4

Memory Source Monitoring Applied

D. Stephen Lindsay

How does the mind/brain differentiate fact from fancy, perception from inference? How do we distinguish creating a novel tune from remembering someone else's melody? How do we discriminate memories of what we witnessed at the scene of a crime from memories of a co-witness's description of what happened? The central premise of the source-monitoring framework (SMF) is that the origins of our sensations, thoughts, images, and feelings are not abstractly and unambiguously specified and labelled a pri- ori but rather are inferred by the mind/brain (usually very rapidly and without conscious reflection) on the basis of their content in the course of our experiencing them. Most of the time the inferences are correct, but often the accessed information is insufficient to support a source attribution and occasionally a mental event from one source is misat- tributed to another. In the realm of gusta- tory experience, for example, inputs from the nose are routinely misattributed to the tongue; lacking olfaction it is reportedly dif- ficult to distinguish an apple from a potato, but when one savours an orange pippin the lovely flavour sensations seem to come from the mouth. As another perceptual example,

what we see, hear, feel, or smell can be influ- enced by our expectations; if you are waiting for Don to telephone and your iPhone rings you may mistake Patrick's voice for Don's, especially if the connection quality is poor or there is lots of background noise or you are momentarily distracted as you take the call.

Research and theorizing informed by the SMF has focused primarily on mental events that are attributed to memory.[1] The major- ity of work on the SMF has had to do with mental events that are attributed to memory for specific experiences in the personal past, that is, to episodic memory. A smaller litera- ture informed by (or at least consistent with) the SMF has examined attributions to knowl- edge or what Newman, Garry, Bernstein, Kantner, and Lindsay (2012) recently termed (in reference to comedian Stephen Colbert's term) "truthiness." Thus the purview of the current chapter is applied implications of source monitoring in the domains of auto-biographical memory and belief. Before dis- cussing those applied issues I will provide some general background on the SMF (see Mitchell & Johnson, 2009, and Lindsay, 2008, for more extensive exegeses of the SMF itself).

A Brief Overview Of the SOurce- MOnitOring frAMewOrk

The SMF has roots in Frederick Bartlett's seminal 1932 work on *Remembering*. It also shares ideas with a variety of more recent theoretical perspectives, including Larry Jacoby's "attributional" approach to the subjective experience of remembering (e.g., Jacoby, Kelley, & Dywan, 1989), Bruce Whittlesea's elaboration of the attribution approach, SCAPE (e.g., Whittlesea, 2003), Koriat and Goldsmith's (e.g., 1996) work on monitoring and control processes, Tulving's (e.g., 1982) ideas about synergistic ecphory and conversion processes, and Michael Ross's (e.g., 1989) work on theories of the self and autobiographical memory. But the immediate parent of the SMF was Marcia Johnson and Carol Raye's (1981) reality monitoring (RM) model.

The motivation for the RM model grew out of research in the 1970s that, partly inspired by Bartlett (1932), explored the roles of knowledge and belief in sculpting remembrance (e.g., Bransford & Johnson, 1972). This

research showed that people often mistake details that they had inferred/ imagined during an event as things they had directly perceived during the event. For example, having read "The spy threw the secret document into the fireplace," sub- jects sometimes remembered having read "The spy burned the secret document" (even though they had not been told that there was a fire in the fireplace) (Johnson, Bransford, & Solomon, 1973). The RM model had to do with differentiating between memories of "real" (i.e., perceptually expe- rienced) past events versus memories of imagined or inferred past events. It empha- sized quantitative aspects of recollections. The core assumption is that memories of perceptual experiences are, on average, more perceptually vivid and contextually embed- ded and have fewer memorial indicators of effortful internal generation than do memo- ries of imagined events, so people are biased to perceive recollections that are high on

perceptual detail and embeddedness and low on indications of effortful cognitive opera- tions as memories of real events, and they tend to attribute memories that are lacking in vividness and embeddedness and rich in markers of cognitive operations to imagina- tion. A key claim of the RM model is that the distributions of memories of real and imag- ined events overlap, such that (for example) we sometimes recollect a peculiarly vivid product of fantasy that we are hence liable to misidentify as a memory of an actual event. The RM model also allowed for a more reflective, post-access process that catches some such errors on the basis of their qualita- tive content. For example, an extraordinarily vivid recollection of flying might at first feel like a memory of a real event but then cor- rectly be identified as a memory of a dream because one knows one cannot fly unaided. But according to the RM model most attribu- tions to reality versus imagination/thought are made without conscious reflection in the course of experiencing the recollection, not as a deliberative post-retrieval decision- making process.

The source-monitoring framework (Johnson, Hashtroudi, & Lindsay, 1993; Lindsay, 2008) differs from the RM model in several ways. Whereas the RM model essentially dichoto- mized memories into two categories (real or imagined),[2] "source" is a multidimensional construct with indefinitely many possibili- ties. Suppose, for example, that you recall an episode in which you learned a joke. Aspects of the source of that recollection include when and where you encountered the joke, the medium in which the joke was presented, the agent who delivered the joke, etc. The notion of "source" overlaps with, but is somewhat more broad and vague than, the notion of "context." The distinction between an event and its source is often fuzzy because aspects of source participate in constituting the event and its meaning (e.g., the import of a statement depends, in part, on who utters it). As Hintzman (2011, p. 257) noted, "Which aspect counts as item and which as context derives more from the perspective of

the researcher than from the way memory actually works."

Whereas the RM model emphasized quan- titative bases for discriminating memories of actual versus imagined events, the SMF emphasizes the qualitative content of the information evoked by cues (although quan- titative characteristics also influence attribu- tions in the SMF). The central idea is that we recognize (or fail to recognize, or misrecog- nize) aspects of memory sources in ways that are analogous to how we recognize (or fail to recognize or misrecognize) stimuli in ongo- ing perception (see also Payne & Blackwell, 1998). Because people rarely reflect on and label aspects of source while they are expe- riencing events (e.g., presumably you are not repeating to yourself "It's the 27th of August at 3:30 pm and I'm sitting in my office read- ing Steve Lindsay's chapter"), we can rarely directly "retrieve" abstract source designa- tions but rather must infer them from cues in the accessed information. The accessed memory information about a joke, for exam- ple, might include fragmentary records of the sound of the teller's voice. Perhaps the acoustic signal would be so clear that you would immediately recognize the speaker as your friend Marty (always good for a joke) without being aware of doing any "monitor- ing" at all – you'd "just" remember Marty telling you the joke, as you might "just" recognize Marty if he walked in the door. In both cases, the available information is used to infer identity. Under other conditions, per- haps the remembered acoustic information would be too impoverished to enable you to identify the speaker of the remembered utter- ance yet provide enough information for you to infer that the jokester was male or at least that you learned the joke by hearing someone tell it rather than by reading it.

The multiple features or aspects that make up an event are only loosely bound, and which ones are accessed at a particular moment depends on multifaceted interac- tions between current and past cognitive processing. Thus often we can access rich cues to some aspects of source but few cues

to other aspects of source. You might, for example, confidently recollect being in your office when you heard the joke, and yet have no idea who told the joke. Sometimes delib- erative, post-access searches of memory can

uncover additional memorial cues to source, enabling us accurately to recognize dimen- sions of source that previously we could not identify.

People are susceptible to source-monitoring errors when a mental event has characteris- tics that are typical of another source; just as when answering the phone you might mistake one friend's voice for another's if the two happen to sound similar, so too you would be susceptible to misremember- ing which of them had uttered a particu- lar statement. Such source misattributions are especially likely if current orientation or expectations bias remembers toward the wrong source.

Source attributions can also be affected by biases as to the strength of memories from particular sources. For example, in three studies by Johnson, Raye, Foley, and Foley (1981), subjects heard some words and had to generate other words on their own, were later shown a mix of words they had heard, words they had generated, and new words. When subjects false alarmed to words spoken by neither partner, they more often attributed those words to their partner than to themselves. This bias presumably arose because subjects remembered little about those words (after all, they were new words) and presumed that they would remember them better if they had generated them them- selves (see Hoffman, 1997).

Time is a particularly challenging aspect of source monitoring. People often have dif- ficulty specifying when a past event occurred, particularly across a range of plausible candi- date times during which the person was in a given context. You may, for example remem- ber an excruciating childhood moment when you put your tongue on a frozen metal post; the content of the memory may include many cues to time of year, time of day, and place, but if you spent your entire childhood

in that place it may be very difficult to say which year that was, let along which month. If the place was in the school yard at recess, that probably helps to constrain the day of the week. And if the event was somehow associated with what Neisser (1982) called a benchmark event (e.g., first day at school, change of domicile) then you may be able to site the event in time quite precisely. But often it is difficult to place past events in time with much precision. Perhaps this is because time per se is not a causal agent; it is events that are embedded in and hence correlated with time that have effects, not time itself.

In everyday life, accurate source monitor- ing is not always at the top of our priori- ties. If you are entertaining friends with an anecdote, your story may seamlessly mingle accurate episodic details with products of imagination, belief, and desire. Your goals in such a situation may have to do more with impression management and persuasion than with source monitoring. Similarly, if your aim is to solve a problem, your thinking is likely to blend retrieval of past solutions with generation of new ones with little reflection as to their provenance. On the witness stand, in contrast, accurate source monitoring may become front and center, enabling you to do a better job of separating fact from fancy.

These ideas about source monitoring are supported by findings from studies in which people were exposed to information from two sources and then later tested (in various ways) on their ability to differentiate informa- tion from those two sources. Consistent with the SMF, errors on such tasks tend to be more common if the two sources are perceptually and/or semantically similar or if the same orienting task had been used to encode items from each source (e.g., Lindsay & Johnson, 1989a; Lindsay, Johnson, & Kwon, 1991). Dividing attention at study or a long study- test delay can impair subsequent source- monitoring (SM) performance to a greater extent than subsequent old/new discrimina- tion (Jacoby, Woloshyn, & Kelley, 1989; cf. Troyer, Winocur, Craik, & Moscovitch, 1999; Kelley & Lindsay, 1993; Lane,

2006). Dividing attention at test can also increase false-memory errors presum- ably by impairing source monitoring (e.g., Knott & Dewhurst, 2007; Zaragoza & Lane, 1998). Orienting subjects to attend to source at test typically reduces (and sometimes eliminates) source-monitoring misattribu- tions (e.g., Oeberst & Blank, 2012).

LiMitAtiOnS Of the SMf

In principle, a well-specified theory of source monitoring should be able to predict the probability of SM errors under any given well-defined set of conditions. But in prac- tice the SMF is too vague and incomplete to support such estimates. Indeed, even pre- dicting whether two conditions will differ in accuracy can be difficult. Suppose, for example, that subjects witness an event and then receive misleading suggestions regard- ing details in the event that presented in ways that either make them very similar to the witnessed event or make them quite distinct (while holding overall memorability of the suggestions approximately constant). Should the rate of reporting suggestions differ in the two conditions? Only if test instructions motivate subjects to try to exclude the post- event information; if subjects assume that the post-event information is a legitimate source of

answers then there is no reason for them to more often report that information in a high- similarity situation than in a low-similarity situation. Source confusability comes into play only if conditions encourage subjects to differentiate information from different sources.

A related limitation is that we know little about how different dimensions of source interact with one another to determine overall similarity. In an early study, we showed that subjects are more likely to misremember who said what if both of two potential speakers were young women than if one was a young woman and the other an older man. We also observed that source misattributions were

more common if the utterance concerned a topic that both speakers had addressed than if it concerned a topic spoken of by only one speaker. In that particular study these two types of similarity appeared to be roughly additive, but in other situations they might interact. The point is that we need more empirical work to explore how multiple dimensions of source act together to deter- mine confusability. Lacking a priori ways to define similarity, the SMF becomes difficult to falsify (see Lindsay & Johnson, 2001).

The vast majority of studies of the SMF have involved situations in which only two sources are in play. Very often, subjects are explicitly asked to differentiate between the two or to base responses on only one of the sources. But in everyday life when thoughts and images come to mind there are indefi- nitely many potential sources; the situation may offer cues to but does not tightly con- strain the field of potential sources. Little is known about source monitoring in such natu- ralistic situations. Nonetheless, as discussed below, there are many reasons to believe that source-monitoring processes play key roles in a wide variety of everyday applied situations.

AppLied ASpectS Of the SMf

According to the SMF, people go through life making moment-to-moment inferences and attributions as to the sources of the thoughts and images that come to mind (at situation- ally varying levels of precision). Such attributions have implications for action. Thus applications of the SMF are ubiquitous. Did I take my medications today, or did I just think about taking them (or was that yester- day anyway)? Did I unload the shotgun or did I merely intend to unload it? Was that claim about Obama being an alien in the *New York Times* or in the *National Enquirer*? Did I see a stop sign and broken glass at the accident scene, or did I hear about those details from another witness? Is this guy the mugger, or is his face familiar because I

saw him somewhere else? Do this patient's symptoms indicate scabies, or is my percep- tion of the case being biased by prior cases? Was the razor held by the black guy, or is a racist stereotype causing that image to come to mind so fluently? Have I always held this view on abortion or am I reducing cognitive dissonance? Did I just compose this catchy melody, or am I remembering someone else's tune? Have I always been liberal-minded, or are transfer-appropriate-processing phe- nomena and my self-theory biasing my remembered past? Does "Hickok" come to mind because it is the correct answer to the question about Buffalo Bill's last name or because I was recently exposed to the name "Hickok?" Are these statistics prob- lems inherently easy, or is it that I've done them so many times before that they seem easy? (See Kelley & Lindsay, 1993.) In the following I summarize some of the research on some of these applied questions.

eyewitness misinformation effect

Elizabeth F. Loftus pioneered the modern study of eyewitness memory and introduced a three-stage procedure in which subjects first view an event (e.g., a slide show depict- ing an accident in which a car hits a pedestrian, including a number of critical event details), are then exposed to verbal mislead- ing suggestions regarding some of the critical details in that event (e.g., that an intersection had been marked by a yield sign when a stop sign had appeared in the event), and finally are tested on memory for critical details about which misleading suggestions had or had not been suggested. Across a wide variety of materials and procedures, subjects often err by reporting misleading suggestions rather than witnessed details.

Loftus initially attributed the effects of misleading post-event information to an updating mechanism. The idea was that when post-event information was encoun- tered subjects retrieved their memorial representation of the original event and (with

some probability) replaced the representation of the witnessed detail (e.g., stop sign) with a representation of the suggested detail (e.g., yield sign). Such a process would have two profound implications. First, to the extent that updating occurred, witnessed details would no longer be available in memory – subjects would not be able to remember the critical detail regardless of how memory was cued. Second, the representation of the suggested detail would be an integral part of the original memory representation, no different from representations of witnessed details.

The Loftus updating process can be ques- tioned on a number of grounds. Indeed, it can be asserted as fact that most if not all of the effect in standard misinformation studies does not reflect such a mechanism. For one thing, as reviewed above such effects can be greatly diminished and perhaps eliminated when tested in different ways. For another, suggestions presented *before* an event is wit- nessed can produce misinformation effects on reports of event details that seem analogous to those produced by post-event information, even though updating makes no sense with pre-event suggestions (Holliday & Hayes, 2002; Lindsay & Johnson, 1989b). Also, suggestions do not have to have been appre- hended as being "about" the witnessed event; relevant details from one story can intrude into reports of another (Allen & Lindsay, 1998; Lindsay, Allen, Chan, & Dahl, 2004). Questions can also be raised about the adap- tiveness of a system that irrevocably discards old knowledge when new information is encountered; privileging such information makes more sense. And my impression is that psychologists have only the vaguest idea of what it means to say that "the" representation of an event can be retrieved, edited, and re- stored for subsequent retrieval and play-back. Finally, as explained by Watkins (1990), it is methodologically challenging to build a con- vincing case for non-availability, and much easier to champion arguments in terms of retrieval and/or output monitoring/conversion processes (cf. Hintzman, 2011; Sederberg, Gershman, Polyn, & Norman, 2011).

From the perspective of the SMF, the interesting question is under what conditions subjects are likely to confuse memories of suggested details as memories of witnessed details. Results from the sorts of tests used by Loftus and others in early research were ambiguous because subjects might know- ingly base their reports on information drawn from the extra-experimental source. Then- typical procedures implied to subjects that the extra-experimental information was accu- rate, so there was no reason for them to avoid using it. Zaragoza and Koshmider (1989) and Lindsay and Johnson (1989a) showed that assessing subjects on a source-monitoring test, in which they were asked to specify the source or sources of their test answers, elimi- nated the suggestibility effect obtained with a yes/no recognition test. But subsequent research revealed that when conditions made it difficult for subjects to distinguish between memories of witnessed event details and memories of extra-event suggestions subjects sometimes appeared genuinely to believe that they had witnessed suggested details (e.g., Zaragoza & Lane, 1994). Provided test instructions discourage subjects from knowingly relying on extra-event informa- tion, manipulations that make memories of suggested details less discriminable from memories of witnessed details increase the likelihood of such errors (e.g., Lindsay, Hagen, Read, Wade, & Garry, 2004).

Lindsay (1990) reported a misinforma- tion experiment in which test instructions clearly (and correctly) warned them that any question-relevant detail that had been mentioned in the extra-event information was a misleading suggestion and therefore should *not* be reported (*à la* Larry Jacoby's "opposition" procedure). When suggestions had been presented shortly before the test instructions (such that memories of sug- gestions were highly accessible and easily distinguishable from memories of the wit- nessed event, which had been viewed two days earlier), subjects did not report sug- gestions at above-baseline rates. This shows that subjects understood and attempted to

follow the opposition instructions. But when the suggestions had been presented two days earlier under conditions that made memories of suggestions highly confusable with mem- ories of event details, subjects quite often falsely reported suggestions as things they had witnessed in the event (see also Eakin, Schreiber, & Sergent-Marshall, 2003).

More recently, Oeberst and Blank (2012) used a multistage procedure in which sub- jects view an event, are exposed to misinfor- mation, take a standard test (on which they often err by reporting misinformation instead of the corresponding event details), and then receive "enlightenment" before taking a final test in which they are asked to remember both what they observed in the event and what (if anything) they encountered in the extra-event information. That is, subjects were told that they had been exposed to misleading suggestions regarding some of the details and were asked to remember con- tent from both sources (see Belli, Lindsay, Gales, & McCarthy, 1994, for a procedure that shared some of these features). In three experiments Oeberst and Blank found that the large misinformation effect their subjects evinced on the standard test was greatly reduced

or eliminated by the enlightenment procedure. Whether or not a misinformation effect survives "enlightenment" should, from the SMF perspective, depend on the extent to which subjects can identify the sources of their memories of suggestions and their memories of event details when motivated to do so, which in turn depends on the inter- action between how memory is cued and how the material from the two sources (and other potentially interfering material) was encoded. Future research using Oeberst and Blank's procedure has the potential to help sharpen our knowledge of those interactions.

recovered memories of childhood sexual abuse

The mid-1990s saw a heated controversy regarding cases in which individuals reported

that they had "recovered" memories of child- hood sexual abuse of which they had previ- ously been unaware. Psychologists on one side argued that such reports were often caused by suggestive approaches to therapy, whereas psychologists on the other side dismissed such claims as unjustified by the available science and motivated by desires to deny the reality of childhood sexual abuse (see Lindsay & Briere, 1997, for a middle-ground position piece on this complex and sensitive network of issues).

This debate inspired memory researchers to conduct studies testing the hypothesis that suggestive procedures can lead adults to believe that they had experienced signifi- cant events in childhood that, really, had not occurred. In the first published study of this sort, Loftus and Pickrell (1995) cued subjects to remember several childhood events that the researchers had learned about from the subjects' siblings, along with a pseudoev- ent (getting lost in a shopping mall) that the sibling indicated had not occurred. About a quarter of their subjects appeared to come to believe that the suggested event really happened. Subsequent studies demonstrated apparent false memories for knocking over a punch bowl at a wedding (e.g., Hyman, Husband, & Billings, 1995), being bitten by a dog (Porter, Birt, Yuille, & Lehman, 2000), riding in a hot air balloon (Wade, Garry, Read, & Lindsay, 2002), and putting Slime in a teacher's desk (Desjardins & Scoboria, 2007; Lindsay, Hagen, Read, Wade, & Garry, 2004), among various other distinctive events (e.g., Hart & Schooler, 2006; Scoboria, Mazzoni, Jarry, & Bernstein, 2012; Scoboria, Wysman, & Otgaar, 2012).

No experiment has tested the hypoth- esis that suggestions can lead individuals to develop compelling false memories or beliefs of being sexually abused by a parent. There are many reasons to believe that hypothesis is true, provided the suggestive influences are sufficiently powerful (see Newman & Garry's chapter on false memory, Chapter 7, in this volume). But there are also reasons to believe that healthy people have a range of effective

defences against the formation of such con- sequential false memories. Most research on false memories has emphasized evidence that false memories occur, but it is also important to make clear that very often subjects suc- cessfully resist suggestive influences, espe- cially if the suggested events are perceived as implausible, the subject lacks schema for the suggested events, and/or the suggestive influences are weak (e.g., Pezdek, Blandon- Gitlin, Lam, Hart, & Schooler, 2006). A large number of variables interact to determine the likelihood that a particular person will develop a particular false belief/memory. A dozen years ago, Don Read and I wrote,

> We are far short of a detailed understanding of the way the various factors that determine the strength of suggestive influences combine with one another and interact with the content of the suggestions and with individual differences. Specific claims regarding the likelihood that a particular constellation of suggestive influences would lead to particular kinds of false memory reports in specific individuals must await the development of such an understanding.
>
> (Lindsay & Read, 2001, p. 81)

I expect that we still have a long wait ahead.

photographs and source monitoring

Wade et al. (2002) used a variant of the familial information false narrative proce- dure in which subjects were shown several childhood photos of themselves and fam- ily members and asked to remember the occasion when the photo was taken. Mixed among the photos was one in which a picture of the subject and a family member had been photoshopped into the basket of a hot-air bal- loon floating high aloft. Half of the subjects eventually appeared to believe that they had taken such a ride (even though the familial informant said they had not in fact done so). Photos are not necessarily more induc- tive of false memories than are narratives – indeed, evidence from Garry & Wade (2005) suggests the opposite – but under the right conditions photos can be very suggestive indeed. Lindsay et al. (2004) asked subjects

to recall three elementary-school-related events, two of which had been reported by parents and the third of which parents said had never occurred. The pseudoevent involved the subjects and a friend putting Slime in their grade 1 or 2 teacher's desk. Subjects were encouraged to try to remember this event in numerous ways over a period of about a week. Half of them were given a copy of the class group photo for that year as an aid to remembering. Among those who tried to remember without a photo, 23 percent were judged to come to believe that they remembered the suggested event. Among those given the photo, 66 percent were judged to believe they remembered putting Slime in the teacher's desk. There are probably several different ways in which photos contribute to false memories, but I believe that the most important is that they scaffold imagination of the suggested event. Without the photo, subjects can only vaguely imagine what it would have been like, but with the photo they can form detailed images of themselves, their accomplice, and their teacher, and those images may begin to feel like memories.

Garry and her co-workers have shown that not only can photographs contribute to the formation of false memories of the distant past, they can also affect judg- ments regarding concurrent information in the present. For example, Strange, Garry, Bernstein, & Lindsay (2011) showed sub- jects newspaper headlines with or without photographs that were related to but did not depict the headline event (e.g., a photo of Tony Blair giving a speech to parliament, with the headline "Blair defends botched Baghdad rescue mission"). Subjects' task was to indicate whether or not they remem- bered learning about each news event, knew that they had learned about the event but didn't recollect doing so, or thought they never learned of the news event. A small proportion of the headlines were made up. For both real and made-up headlines, sub- jects were more likely to indicate that they thought they had learned about the event when the headline was accompanied by a

photo than when it was presented without a photo. Similarly, Newman, Garry, Bernstein, Kantner, and Lindsay (2012) found that non- probative photographs increased the "truthi- ness" of a variety of kinds of statements. For example, subjects were more likely to endorse the true/false statement "The liquid metal inside a thermometer is magnesium" if the statement was accompanied by a picture of a thermometer. Here again, we believe that pictures scaffold participants' attempts to imagine the claim being true, nudging them in the direction of believing it.

forced fabrication

Maria Zaragoza and Jennifer Ackil devel- oped a procedure in which subjects are required to answer questions about details in a video that were not in fact shown in that video (e.g., Ackil & Zaragoza, 1995, 2011). For example, subjects might be asked "What kind of weapon was the thief carrying?" when the thief had not been shown carrying a weapon. Subjects are typically strongly resistant to this demand, and only produce specific answers when pushed to do so and even then do so with many verbal hedges that make it clear that they feel that they are guessing, not remembering. Yet, fascinat- ingly, after a delay of days or weeks these same subjects quite often appear to believe that they had indeed witnessedin the event the details they had so reluctantly generated in the forced confabulation phase. It is impor- tant for forensic interviewers (and especially those working with children) to understand the risks of encouraging subjects to guess or speculate (Poole & Lamb, 1998; Principe, Greenhoot, & Ceci, Chapter 35, this volume).

Mugshot pre-exposure effect and unconscious transference (aka bystander misidentification)

Police sometimes ask witnesses to look through mugshots of prospective suspects, as a way of focusing their investigations

and getting leads. If subsequent investiga- tive work yields inculpating evidence, or if the proto-suspect is not able to provide a compelling alibi (which, it turns out, is quite difficult to do – see Olson & Wells, 2012), then police may run a lineup identification test with that person as the suspect. Unfor- tunately, exposing witnesses/subjects to a mugshot of an innocent prospective suspect before presenting a lineup including that suspect increases the chance that witnesses/ subjects will mistakenly identify that suspect as the culprit (see meta-analysis by Def- fenbacher, Bornstein, & Penrod, 2006). This "transference" effect is especially large if neither the mugshots nor the lineup included the culprit. Also, the effect is greater when the innocent suspect is falsely identified from the mugshots, but it occurs even if no such initial identification is made. This effect may partly reflect failures of source monitor- ing. That is, when viewing the lineup sub- jects may mistakenly

attribute the familiarity of the pre-exposed innocent suspect to the witnessed event rather than to the mugshots.

Researchers have also tested the hypoth- esis that witnesses may confuse their memo- ries of an innocent bystander as memories of the perpetrator of a crime. Compared with evidence on ill effects of mugshots, the evi- dence for such "unconscious transference" effects is more mixed. Deffenbacher et al. (2006) argued that the extant findings sup- port the reality of such an effect, but there are reasons to believe that some of the exist- ing studies involve "change blindness" rather than unconscious transference. "Change blindness" (e.g. Potter, 1976) occurs when a viewer fails to notice a marked change in the environment, such as failing to notice that an actor's scarf disappears from one camera angle to the next (Simons & Levin, 1997). Davis, Loftus, Vanous, and Cucciare (2008) presented evidence that change blindness can masquerade as unconscious transference when viewers mistakenly believe that the culprit and bystander are one and the same person. Subjects watched a video in which an innocent person was shown walking down the liquor aisle in a grocery store; the view

of that person was briefly obstructed by a big stack of cardboard boxes. Then a different person emerged into view on the same trajec- tory as the first person. This second person then stole a bottle of liquor. Later, subjects often erroneously identified the innocent suspect as the culprit. Many subjects failed to notice that the person had changed, and those who did not notice were especially likely to falsely identify the innocent person. It seems likely that similar identity confu- sions have played a role in producing appar- ent bystander misidentification effects in some other studies as well (e.g., Ross, Ceci, Dunning, & Toglia, 1994). Nonetheless, there are also good reasons to believe that genuine source-monitoring confusions some- times contribute to bystander misidentifica- tion effects (e.g., Perfect & Harris, 2008).

unconscious plagiarism/ cryptomnesia

I have a yellowed newspaper clipping of an Ann Landers article from the late 1980s, in which the famed advice columnist followed up on an earlier piece in which she had pub- lished a poem sent in by a reader who recruited Ann's help in discovering the poet's identity. Four people wrote to Ann explaining how and when and why they had written the poem; perhaps one of them had actually done so. Comparable anecdotes of plagiarism abound, with cases involving musicians, poets, sci- entists, et alia (see Gregory, 1923, for some early observations, and Perfect & Stark, 2008, for a review). Such false claims of creation could be explained in a variety of ways, but the most interesting possibility is that at least some of the claimants had false memories of creating the work in question.

Brown and Murphy (1989) developed a procedure to study these issues that has been widely adopted (with due citation). First, the subject participates in an idea- generation phase with one or more other per- sons (confederates or fellow subjects). Later, subjects are asked to recall the ideas that they

contributed during the collaboration phase, and they are also asked to generate additional brand new ideas of their own. Two indices of plagiarism are derived: Recall-own errors, in which subjects report that they generated ideas that others had provided during the col- laboration phase, and generate-new errors, in which subjects present as new creations ideas that had been reported (by them or someone else) in the collaboration phase.

As Perfect and Stark (2008) noted, recall- own errors and generate-new errors differ qualitatively. Screening out previously gen- erated ideas from the generate-new phase essentially relies on old/new recognition; any idea generated during the collaboration phase should be excluded regardless of the specific source. In contrast, screening out ideas that others had generated during the recall-own task requires a finer grained source-monitor- ing judgment. Consistent with this distinction, manipulations of source similarity have been shown to affect recall-own errors but not generate-new errors (Landau & Marsh, 1997). Stark and Perfect (2006, 2007, 2008; Stark, Perfect, & Newstead, 2005) found that asking subjects to improve ideas gener- ated in the collaboration phase dramatically increased recall-own errors. The effect of working on improvements does not reduce to a matter of mere memory strength, because asking subjects to form vivid visual images of ideas (which boosted memory strength to the same extent as thinking about improve- ments) did not increase recall-own errors. Using a clever design in which subjects both generated improvements and received (bogus) feedback about idea quality, Perfect and Stark (2008) reported evidence that it is the process of generating improvements (not perceived idea quality) that inflates generate- own plagiarism. Thus there is something about thinking about improvements to an idea that increases the risk of later thinking the idea was one's own all along. This may help explain why collaborations so often yield disputes about authorship; working to improve another's idea may later make that

idea feel very much one's own.

Mental health

In a 1988 chapter, Marcia Johnson explored the idea that psychotic delusions and hal- lucinations arise from major breakdowns in the same reality monitoring processes whose more benign errors give rise to everyday memory distortions and misperceptions in healthy individuals. By the time of this writ- ing, a substantial number of articles have reported studies of individuals with and with- out schizophrenia tested on source-memory tests. Interest has focused on interactions between diagnostic group and type of test. In the first such article, Harvey (1985) reported evidence that patients diagnosed with schiz- ophrenia had problems in differentiating memories of saying a word from memories of thinking a word, whereas those diagnosed with mania had problems in discriminat- ing memories from two external sources. Unfortunately, however, there has been great inconsistency in results across studies. The inconsistency is probably at least partly due to the fact that studies with patients often have small numbers (N), but my impression is that researchers have also roiled the waters some- what by using a variety of different tasks and procedures and terminologies. Achim and Weiss (2008) reported a meta-analysis of 27 studies comparing schizophrenic and control groups on various source-monitoring tasks. They expected to find that patients would be particularly impaired on self/other discriminations (what they termed "reality monitor- ing") relative to discriminations between thoughts and actions or discriminations between two external sources, but the degree of impairment on all of those tasks was moderate and equivalent. Nor do schizophrenics consistently demonstrate greater-than-usual rates of false memories in DRM procedures, but they do show a striking tendency to be overconfident in errors and underconfident in correct responses (e.g., Moritz, Woodward, Jelinek, & Klinge, 2008). This suggests that the SM deficit associated with schizophrenia is not due to extraordinarily "strong" memo- ries of thoughts/images in this population

but rather to poor metacognitive calibration of confidence.

A number of studies have exam- ined relationships between false memory errors and individual difference measures. Unfortunately, most such studies have Ns that are too small to get much traction in such analyses. One of the variables that has most consistently correlated with false memories is responses on the Dissociative Experiences Scale (e.g., Gallo, 2010; Hyman & Billings, 1998; Porter et al., 2000). Another is age: Pre-schoolers are more sus- ceptible to source confusions than are older children and young adults (e.g., Lindsay, 2002; Principe, Greenhoot, & Ceci, Chapter 35, this volume), and source-monitoring dif- ficulties increase late in the lifespan (e.g., Mitchell, Johnson, & Mather, 2003).

reducing SM errOrS

The likelihood of SM errors can be reduced by attention. Attending reflectively to aspects of source during an event (e.g., noting to oneself which things one is witnessing and which things one is inferring; noting and reflecting on the where and the who and the how of events as they happen) has been shown to enhance SM. And dividing atten- tion at study impairs SM. Those attentional factors seem very likely to matter in the real world as well as in studies. Likewise attend- ing to dimensions of source while memory is being used and scrutinizing memory for source-relevant cues are likely to reduce error rates. False alarms can further be reduced by setting a high threshold on what is accepted as a memory of an actual event (at the cost of increased rates of errone- ously identified memories of actual events as memories of inferences etc.). But source misattributions likely cannot be driven to zero, because it is adaptive and efficient and suits the organism's purposes to gloss and blur information across multiple sources (see Newman & Lindsay, 2009; Schacter, 2012).

Reconstructive processes that blend products of inference, bias, expectation, and imagina- tion with products of retrieval serve us well most of the time. For one thing, these pro- cesses likely support our senses of self (e.g., Williams & Conway, 2009). More funda- mentally, without such reconstructive mecha- nisms our ability to recollect our own pasts (and envision our futures) would be grossly impoverished. Reconstructive processes ena- ble us to use partial and imperfect cues to re-envision the past as it probably was. Our recollections often stray from the "literal" truth of the past but generally capture the essence of what happened with effective fidelity. Sometimes relatively minor memory errors (e.g., thinking that you saw Paul yes- terday when it was really the day before) can be profoundly consequential (e.g., by under- mining his perfectly valid alibi). And some- times conditions conspire to foster grossly false beliefs or illusory memories (as when a person comes to

believe that he or she was abducted by space aliens or subjected to outlandish and improbable satanic ritual abuse), but in healthy individuals such false memories are unlikely unless the person is exposed to prolonged and multifaceted sug- gestive influences. In brief, reconstructive remembering does us more good than harm. If that wasn't the case our memories would have evolved differently.

future directiOnS

As noted in the earlier section on limi- tations, the source-monitoring framework is not sufficiently well-defined to enable specification of specific predictions in com- plex situations. For example, the framework holds that all else being equal, confusions between memory sources will be more com- mon for sources that are highly similar than for sources that are dissimilar (provided that performance is above floor and below ceil- ing and that the task motivates subjects to differentiate between sources), but when all

else is not equal, predictions are less clear. This is in part simply a reflection of the dif- ficulty of developing psychological models of similarity (Decock & Douven, 2011). The problem is compounded by variations across condition in individuals' motivation, orientation, attention, goals, criteria, etc. at study and at test. SM performance may also affected by material in memory prior to study and by material learned between study and test, potentially in ways that interact with experimental manipulations. All of this makes precise prediction difficult.

Most SM studies involve discriminations between two rival sources (e.g., which of two actors said "Fish?" Did you generate the word "motel" from a stem or did you merely read that word? Did you read that the spy burned the document, or did you just infer that?) (Often some items were not studied and subjects have the option of responding Source A, Source B, or new.) In everyday life, potential sources of thoughts, images, and feelings are not so well-defined and narrowly constrained. The interaction between your past, your current orientation, and your environment causes thoughts and images to come to mind moment by moment and as they do you make attributions at vari- ous levels of specificity (grain size) from a huge gamut of potential sources. Maybe, for example, you read something about the con- cept of similarity and the phrase "likeness and likelihood" pops to mind. That could be a new idea, or it could be something you heard or read at some time in some context. Maybe automatic source-monitoring pro- cesses have filled in some of those dimen- sions, such that it seems simply to come to mind as something you read years ago (a remarkable chapter by Richard Shweder, 1977). My point here is that although it seems reasonable to extend the SMF to these naturalistic situations in which potential sources are not pre-defined there have been very few if any tests of the framework in such situations.

The SMF has emphasized source attribu- tions that are made during the course of or

after retrieval, but people also use source to constrain searches of memory. Try, for example, to remember a high-school episode involving a phone call. Give it a go – these illustrations are always more fun if you try them. Probably you can recall a high-school phone episode without having memories of recent phone calls come to mind – you can largely constrain the memories that come to mind to your high-school years, an example of source-constrained cued recall. Likely the constraint is imperfect – maybe a high- salience recent memory of a phone call will intrude, or one from junior high or college years. For present purposes the point is merely that it would be interesting to know more about source-constrained recall and how it interacts with SM processes that unfold as thoughts and images come to mind. (For ideas about source-constraint in recognition, see Alban & Kelley, 2012; Jacoby, Shimizu, Daniels, & Rhodes, 2005; Kantner & Lindsay, 2013.)

Marcia Johnson situates ideas about SM in the broader context of her multiple-entry modular memory (MEM) theory. MEM has an ambitiously broad scope.

Perhaps the hottest arena for future research on SM has to do with the brain structures and functions that underlie source monitoring. Brain-imaging techniques have been used to study SM for at least two decades, and in recent years the quality and informativeness of that work has increased substantially (see Johnson, Raye, Mitchell, & Ankudowich, 2011, and Mitchell & Johnson, 2009, for reviews). Very briefly (and relying heavily on these reviews), it appears that various kinds of mental processing have lasting effects on the specialized brain regions that perform those processes (e.g., the fusiform gyrus for high- level representations of faces); hippocampal processes (modulated by the amygdale and various subparts of the prefrontal cortex [PFC]) bind together different features during encoding. Appropriate cues evoke informa- tion from representational areas, with that information converging in parietal regions. PFC appears to be involved in deliberative

efforts to retrieve additional information from representational information and in attribut- ing information to particular sources. If suf- ficiently detailed, distinctive, and coherent information converges in the parietal cortex, it gives rise to the subjective experience of recollecting a prior experience. Much remains to be learned about the brain functions that give rise to subjective experiences of know- ing, remembering, solving, etc., but the rate of progress on these questions appears to be accelerating tremendously.

cOncLuSiOn

The thoughts and images that crowd the mind have multiple sources – products of percep- tion, inference, schemata, and episodic mem- ory interweave in the tumbling stream of thought. A person who made no differentiation between vision and visualization, between fact and fancy, would not long survive. We have evolved abilities to attribute mental events to likely sources, and most of the time those (largely unconscious) attribution processes serve us well. Mental events that feel like memories usually are based largely on mem- ory; events that seem to be happening "out there" in the environment usually are, etc. The inferences we make about what probably hap- pened blend near-seamlessly with memories of what did happen, and those inferences are usu- ally essentially accurate. But at times a mental event will have characteristics of a source other than its true source, and on such occasions people are vulnerable to source-monitoring errors. Such errors can be deeply consequen- tial in a wide gamut of real-world domains.

nOteS

1 For one of several exceptions, see Johnson and Sherman's (1990) chapter on imagined future events, which in some ways presaged recent proposals as to the overlap between mechanisms of mental time travel backward and forward (e.g., Schacter, 2012).

2 Johnson and Raye and their co-workers applied the RM model to several subtypes of this basic dichotomy, but the fundamental distinction was a dichotomy between sources having more versus less of certain characteristics.

referenceS

Achim, A. M., & Weiss, A. P. (2008). No evidence for a differential deficit of reality monitoring in schizophrenia: A meta-analysis of the associative memory literature. *Cognitive Neuropsychiatry*, *13*, 369–384. doi:10.1080/13546800802299476

Ackil, J. K., & Zaragoza, M. S. (1995). Developmental differences in eyewitness suggestibility and memory for source. *Journal of Experimental Child Psychology*, *60*, 57–83. doi:10.1006/jecp.1995.1031

Ackil, J. K., & Zaragoza, M. S. (2011). Forced fabrication versus interviewer suggestions: Differences in false memory depend on how memory is assessed. *Applied Cognitive Psychology*, *25*, 933–942. doi:10.1002/ acp.1785

Alban, M. W., & Kelley, C. M. (2012). Variations in constrained retrieval. *Memory & Cognition*, *40*, 681–692. doi:10.3758/ 1158 s13421-012-0185-5.

Allen, B. P., & Lindsay, D. S. (1998). Amalgamations of memories: Intrusions of information from one event into reports of another. *Applied Cognitive Psychology*, *12*, 277–285.

Bartlett, F. C. (1932). *Remembering*: *A study in experimental and social psychology*. New York: Macmillan.

Belli, R. F., Lindsay, D. S., Gales, M. S., & McCarthy, T. T. (1994). Memory impairment and source misattribution in postevent misinformation experiments with short retention intervals. *Memory and Cognition*, *22*, 40–54.

Bransford, J. D., & Johnson, M. K. (1972). Contextual prerequisites for understanding: Some investigations of comprehension and recall. *Journal of Verbal Learning & Verbal Behavior*, *11*, 717–726. doi:10.1016/S0022-5371(72)80006-9

Brown, A. S., & Murphy, D. R. (1989). Cryptomnesia: Delineating inadvertent plagiarism. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *15*, 432–442. doi:10.1037/0278-7393.15.3.432

Davis, D., Loftus, E. F., Vanous, S., & Cucciare, M. (2008). 'Unconscious transference' can be an instance of 'change blindness'. *Applied Cognitive Psychology*, *22*, 605–623. doi:10.1002/acp.1395

Decock, L., & Douven, I. (2011). Similarity after Goodman. *Review of Philosophy and Psychology*, *2*, 61–75. doi:10.1007/s13164-010-0035-y

Deffenbacher, K. A., Bornstein, B. H., & Penrod, S. D. (2006). Mugshot exposure effects: Retroactive interference, mugshot commitment, source confusion, and unconscious transference. *Law & Human Behavior*, *30*, 287–307. doi:10.1007/s10979-006-9008-1

Desjardins, T., & Scoboria, A. (2007). "You and your best friend Suzy put Slime in Ms. Smollett's desk": Producing false

memories with self-relevant details. *Psychonomic Bulletin & Review*, *14*, 1090–1095. doi:10.3758/BF03193096
Eakin, D. K., Schreiber, T. A., & Sergent-Marshall, S. (2003). Misinformation effects in eyewitness memory: The presence and absence of memory impairment as a function of warning and misinformation accessibility. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *29*, 813–825. doi:10.1037/0278-7393.29.5.813
Gallo, D. A. (2010). False memories and fantastic beliefs: 15 years of the DRM illusion. *Memory & Cognition*, *38*, 833–848. doi:10.3758/MC.38.7.833
Garry, M., & Wade, K. A. (2005). Actually, a picture is worth less than 45 words: Narratives produce more false memories than photographs do. *Psychonomic Bulletin & Review, 12*, 359–366. doi:10.3758/ BF03196385
Gregory, J. C. (1923). Memory, forgetfulness, and mistakes of recognition in waking and dreaming, *Monist*, *33*, 15–32.
Hart, R. E., & Schooler, J. W. (2006). Increasing belief in the experience of an invasive procedure that never happened: The role of plausibility and schematicity. *Applied Cognitive Psychology*, *20*, 661–669. doi:10.1002/acp.1218
Harvey, P. D. (1985). Reality monitoring in mania and schizophrenia: The association of thought disorder and performance. *Journal of Nervous and Mental Disease*, *173*, 67–73. doi:10.1097/00005053-198502000-00001
Hintzman, D. L. (2011). Research strategy in the study of memory: Fads, fallacies, and the search for the "coordinates of truth". *Perspectives on Psychological Science*, *6*, 253–271. doi:10.1177/1745691611406924
Hoffman, H. G. (1997). Role of memory strength in reality monitoring decisions: Evidence from source attribution biases. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *23*, 371–383. doi:10.1037/0278-7393.23.2.371
Holliday, R. E., & Hayes, B. K. (2002). Automatic and international processes in children's recognition

memory: The reversed misinformation effect. *Applied Cognitive Psychology*, *16*, 1–16. doi:10.1002/ acp.789
Hyman, I. E. Jr., & Billings, F. (1998). Individual differences and the creation of false childhood memories. *Memory*, *6*, 1–20. doi:10.1080/741941598
Hyman, I. E. Jr., Husband, T. H., & Billings, F. (1995). False memories of childhood experiences. *Applied Cognitive Psychology*, *9*, 181–197. doi:10.1002/ acp.2350090302
Jacoby, L. L., Kelley, C. M., & Dywan, J. (1989). Memory attributions. In H. Roediger and F. M. Craik (Eds.), *Varieties of memory and consciousness: Essays in honour of Endel Tulving* (pp. 391–422). Hillsdale, NJ England: Lawrence Erlbaum Associates, Inc.
Jacoby, L. L., Shimizu, Y., Daniels, K. A., & Rhodes, M. G. (2005). Modes of cognitive control in recognition and source memory: Depth of retrieval. *Psychonomic Bulletin & Review*, *12*, 852–1197. doi:10.3758/BF03196776.
Jacoby,L.L.,Woloshyn,V.,& Kelley,C.M.(1989).Becoming famous without being recognized: Unconscious influences of memory produced by dividing attention. *Journal of Experimental Psychology: General, 118*, 115–125. doi:10.1037/0096-3445.118.2.115
Johnson, M. K. (1988). Discriminating the origin of information. In T. F. Oltmanns and B. A. Maher (Eds.), *Delusional beliefs* (pp. 34–65). Oxford: John Wiley & Sons.
Johnson, M. K., Bransford, J. D., & Solomon, S. K. (1973). Memory for tacit implications of sentences. *Journal of Experimental Psychology*, *98*, 203–205. doi:10.1037/h0034290
Johnson, M. K., Hashtroudi, S., & Lindsay, D. (1993). Source monitoring. *Psychological Bulletin*, *114*(1), 3–28. doi:10.1037/0033-2909.114.1.3
Johnson, M. K., & Raye, C. L. (1981). Reality monitoring. *Psychological Review*, *88*, 67–85.
Johnson, M. K., Raye, C. L., Foley, H. J., & Foley, M. A. (1981). Cognitive operations and decision bias in reality monitoring. *The American Journal of Psychology*, *94*, 37–64. doi:10.2307/1422342
Johnson, M. K., Raye, C. L., Mitchell, K. J., & Ankudowich, E. (2012). The cognitive neuroscience of the true and false memories. In R. F. Belli (Ed.), *True and false recovered memories: Toward a reconciliation of the debate* (pp. 15–52). New York: Springer Science + Business Media. doi:10.1007/978-1-4614-1195- 6_2
Johnson, M. K., & Sherman, S. J. (1990). Constructing and reconstructing the past and the future in the present. In E. T. Higgins and R. M. Sorrentino (Eds.), *Handbook of motivation and social cognition:*

Foundations of social behavior (pp. 482–526). New York: Guilford Press.
Kantner, J. & Lindsay, D. (2013). Top-down constraint on recognition memory. *Memory & Cognition*, *41*, 465–479. doi:10.3758/s13421-012-0265-6
Kelley, C. M., & Lindsay, D. (1993). Remembering mistaken for knowing: Ease of retrieval as a basis for confidence in answers to general knowledge questions. *Journal of Memory and Language*, *32*, 1–24. doi:10.1006/jmla.1993.1001
Knott, L. M., & Dewhurst, S. A. (2007). The effects of divided attention at study and test on false recognition: A comparison of DRM and categorized lists. *Memory & Cognition*, *35*, 1954–1965. doi:10.3758/BF03192928
Koriat, A., & Goldsmith, M. (1996). Monitoring and control processes in the strategic regulation of memory accuracy. *Psychological Review*, *103*, 490–517. doi:10.1037/0033-295X.103.3.490
Landau, J. D., & Marsh, R. L. (1997). Monitoring source in an unconscious plagiarism paradigm. *Psychonomic Bulletin &*

Review, *4*, 265–270. doi:10.3758/BF03209404
Lane, S. M. (2006). Dividing attention during a witnessed event increases eyewitness suggestibility. *Applied Cognitive Psychology*, *20*, 199–212. doi:10.1002/ acp.1177
Lindsay, D. S. (1990). Misleading suggestions can impair eyewitnesses' ability to remember event details. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *16*, 1077–1083.
Lindsay, D. S. (2002). Children's source monitoring. In
H. L. Westcott, G. Davies, and R. H. C. Bull (Eds.), *Children's testimony: Psychological research and forensic practice* (pp. 83–98). Chichester, UK: John Wiley and Sons.
Lindsay, D. S. (2008). Source monitoring. In H. L. Roediger, III (Ed.), *Cognitive psychology of memory. Vol. 2 of Learning and memory: A comprehensive reference*, 4 vols. (J. Byrne, Editor), pp. 325–347. Oxford: Elsevier.
Lindsay, D. S., Allen, B. P., Chan, J. C. K., & Dahl, L. C. (2004). Eyewitness suggestibility and source similarity: Intrusions of details from one event into memory reports of another event. *Journal of Memory and Language*, *50*, 96–111.
Lindsay, D. S., & Briere, J. (1997). The controversy regarding recovered memories of childhood sexual abuse: Pitfalls, bridges and future directions. *Journal of Interpersonal Violence*, *12*, 631–647.
Lindsay, D. S., Hagen, L., Read, J. D., Wade, K. A., & Garry,
M. (2004). True photographs and false memories.
Psychological Science, *15*, 149–154.

Lindsay, D. S., & Johnson, M. K. (1989a). The eyewitness suggestibility effect and memory for source. *Memory and Cognition*, *17*, 349–358.
Lindsay, D. S., & Johnson, M. K. (1989b). The reversed eyewitness suggestibility effect. *Bulletin of the Psychonomic Society*, *27*, 111–1139.
Lindsay, D. S., & Johnson, M. K. (2001). False memories, fuzzy trace theory, and the source monitoring framework. *Learning and Individual Differences*, *12*, 145–161.
Lindsay, D. S., Johnson, M. K., & Kwon, P. (1991). Developmental changes in memory source monitoring. *Journal of Experimental Child Psychology*, *52*, 297–318.
Lindsay, D. S., & Read, J. D. (2001). The recovered memories controversy: Where do we go from here? In G. Davies and T. Dalgleish (Eds.), *Recovered memories: Seeking the middle ground* (pp. 71–94). London: Wiley.
Loftus, E. F., & Pickrell, J. E. (1995). The formation of false memories. *Psychiatric Annals*, *25*, 720–725.
Mitchell, K. J., & Johnson, M. K. (2009). Source monitoring 15 years later: What have we learned from fMRI about the neural mechanisms of source memory? *Psychological Bulletin*, *135*, 638–677.
Mitchell K., Johnson M. K., & Mather M. (2003). Source monitoring and suggestibility to misinformation: Adult age-related differences. *Applied Cognitive Psychology*, *17*, 107–119.
Moritz S., Woodward T., Jelinek L., & Klinge, R. (2008). Memory and metamemory in schizophrenia: A liberal acceptance account of psychosis. *Psychological Medicine*, *38*, 825–832.
Neisser, U. (1982). Snapshots or benchmarks? In U. Neisser (Ed.) *Memory observed*. New York: W.H. Freeman.
Newman, E., Garry, M., Bernstein, D. M., Kantner, J., & Lindsay, D. S. (2012). Non-probative photographs (or words) inflate truthiness. *Psychonomic Bulletin & Review*.
Newman, E., & Lindsay, D. S. (2009). False memories: What the hell are they for? *Applied Cognitive Psychology*, *23*, 1105–1121.
Oeberst, A., & Blank, H. (2012). Undoing suggestive influence on memory: The reversibility of the eyewitness misinformation effect. *Cognition*, *125*, 141–159.
Olson, E. A. & Wells, G. L. (2012). The alibi-generation effect: Alibi-generation experience influences alibi evaluation. *Legal and Criminological Psychology*, *17*, 151–164. doi:10.1111/j.2044-8333.2010.02003.x
Payne, D. G., & Blackwell, J. M. (1998). Truth in memory: Caveat emptor. In S. J. Lynn and K. M. McConkey

(Eds.), *Truth in memory* (pp. 32–61). New York: Guilford Press.
Perfect T., & Harris L. (2003). Adult age differences in unconscious transference: Source confusion or identity blending? *Memory & Cognition*, *31*, 570–580.
Perfect, T. J., & Stark, L. J. (2008). Tales from the Crypt
... omnesia. In J. Dunlosky and R. A. Bjork (Eds.), *Handbook of metamemory and memory* (pp. 285– 314). New York: Psychology Press.
Pezdek, K., Blandon-Gitlin, I., Lam, S., Hart, R., & Schooler, J. W. (2006). Is knowing believing? The role of event plausibility and background knowledge in planting false beliefs about the personal past. *Memory & Cognition*, *34*, 1628–1635.
Poole, D.A., & Lamb, M. E. (1998). *Investigative interviews of children: A guide for helping professionals*. Washington, DC: American Psychological Association. doi:10.1037/10301-000
Porter, S., Birt, A. R., Yuille, J. C., & Lehman, D. R. (2000). Negotiating false memories: Interviewer and rememberer characteristics relate to memory distortion. *Psychological Science*, *11*, 507–510. doi:10.1111/1467-9280.00297
Potter, M. C. (1976). Short-term conceptual memory for pictures. *Journal of Experimental Psychology: Human Learning and Memory*, *2*, 509–522. doi:10.1037/0278-7393.2.5.509
Ross, D. F., Ceci, S. J., Dunning, D., & Toglia, M. P. (1994). Unconscious transference and lineup identification: Toward a memory blending approach. In D. Ross,
J. D. Read, and M. P. Toglia (Eds.), *Adult eyewitness testimony: Current trends and developments* (pp. 80–100). New

York: Cambridge University Press. doi:10.1017/CBO9780511759192.005
Ross, M. (1989). Relation of implicit theories to the construction of personal histories. *Psychological Review*, *96*, 341–357. doi:10.1037/0033-295X.96.2.341
Schacter, D. L. (2012). Adaptive constructive processes and the future of memory. *American Psychologist*, *67*, 603–613. doi:10.1037/a0029869
Scoboria, A., Mazzoni, G., Jarry, J. L., & Bernstein,
D. M. (2012). Personalized and not general suggestion produces false autobiographical memories and suggestion-consistent behavior. *Acta Psychologica*, *139*, 225–232. doi:10.1016/j. actpsy.2011.10.008
Scoboria, A., Wysman, L., & Otgaar, H. (2012). Credible suggestions affect false autobiographical beliefs. *Memory*, *20*, 429–442. doi:10.1080/09658211.20
12.677449
Sederberg, P. B., Gershman, S. J., Polyn, S. M., & Norman,
K. A. (2011). Human memory reconsolidation can

be explained using the temporal context model. *Psychonomic Bulletin & Review*, *18*, 455–468. doi:10.3758/s13423-011-0086-9
Shweder, R.A.(1977). Likeness and likelihood in everyday thought: Magical thinking in judgments about personality. *Current Anthropology, 18*, 637–658. doi:10.1086/201974
Simons, D. J., & Levin, D. T. (1997). Change blindness. *Trends in Cognitive Sciences, 1*, 261–267. doi:10.1016/S1364-6613(97)01080-2
Stark, L., & Perfect, T. J. (2006). Elaboration inflation: How your ideas become mine. *Applied Cognitive Psychology, 20*, 641–648. doi:10.1002/acp.1216
Stark, L., & Perfect, T. J. (2007). Whose idea was that? Source monitoring for idea ownership following elaboration. *Memory, 15*, 776–783. doi:10.1080/09658210701643042
Stark, L., & Perfect, T. (2008). The effects of repeated idea elaboration on unconscious plagiarism. *Memory & Cognition, 36*, 65–73.
Stark, L., Perfect, T. J., & Newstead, S. E. (2005). When elaboration leads to appropriation: Unconscious plagiarism in a creative task. *Memory, 13*, 561–573. doi:10.1080/09658210444000232
Strange, D., Garry, M., Bernstein, D. M., & Lindsay, D. S. (2011). Photographs cause false memories for the news. *Acta Psychologica, 136*, 90–94.
Troyer, A. K., Winocur, G., Craik, F. M., & Moscovitch,
M. (1999). Source memory and divided attention: Reciprocal costs to primary and secondary tasks. *Neuropsychology, 13*, 467–474. doi:10.1037/0894- 4105.13.4.467
Tulving, E. (1982). Synergistic ecphory in recall and recognition. *Canadian Journal of Psychology/*

Revue Canadienne De Psychologie, 36, 130–147. doi:10.1037/h0080641
Wade, K. A., Garry, M., Read, J., & Lindsay, S. (2002). A picture is worth a thousand lies: Using false photographs to create false childhood memories. *Psychonomic Bulletin & Review, 9,* 597–603. doi:10.3758/BF03196318
Watkins, M. J. (1990). Mediationism and the obfuscation of memory. *American Psychologist, 45*(3), 328–335. doi:10.1037/0003-066X.45.3.328
Williams, H. L., & Conway, M. A. (2009). Networks of autobiographical memories. In P. Boyer and J. V. Wertsch (Eds.), *Memory in mind and culture* (pp. 33–61). New York: Cambridge University Press. doi:10.1017/CBO9780511626999.004
Whittlesea, B. A. (2003). On the construction of behavior and subjective experience: The production and evaluation of performance. In J. S. Bowers and
C. J. Marsolek (Eds.), *Rethinking implicit memory*
(pp. 239–260). New York: Oxford University Press.
Zaragoza, M. S., & Koshmider, J. W. (1989). Misled subjects may know more than their performance implies. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *15*, 246–255. doi:10.1037/0278-7393.15.2.246
Zaragoza, M. S., & Lane, S. M. (1994). Source misattributions and the suggestibility of eyewitness memory. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *20*, 934–945. doi:10.1037/0278-7393.20.4.934
Zaragoza, M. S., & Lane, S. M. (1998). Processing resources and eyewitness suggestibility. *Legal and Criminological Psychology*, *3*(Part 2), 305–320. doi:10.1111/j.2044-8333.1998.tb00368.x