1997; Sutton et al., 2010; see Hirst & Fineberg, 2012, for an application to Belgian collective memory).

The literature we have reviewed so far indicates that practice effects, social contagion, and retrieval-induced forgetting all have the ability to shape not just individual memory, but to promote convergence across individuals onto a shared representation of the past. They act on both speaker and listener in similar ways, and as a result, shape the memories of speaker and listener in similar ways. Social contagion, for instance, implants a memory held by the speaker into the listener, thereby producing a shared memory. And retrieval-induced forgetting leads both speaker and listener to forget in particular the unmentioned memories that are closely related to memories that have been recalled.

Practice effects, social contagion, and retrieval-induced forgetting, then, may be representative of the cognitive mechanisms underlying the formation of a collective memory. These claims about the formation of collective memory, of course, begin at the micro-level, with the individual processes governing individual memory performance. Through the interplay among practice effects, social contagion, and retrieval-induced forgetting, socially interacting individuals come to share their renderings of the past. But what about macro-level discussions of collective memory? Social scientists have, of course, had a great deal to say about the characteristics of, for instance, national collective memories, or historical memories. To the extent that psychology is employed to characterize collective memory, the effort usually borrows from the psychodynamic lexicon. Thus, there are extensive discussions about how societies “repress” past traumas (e.g., Caruth, 1996). The use of cognitive

vocabulary is much more limited. Cognitive psychologists, nevertheless, have made some efforts to characterize collective memory at a macro-level. Let us provide three examples.

Generation effects

As Mannheim (1952) noted in his studies of the sociology of knowledge, each generation possesses a distinctive set of memories particular to that generation. That is not to say that other generations might not have similar memories, but the memories of one generation are more accessible to members for that generation than they are to members of other generations. Schuman and Scott (1989) provided a rigorous methodology for specifying generational memories. They asked participants to list the three most important historical memories in, for instance, the last 50 years. Different generations provided different memories, with each generation providing memories, in the main, of public events that figured in late adolescence or early adult life. For instance, those in their late teens or early twenties during the Korean War tended to list it in their top three, while younger and older participants tended not to. Similarly, for those in their late teens and early twenties during the late 1960s and early 1970s, the Vietnam War figured centrally. On the other hand, it should be stressed that some memories of public events reach across generations, e.g., World War II (Koppel et al., 2013). Why some memories are generationally specific, while others are not remains unclear at present.

As to the generationally specific memory, a number of cognitive explanations exist. By and large, they build on the cognitive explanations offered for the reminiscence bump (Rathbone, Moulin, & Conway, 2008). This is a similar phenomenon to the generation effect, but deals with autobiographical memories rather than memories of public events. Thus, if asked to say the first autobiographical memory that comes to mind when given a word to free-associate from, people will tend to remember events from their late adolescence and early adulthood: their first day at college, their wedding, their

graduation from high school. Some researchers claim that these autobiographical events are encoded in a more robust, detailed, or elaborate manner, perhaps because they are distinctive or important for identity development. Similarly, Belli (1998) has argued that public events during this time are better and more elaborately encoded, for similar reasons, and hence figure more centrally in any list of “important public events.” However, in a study of event memories of the terrorist attack of September 11, 2001, Meksin and Hirst (2005) reported that those who were in their late adolescence or early adulthood actually had worse memories for the event itself (e.g., the names of the airlines involved) one week, 11 months, and 35 months after the attack than did respondents over 35 years of age. These results suggest that the memory held by the younger generation may have changed over time in a manner that allows them to go from being less memorable to being more memorable, less accessible to more accessible. The generality of this pattern is difficult to determine, however, inasmuch as it has only been examined in the context of 9/11.

Dating public memories

People will often date events in their private lives using public events as landmarks (e.g. “I went to Europe before the war broke out.”) Brown et al. (2009) have explored this phenomenon by first asking participants to recall a specific autobiographical memory that words such as *automobile*, *ball*, and *river* brought to mind. They then asked participants to date the event (day and year) and to verbalize their thoughts as they were completing the task. Brown et al. coded these protocols as to whether they referred to personal events (e.g., “around when I got married”), to historical events (e.g., “after the war”), or to pop, sports, or cultural events (e.g., “after the Horowitz Carnegie Hall concert”). If autobiographical events were dated by referring to historical events, Brown et al. said that participants were “living in history.” Despite testing participants from many

countries, they observed “living in history” in only two of their samples: Bosnians and Turks living in Izmir, following a terrible earthquake. People seem only to employ historical events as temporal landmarks for autobiographical memories when the events are disruptive to daily life. Even something as significant as the terrorist attack of September 11 did not serve as a temporal landmark for New Yorkers. Personal and public timelines did not intersect in most instances.

Flashbulb memories

Brown et al.’s (2009) research focuses on dating events on a timeline. But there is a class of events where the public and private do appear to intersect, if not when dating an event, then at least in terms of the connection people feel to the public event. The terrorist attack of 9/11 is one of these, but there are a host of others: the assassination of John F. Kennedy, the death of Princess Diana, the resignation of Margaret Thatcher (see Brown & Kulik, 1977; Kvavilashvili, Mirani, Schlagman, & Kornbrot, 2003; Hirst et al., 2009). These are public events, but people remember vividly and confidently the circumstances in which they learned of the event, the latter often referred to as *flashbulb memories*. Flashbulb memories are not formed for all public events of consequence. We dare say that few Americans have flashbulb memories of learning of the nomination of Samuel Alito for a Justice of the Supreme Court, but his appointment will have long and dramatic consequences. Nevertheless, for some public events – the characteristics of which are only beginning to be determined – the private and the public intersects (e.g., Luminet & Curci, 2009).

Although early studies of flashbulb memories focused on the characteristics and accuracy of the autobiographical memories formed of reception events, more recent studies have turned to memory for the events themselves. What are the memories participants have of the event? If there is a consensual memory, then the study of the memory of these events becomes the study of the

formation of collective memories. Are these memories accurate? What do people remember about these events? How can we predict what they would remember?

Although the study of memory for public events is in its infancy, one clear observation is emerging. Although these events are usually of extraordinary historical importance, they are not remembered accurately – and what is remembered reflects the social practices surrounding the event more than anything intrinsically memorable about the event. Consider the terrorist attack of 9/11. In a three-year follow-up study, Hirst et al. (2009) found that participants from across the United States showed a dramatic decline in event memory from the first week after the attack to 11 and 35 months after the attack. After a week, participants answered questions about the facts of 9/11 accurately 88 percent of the time, on average, but only 77 percent of the time after 11 months. Performance did not decline between 11 and 35 months.

What people remembered reflected how the event was told through public media. Participants remembered the number of planes and the crash sites, details of the attack that appear in almost every rendering of the story. They failed to remember the names of the airlines and the location of President Bush, things often not mentioned in accounts of the attack. For instance, the extensive Wikipedia account of the “September 11 attacks” does not mention that Bush was in Florida at the time of the attacks (http://en.wikipedia.org/wiki/September_11_attacks). Moreover, whereas many written summaries of the event will name the flights, in order to avoid confusion and keep the various planes involved distinct, brief summaries do not. Accounts designed for children clearly state that there were four planes and that the planes crashed into the World Trade Center, the Pentagon, and “a field,” but no mention is made of the airlines names (nor the location of the President; see, for instance, www.classbrain.com/artfree/publish/cat_index_17.shtml).

There is a close correspondence between how much the media covers a public event and how well it is remembered. As we noted, memory for the facts of 9/11 seemed to asymptote after 11 months: Memories *generally* did not get better, but they also did not get worse. This pattern is in marked contrast to the pattern of forgetting observed for the facts about the Challenger explosion. Bohannon and Symons (1992) reported that memory here tended to decline steadily over a three-year period. Hirst et al. (2009) contrasted the rate of forgetting of the facts of these two events with the coverage of the events, as tracked by Lexus/Nexus. A decline in press coverage nicely predicts the rate of forgetting.

A clear example of the effect of media is what Hirst et al. (2009) dubbed the *Michael Moore effect*. In Moore's film about the terrorist attack, *Fahrenheit 911*, Bush was shown sitting in a Florida elementary school classroom reading to the attendant students *My Pet Goat*, despite having been told of the attack by an aide. In the Hirst et al. survey, memory for Bush's location went from 60 percent accuracy after 11 months to 91 percent after 35 months for those who saw the film.

These observations nicely illustrate why one must view memory as "extending beyond the surface of the skin," as we suggested it must be in the introduction to this chapter. What people remember about public events, such as 9/11, appears to have less to do with the events' intrinsic characteristics, such as their emotional salience, but the social practices governing whether a memory will be continually rehearsed. As a consequence, what people remember is as much a reflection of what happens in the world as it is about internal mechanisms.

CONCLUSION

We began this chapter by asking how psychologists should study social influences of memory: Resign themselves to the complexity

of the topic and avoid studying them, control for them, or investigate them head on? The chapter could be viewed as an argument for studying them "head on." Indeed, it has strongly asserted that without understanding social influences we will never understand why people remember what they do, why people come to share similar renderings of the past, and why human memory possesses the flaws that undoubtedly characterize it. These so-called flaws can take on different meaning when they are viewed as means of promoting collective memories. A number of evolutionary psychologists have stressed how human behavior and cognition, such as their complex syntax (Hurford, 2011) and their high level of intelligence (Humphrey, 1976), have been shaped by the need of humans to adapt to complex social situations. The contribution of practice effects, social contagion, and induced forgetting in promoting the formation of collective memory suggests that we might add memory to this list of social adaptations (see Hirst, 2010; Hirst & Brown, 2012): The mechanisms of human memory are exquisitely tuned to social influences so that others can shape and reshape memories in a way that promotes the formation of collective memories. Individual memory, of course, does not have to work this way. Computer memories, for instance, do not have this characteristic flexibility. Yet the seeming flaws of memory – what makes computers seem superior to many of us – are just those facets of memory that allow for the formation and maintenance of collective memories (Hirst & Echterhoff, 2012). Only by focusing on the social aspects of memory could one begin to understand the virtues of mnemonic flaws.

REFERENCES

- Allport, G.W. & Postman, L. (1947). *The psychology of rumor*. New York: Henry Holt.
- Anderson, M. C. & Levy, B. J. (2007). Theoretical issues in inhibition: Insights from research on human

- memory. In D. S. Gorfein and C. M. MacLeod (Eds.), *Inhibition in cognition* (pp. 81–102). Washington, DC: American Psychological Association.
- Anderson, M. C. & Spellman, B. A. (1995). On the status of inhibitory mechanisms in cognition: Memory retrieval as a model case. *Psychological Review*, *102*, 68–100.
- Andersson, J. (2001). Net effect of memory collaboration: How is collaboration affected by factors such as friendship, gender, and age? *Scandinavian Journal of Psychology*, *42*, 367–375.
- Axelrod, R. (1997). *The complexity of cooperation: Agent-based models of competition and collaboration*. Princeton, NJ: Princeton University Press.
- Barber, S. J. & Mather, M. (2012). Forgetting in context: The effects of age, emotion, and social factors on retrieval induced forgetting. *Memory & Cognition*, *40*, 874–888.
- Barnier, A. J., Hung, L., & Conway, M. A. (2004). Retrieval-induced forgetting of emotional and unemotional autobiographical memories. *Cognition & Emotion*, *18*, 457–477.
- Barnier, A. J., Sutton, J., Harris, C. B., & Wilson, R. A. (2008). A conceptual and empirical framework for the social distribution of cognition: The case of memory. *Cognitive Systems Research*, *9*, 33–51.
- Bartlett, F. (1932). *Remembering: A study in experimental and social psychology*. New York: Cambridge University Press.
- Basden, B. H., Basden, D. R., Bryner, S., & Thomas, R. L. III. (1997). A comparison of group and individual remembering: Does collaboration disrupt retrieval strategies? *Journal of Experimental Psychology: Learning, Memory & Cognition*, *23*, 1176–1189.
- Basden, B. H., Basden, D. R., & Henry, S. (2000). Cost and benefits of collaborative remembering. *Applied Cognitive Psychology*, *14*, 497–507.
- Bateson, G. (1979). *Mind and nature: A necessary unity (Advances in systems theory, complexity, and the human sciences)*. New Jersey, NJ: Hampton Press.
- Belli, R. F. (1998). The structure of autobiographical memory and the event history calendar: Potential improvements in the quality of retrospective reports in surveys. *Memory*, *6*, 383–406.
- Block, N. & Fodor, J. (1972). What psychological states are not. *Philosophical Review*, *81*(2), 159–181.
- Bohannon, J. N. & Symons, V. L. (1992). Flashbulb memories: Confidence, consistency, and quantity. In E. Winograd and U. Neisser (Eds.), *Affect and accuracy in recall: Studies of "flashbulb" memories* (pp. 65–91). New York: Cambridge University Press.
- Brown, A. D., Coman, A., & Hirst, W. (2009). The role of narratorship and expertise in social remembering. *Social Psychology*, *40*, 113–129.
- Brown, N. R., Lee, P. J., Krsiak, M., Conrad, F. G., Havelka, J., & Reddon, J. R. (2009). Living in history: How war, terrorism, and natural disaster affect the organization of autobiographical memory. *Psychological Science*, *20*, 399–405.
- Brown, R. & Kulik, J. (1977). "Flashbulb memories". *Cognition*, *5*(1), 73–99.
- Caruth, C. (1996). *Unexplained experience: Trauma, narrative, and history*. Baltimore, MD: Johns Hopkins University Press.
- Casasanto, D. (2009). Embodiment of abstract concepts: Good and bad in right- and left-handers. *Journal of Experimental Psychology: General*, *138*(3), 351–367.
- Charness, N. (1976). Memory for chess positions: Resistance to interference. *Journal of Experimental Psychology: Human, Learning & Memory*, *2*(6), 641–653.
- Clark, A. (2010). *Supersizing the mind: Embodiment, action, and cognitive extension*. New York: Oxford University Press.
- Coman, A., & Hirst, W. (2012). Cognition through a social network: the propagation of practice and induced forgetting effects. *Journal of Experimental Psychology: General*. In press.
- Coman, D., Coman, A., & Hirst, W. (2012). Memory accessibility and treatment decision making for significant others. The role of socially shared retrieval induced forgetting. In preparation.
- Coman, A., Kolling, A., Lewis, M., & Hirst, W. (2012). Mnemonic convergence: from empirical data to large-scale dynamics. *Lectures in Computer Science*, *7227*, 256–265.
- Coman, A., Manier, D., & Hirst, W. (2009). Forgetting the unforgettable through conversation: socially-shared retrieval-induced forgetting of September 11 memories. *Psychological Science*, *20*, 627–633.
- Congleton, A., & Rajaram, S. (2011). The influence of learning methods: Prior repeated retrieval enhances retrieval organization, abolishes collaborative inhibition, and promotes post-collaborative memory. *Journal of Experimental Psychology: General*, *140*, 535–551.
- Cuc, A., Koppel, J., & Hirst, W. (2007). Silence is not golden: A case for socially-shared retrieval-induced forgetting. *Psychological Science*, *18*, 727–733.
- Cuc, A., Ozuru, Y., Manier, D., & Hirst, W. (2006). On the formation of collective memories: The role of a dominant narrator. *Memory & Cognition*, *34*, 752–762.
- DiMaggio, P. (1997). Culture and cognition. *Annual Review of Sociology*, *23*, 263–287.

- Dodd, D. H. & Bradshaw, J. M. (1980). Leading questions and memory: Pragmatic constraints. *Journal of Verbal Learning and Verbal Behavior*, *19*, 695–704.
- Dudukovic, N. M., Marsh, E. J., & Tversky, B. (2004). Telling a story or telling it straight: The effects of entertaining versus accurate retellings on memory. *Applied Cognitive Psychology*, *18*, 125–143.
- Ebbinghaus, H. (1913). *Memory: A contribution to experimental psychology*. New York: Teachers College, Columbia University (original work published in 1885).
- Echterhoff, G., Groll, S., & Hirst, W. (2007). Tainted truth: Overcorrection for misinformation influence on eyewitness memory. *Social Cognition*, *25*, 367–409.
- Echterhoff, G., Higgins, E. T., Kopietz, R., & Groll, S. (2008). How communication goals determine when audience tuning biases memory. *Journal of Experimental Psychology: General*, *137*, 3–21.
- Echterhoff, G., Higgins, E.T., & Levine, J. M. (2009). Shared reality: Experiencing commonality with others' inner states about the world. *Perspectives on Psychological Science*, *4*, 496–521.
- Echterhoff, G., Hirst, W., & Hussy, W. (2005). How eyewitnesses resist misinformation: Social postwarnings and the monitoring of memory characteristics. *Memory & Cognition*, *30*, 770–782.
- Epstein, J. (2006). *Generative social science: Studies in agent-based computational modeling*. Princeton, NJ: Princeton University Press.
- Finlay, F., Hitch, G. J., & Meudell, P. R. (2000). Mutual inhibition in collaborative recall: Evidence for a retrieval-based account. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *26*, 1556–1567.
- Flavell, J. H. (1987). Speculation about the nature and development of metacognition. In F. Weinert and R. Kluwe (Eds.), *Metacognition, motivation, and understanding* (pp. 21–29). Hillsdale, NJ: Lawrence Erlbaum.
- Gabbert, F., Memon, A., & Allan, K. (2003). Memory conformity: Can eyewitnesses influence each other's memories for an event? *Applied Cognitive Psychology*, *17*, 533–544.
- Geertz, C. (1973). *The interpretation of culture: Selected essays*. New York: Basic Books.
- Grice, P. (1975). Logic and conversation. In P. Cole and J. Morgan (Eds.) *Syntax and semantics* (Vol 3). New York: Academic Press.
- Halbwachs, M. (1950). *Collective memory* (F. J. Ditter, V. Y. Ditter, Trans). New York: Harper & Row.
- Higgins, E. T. & Rholes, W. S. (1978). Saying is believing: Effects of message modification on memory and liking for the person described. *Journal of Experimental Social Psychology*, *14*, 363–378.
- Hirst, W. (2010). A virtue of memory: The contribution of mnemonic malleability to collective memory. In P. A. Reuter-Lorenz, K. Baynes, G. R. Mangun and E.A. Phelps (Eds.), *The cognitive neuroscience of the mind: A tribute to Michael. S. Gazzaniga* (pp. 139–154). Cambridge, MA: MIT Press.
- Hirst, W. & Brown, A. (2012). On the virtues of an unreliable memory: Its role in grounding sociality. In G. Semin and G. Echterhoff (Eds.), *Grounding sociality: Neurons, minds, and culture*, (pp. 95–114). New York: Psychology Press.
- Hirst, W. & Echterhoff, G. (2012). Remembering in conversations: The social sharing and reshaping of memory. *Annual Review of Psychology*, *63*, 55–79.
- Hirst, W. & Fineberg, I. A. (2012). Psychological perspective on collective memory and national identity: The Belgian case. *Memory Studies*, in press.
- Hirst W. & Manier D. (2008). Towards a psychology of collective memory. *Memory*, *16*, 183–200.
- Hirst, W., Phelps, E. A., Buckner, R. L., Budson, A. E., Cuc, A., et al. (2009). Long-term retention of the terrorist attack of September 11: Flashbulb memories, event memories, and the factors that influence their retention. *Journal of Experimental Psychology: General*, *138*, 161–176.
- Hollingshead, A. B. (1998). Communication, learning, and retrieval in transactive memory systems. *Journal of Personality & Social Psychology*, *34*, 423–442.
- Hollingshead, A. B. & Brandon, D. P. (2003). Potential benefits of communication in transactive memory systems. *Human Communication Research*, *29*, 607–615.
- Humphrey, N. K. (1976). The social function of intellect. In P. P. G. Bateson and R. A. Hinde (Eds.) *Growing points in ethology*. New York: Cambridge University Press.
- Hurford, J. M. (2011). *The origins of grammar*. New York: Oxford University Press.
- Hutchins, E. (1995). *Cognition in the wild*. Cambridge, MA: MIT Press.
- Hyman, I. E. (1994). Conversational remembering: Story telling with a peer versus for an experimenter. *Applied Cognitive Psychology*, *8*, 49–66.
- Johnson-Laird, P. (1987). How could consciousness arise from the computations of the brain? In C. Blakemore and S. Greenfield (Eds.), *Mindwaves*. Oxford: Basil Blackwell.
- Koessler, S., Engler, H., Riether, C., & Kissler, J. (2009). No retrieval induced forgetting under stress. *Psychological Science*, *20*, 1356–1363.

- Koppel, J., Wohl, D., Meksin, R., & Hirst, W. (2013). The role of expertise and resistance in moderating socially shared retrieval-induced forgetting. *Social Cognition*, under review.
- Kvavilashvili, L., Mirani, J., Schlagman, S., & Kornbrot, D. (2003). Comparing flashbulb memories of September 11 and the death of Princess Diana: Effects of time delays and nationality. *Applied Cognitive Psychology*, *17*, 1017–1031.
- Lim, M., Metzler, R., & Bar-Yam, Y. (2007). Global pattern formation and ethnic/cultural violence. *Science*, *317*(5844), 1540–1544.
- Lindsay, D. S., Hagen, L., Read, J. D., Wade, K. A., & Garry, M. (2004). True photographs and false memories. *Psychological Science*, *15*, 149–154.
- Loftus, E. F. (1979). *Eyewitness testimony*. Cambridge, MA: Harvard University Press.
- Loftus, E. F. (1993). The reality of repressed memories. *American Psychologist*, *48*, 518–537.
- Loftus, E. F. & Palmer, J. C. (1974). Reconstruction of automobile destruction: An example of the interaction between language and memory. *Journal of Verbal Learning and Verbal Behavior*, *13*, 585–589.
- Luminet, O. & Curci, A. (Eds.) (2009). *Flashbulb memories: New issues and new perspectives*. New York: Psychology Press.
- Mannheim, K. (1952). *Essays on the sociology of knowledge*. New York: Oxford University Press.
- Marsh, E. J. (2007). Retelling is not the same as recalling: Implications for memory. *Current Directions in Psychological Science*, *16*, 16–20.
- Meade, M. L., Nokes, T. J., & Morrow, D. G. (2009). Expertise promotes facilitation on a collaborative memory task. *Memory*, *17*, 39–48.
- Meksin, R. & Hirst, W. (2005, January). Generational effects on memory for the terrorist attack of September 11, 2001. Paper presented at the meeting of the Society of Applied Research on Memory and Cognition, Wellington, New Zealand.
- Meksin, R. & Hirst, W. (2012, March). A 10-year follow-up of a study of memory for the terrorist attack of September 11, 2001. Paper presented at the meeting of the Eastern Psychological Association, Pittsburgh, PA.
- Meudell, P. R., Hitch, G. J., & Boyle, M. M. (1995). Collaboration in recall: Do pairs of people cross-cue each other to produce new memories? *Quarterly Journal of Experimental Psychology A: Human Experimental Psychology*, *48*, 141–152.
- Neisser, U. (1967). *Cognitive psychology*. New York: Meredith.
- Nora, P. (Ed.) (1992). *Les Lieux de memoire* (Vol 7). Paris: Gallimard.
- Nye, J. & Brower, A. M. (1996). *What's social about social cognition? Research on socially shared cognition in small groups*. Thousand Oaks, CA: Sage Publications, Inc.
- Olick, J. K. & Robbins, J. (1998). From “collective memory” to the historical sociology of mnemonic practices. *Annual Review of Sociology*, *24*, 105–140.
- Pasupathi, M., Stallworth, L. M., & Murdoch, K. (1998). How what we tell becomes what we know: Listener effects on speakers’ long-term memory for events. *Discourse Processes*, *26*, 1–25.
- Rajaram, S. & Pereira-Pasarin, L. P. (2010). Collaborative memory: Cognitive research and theory. *Perspectives on Psychological Science*, *5*, 649–663.
- Rathbone, C. J., Moulin, C. J., & Conway, M. A. (2008). Self-centered memories: The reminiscence bump and the self. *Memory & Cognition*, *36*(8), 1403–1414.
- Roediger, H. L., Meade, M. L., & Bergman, E. (2001). Social contagion of memory. *Psychonomic Bulletin and Review*, *8*, 365–371.
- Schuman, H. S. & Scott, J. (1989). Generations and collective memories. *American Sociological Review*, *54*, 359–381.
- Shteynberg, G. (2010). A silent emergence of culture: The social tuning effect. *Journal of Personality and Social Psychology*, *99*, 683–689.
- Sparrow, B., Liu, J. & Wegner, D. M. (2011). Google effects on memory: Cognitive consequences of having info at our fingertips. *Science*, *333*, 776–778.
- Squire, L. R. (2004). Memory systems of the brain: A brief history and current perspective. *Neurobiology of Learning and Memory*, *82*, 171–177.
- Stasser, G. & Titus, W. (1987). Effects of information load and percentage of shared information on the dissemination of unshared information during group discussion. *Journal of Personality and Social Psychology*, *53*, 81–93.
- Stone, C. B., Barnier, A. J., Sutton, J., & Hirst W. (2012a). Forgetting our personal past: Socially shared retrieval-induced forgetting for autobiographical memories. *Journal of Experimental Psychology: General*. In press.
- Stone, C. B., Coman, A., Brown, A. D., Koppel, J., & Hirst, W. (2012b). The sound – and mnemonic consequences – of silence. *Perspectives on Psychological Science*, *7*, 39–53.
- Sutton, J., Harris, C., Keil, P., & Barnier, A. (2010). The psychology of memory, extended cognition, and socially distributed remembering. *Phenomenology and the Cognitive Sciences*, *9*(4), 521–560.
- Tulving, E. (1983). *Elements of episodic memory*. New York: Oxford University Press.

- Vandierendonck, A. & Van Damme, R. (1988). Schema anticipation in recall: Memory process or report strategy? *Psychological Research, 50*, 116–122.
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.
- Watts, D. J. (2004). The new science of networks. *Annual Review of Sociology, 30*, 243–270.
- Wegner, D. M. (1987). Transactive memory: A contemporary analysis of group mind. In B. Mullen and G. R. Goethals (Eds.), *Theories of group behavior, Springer Series of Social Psychology* (pp. 185–208). New York: Springer-Verlag.
- Weldon, M. S., Blair, C., & Huebsch, D. (2000). Group remembering: Does social loafing underlie collaborative inhibition? *Journal of Experimental Psychology: Learning, Memory & Cognition, 26*, 1568–1577.
- Wertsch, J. V. (2002). *Voices of collective remembering*. New York: Cambridge University Press.
- Wertsch, J. V. (2008). Collective memory and narrative templates. *Social Research, 75*, 133–156.
- Wilson, R. A. (2005). Collective memory, group minds, and the extended mind thesis. *Cognitive Processing, 6*, 227–236.
- Wilson, R. A. & Clark, A. (2009). How to situate cognition: Letting nature take its course. In P. Robbins and M. Aydede (Eds.), *The Cambridge handbook of situated cognition* (pp. 55–77). New York: Cambridge University Press.
- Wittenbaum, G. M., Hollingshead, A. B., & Botero, I. C. (2004). From cooperative to motivated information sharing in groups: Moving beyond the hidden profile paradigm. *Communication Monographs, 71*, 286–310.
- Wittenbaum, G. M. & Park, E. S. (2001). The collective preference for shared information. *Current Directions in Psychological Science, 10*, 70–73.
- Wright, D. B., Self, G., & Justice, C. (2000). Memory conformity: Exploring misinformation effects when presented by another person. *British Journal of Psychology, 91*, 189–202.
- Wundt, W. (1912/1973). *An introduction to psychology*. New York: Arno Press.