

The Role of Emotional Elaboration in the Creation of False Memories

SARAH B. DRIVDAHL¹,
MARIA S. ZARAGOZA^{2*} and DIANNE M. LEARNED^{2,3}

¹*Department of Psychology, Northwest University, USA*

²*Department of Psychology, Kent State University, USA*

³*Department of Psychology, Western Washington University, USA*

SUMMARY

Two experiments employed an eyewitness suggestibility paradigm to examine the effects of emotional elaboration on the creation of false memories for suggested events. The results of both experiments converge in showing that reflectively elaborating on the emotional consequences of suggested events increases both false belief and false memory in having witnessed the suggested events. Moreover, the results also showed that emotional elaboration leads to higher false memory than other types of meaningful elaboration, thus providing evidence that the emotional content of the elaboration plays a role in promoting false memory development. The results have several real-world implications for forensic and therapeutic interviews. Copyright © 2008 John Wiley & Sons, Ltd.

In any consideration of memory, the issue of accuracy is soon forthcoming. Although some memory errors can be relatively harmless, in other cases such errors can have profoundly negative consequences. For example, inaccuracies in eyewitness memory can lead to wrongful accusation and even wrongful conviction of innocent persons (see, e.g. Doyle, 2005). One well-documented source of error in eyewitness memory is exposure to suggestive interviews. Numerous studies have shown that exposure to misleading or suggestive interviews can lead to false memories that are sometimes vividly detailed and confidently held (see, e.g. Loftus, 2003, and Zaragoza, Belli, & Payment, 2007, for recent reviews).

The phenomenon of false memories for suggested items or events is an example of a broader class of memory errors known as source misattributions—instances where memories that originated from one source (a postevent interview) are confused or misattributed to a different source (the originally witnessed event). M. Johnson and colleagues (Johnson, 1992; Johnson, Hashtroudi, & Lindsay, 1993; Mitchell & Johnson, 2000) have developed a theoretical framework, the source monitoring framework (SMF), that provides some insight into when and how such errors come about.

*Correspondence to: Maria S. Zaragoza, Department of Psychology, Kent State University, Kent, OH 44242, USA. E-mail: mzaragoz@kent.edu

According to the SMF, memory for source is an attribution (cf., Jacoby, Kelley, & Dywan, 1989) that is the product of both heuristic and more systematic judgment processes. From this view, information about the source of a memory is not stored directly, but is based on an evaluation of the phenomenal qualities or characteristics of a mental experience. So, for example, if a memory contains a great deal of visual detail, an individual would likely attribute the memory to an event he or she saw. People can, and often do, accurately attribute the source of their memories because memories from different sources tend to differ on average in the quantity and quality of the characteristics associated with them (e.g. memories of perceived events typically have more vivid perceptual, temporal and spatial information than memories of imagined events; Johnson, Foley, Suengas, & Raye, 1988). Nevertheless, because a memory can have features that are typical of another source (e.g. an imagined event with exceptionally vivid sensory and perceptual features) errors can and do occur. From this view, source misattributions are likely to arise when a memory contains characteristics that are typical of another source, or when the rememberer fails to retrieve information that uniquely specifies the memory's source.

From the perspective of the SMF, it is not surprising that participants/witnesses who undergo suggestive interviews are likely to confuse postevent suggestions for events they saw. In situations where eyewitness suggestibility is a concern, the overlap between the witnessed event and postevent interviews is often multifaceted and extensive. For example, because the interview is *about* the witnessed event, much of what is discussed during the postevent interview will overlap with what was actually seen, even if additional misleading information is introduced. Hence, accurately remembering that some piece of information was discussed during the postevent interview is not diagnostic with regard to whether or not it was also part of the originally witnessed event. Moreover, answering questions about a witnessed event requires that participants/witnesses reactivate and reconstruct the events they witnessed. The act of retrieving the original memory while processing the postevent questions likely increases the temporal overlap between the original and postevent episodes, further blurring the distinction between the two sources.

Consistent with the SMF, many studies have shown that imagining suggested events increases the likelihood that people will develop false memories for suggested events (e.g. Dobson & Markham, 1993; Garry, Manning, Loftus, & Sherman, 1996; Goff & Roediger, 1998; Gonsalves, Reber, Gitelman, Parrish, Mesulman, & Paller, 2004; Hyman & Pentland, 1996; Lindsay, Hagen, Read, Wade, & Garry, 2004). One reason that imagining suggested events is thought to promote the development of false memories is because visual imagery induces participants to create a representation of the fictitious event that is rich in vivid sensory/perceptual and contextual details, characteristics that render it confusable with a memory for a 'real' event (cf., Johnson et al., 1993; Suengas & Johnson, 1988).

A study by Drivdahl and Zaragoza (2001) provides more direct evidence for the role of perceptual detail in producing false memories for suggested events (see also Thomas, Bulevich, & Loftus, 2003, for related evidence using an imagination inflation paradigm). In Drivdahl and Zaragoza (2001) participants viewed a videotape depicting a house burglary, and later read a narrative account of the event that, although largely accurate, contained several misleading suggestions (e.g. the narrative stated that in addition to stealing money the thief stole a ring, when in fact he did not steal any jewellery). To implement the perceptual elaboration manipulation, follow-up questions were inserted at regular intervals throughout the narrative, and participants were instructed to answer them as they encountered them. For some participants, the questions always requested further information about the perceptual characteristics of the suggested (i.e. fictitious) item or the

physical context in which it was encountered (e.g. Did the *ring* have a gemstone? Did the thief find the *ring* in the top drawer?). On a delayed source memory test, participants who were asked questions that encouraged them to elaborate on the perceptual details of suggested events were much more likely to later claim they 'definitely' remembered the fictitious events than misled participants who were asked follow-up questions about the suggested items that did not encourage perceptual elaboration (although the latter also developed false memories). Moreover, participants who were asked multiple elaboration questions evidenced even higher false memory rates. Drivdahl and Zaragoza (2001) proposed that answering perceptual elaboration questions increased false memory because it induced participants to form a more detailed, specific and embellished mental image of the suggested items than they otherwise would have done.

Converging evidence for the role of perceptual elaboration in eyewitness suggestibility is provided by the recent finding (Lane & Zaragoza, 2007) that asking participants to generate written descriptions of suggested items (e.g. what they looked like) produces large increases in false recollections of having witnessed the suggested items. This finding, like that of Drivdahl and Zaragoza (2001) is consistent with the evidence that imagery instructions increase false memory, except that rather than instructing participants to imagine suggested events, participants answered questions that encouraged the generation of perceptually detailed representations of the suggested events.

Although imagining a suggested event clearly involves creating a concrete, perceptually specified mental representation, it is also likely that imagining how a false event may have transpired involves reflectively elaborating on other aspects of the event, such as its meaning and emotional implications. A well-known study by Ceci, Loftus, Leichtman, and Bruck (1994) is one of the few studies to have encouraged participants to elaborate on suggested events in a variety of ways. Ceci et al. (1994) asked children to recall several events that happened to them when they were younger, including one fictitious event (e.g. they rode in a hot air balloon, or got their finger stuck in a mousetrap). The children were interviewed about these events repeatedly over a period of several weeks, and at each interview were asked to 'think about' various aspects of the fictitious event, such as what they were wearing, and who was with them. Of particular relevance to the present investigation, Ceci et al. (1994) also explicitly asked participants to think about 'how they felt' during the fictitious event. The finding was that some of these children came to firmly believe that these fictitious events had actually happened to them. However, the extent to which the instruction to 'imagine how they felt' contributed to the development of these false memories is difficult to discern, because all participants were repeatedly instructed to elaborate on these fictitious events in a variety of different ways. Nevertheless, there are reasons to suspect that 'imagining how they felt' played a role in the development of these false beliefs.

One of the characteristics of real-life experiences (and hence memories of real events) is their rich emotional content. Empirical evidence for this assertion comes from a carefully controlled laboratory study by Suengas and Johnson (1988), which compared the qualitative characteristics of memories for perceived and imagined events. In this study, participants actually performed or imagined a series of everyday events (e.g. having a cup of coffee with some cookies) and later rated the qualities or characteristics of their memories for these imagined and performed events using a memory characteristics questionnaire (MCQ). In addition to sensory/perceptual and contextual information, one characteristic that differentiated imagined from performed events on these self-ratings was thoughts and feelings, with memories of actually performed events containing more thoughts and feelings than memories based on imagining the same events (although

imagined events were not devoid of thoughts and feelings). This finding was replicated and extended by Hashtroudi, Johnson, and Chrosniak (1990), who showed the same result when judges rated memory accounts provided by others.

Finally, consistent with the SMF, there is evidence that people use their knowledge of the characteristics that, in general, differentiate between different sources of memories when making source judgments about a specific memory. In particular, there is evidence that, along with perceptual and contextual detail, people use the presence of emotional detail to infer that a memory is 'real'. For example, in a study where participants were asked to judge the believability of simulated memory accounts provided by others, Johnson, Bush, and Mitchell (1998) showed that accounts containing plausible emotional details were judged as more believable than the same accounts without the emotional details.

Because people tend to make source judgments by evaluating a memory's characteristics, false memories can develop when a fictitious memory has characteristics that are highly similar to those of perceived events. Although perceived events tend to have richer emotional content than imagined events (Suengas & Johnson, 1988), this is not always the case. In particular, there is evidence that inducing participants to repeatedly reflect or talk about the emotional aspects of imagined events can increase the amount of emotional detail associated with an imagined event. Specifically, Suengas and Johnson (1988) showed that after inducing participants to repeatedly think or talk about their thoughts and feelings associated with events they had earlier imagined (e.g. positive and negative feelings associated with the imagined events, other times they had felt similarly) their imagined memories were rated as having as much cognitive and emotional content as their memories for events they had actually performed. In sum, the results of Suengas and Johnson (1988) showed that even though 'real' events tended to have more emotional and cognitive content than the same events did when imagined, repeatedly encouraging participants to think about thoughts and feelings associated with the imagined events produced memories that resembled perceived events on this dimension. Extrapolating from this finding to the eyewitness memory domain, it is possible that encouraging participants to reflectively elaborate on the likely emotional correlates or consequences of a fictitious event would increase false memory, because adding plausible emotional content would increase the suggested memory's similarity to a memory for an actually experienced event.

The goal of the present study was to assess whether having participants imagine the likely emotional consequences of a fictitious event would, like perceptual elaboration, lead to an increase in false memory. To this end, a modification of the procedures and materials used by Drivdahl and Zaragoza (2001) was used. All participants viewed a movie clip and read a narrative description of the video that contained several misleading suggestions (e.g. participants were exposed to the suggestion that one of the characters injured himself when he fell). After reading the narrative, participants were given a questionnaire that encouraged them to engage in either perceptual elaboration of the suggested events (Perceptual Elaboration Group) or emotional elaboration (Emotion-Other and Emotion-Self groups). For example, participants in the Emotion-Other group were asked 'Imagine how *embarrassed* Delaney felt at having injured himself in front of the campers'. Note that both the suggested event (that he injured himself) and the resulting emotion (that he was embarrassed) are entirely fictitious. Hence, participants were asked to speculate about the likely emotional consequences of an event they never actually witnessed. However, in pilot testing of the Emotion-Other

task, several participants indicated that they performed the task by imagining how *they* would have felt in the same situation. Because it is well-established that self-reference encourages elaborative processing and leads to large improvements in memory performance (e.g. Klein & Kihlstrom, 1986; Rogers, Kuiper, & Kirker, 1977), we included an Emotion-Self group that was identical to the Emotion-Other group with the exception that participants were asked to rate how they would have felt if they'd been the character in the video (e.g. 'Imagine how *embarrassed* you would have felt if you'd been Delaney and injured yourself in front of the campers'). To assess false memory, one week later, all participants took a source memory test, and we assessed their recollective experience. The measure of primary interest was the extent to which participants claimed to 'remember' witnessing the suggested items.

To assess whether emotional elaboration increases false memory, we compared performance in the emotional elaboration groups with those of participants who had equal exposure to the misleading suggestions, but had not been encouraged to elaborate on the suggested items in any way (Repeated Exposure group). Given that merely exposing participants to suggested information can lead to false memory, and that repeated exposure increases this effect (Zaragoza & Mitchell, 1996), it was important to control for the effects of exposure to suggestion alone. If emotional elaboration of suggested items increases false memory, participants in the Emotion-Self and Emotion-Other groups should evidence higher levels of false memory for the suggested items than participants in the Repeated Exposure group. Consistent with prior research, we also predicted that all participants who had been exposed to misleading suggestions would have higher levels of false memory and false belief than participants who were never misled (No Misinformation Control group).

Whereas the primary concern of the current study is assessing whether the presence of emotional detail is a 'feature' that the rememberer might interpret as evidence that a false memory is actually real, much recent work on emotion on source monitoring has focused on a somewhat different issue. Specifically, there is growing evidence that emotional involvement at encoding can lead to impaired source memory, even though it enhances memory for content (see Mather, 2007, for a review; but also see Kensinger & Schacter, 2006, for conflicting evidence). It appears that a focus on emotion at encoding (especially one's own emotional reactions) sometimes comes at the expense of encoding sensory/perceptual and contextual features that often provide important cues to the memory's source (Hashtroudi et al., 1990; Suengas & Johnson, 1988). Because of the potential trade-off between the processing of emotional information versus perceptual information, inducing an emotional focus can lead to poorer source memory (Hashtroudi, Johnson, Vnek, & Ferguson, 1994; Johnson, Nolde, & De Leonardis, 1996).

Given the above findings, it is possible that emotional elaboration will use processing resources that would otherwise be used to encode information about the source of the suggested items. If so, then emotional elaboration might increase false memory for the suggestions because it impairs memory for the actual source of the misleading suggestions (i.e. the postevent questionnaire). There is considerable evidence that poor or ambiguous information about an item's true source renders it more susceptible to misattribution (cf. Johnson et al., 1993). To assess this possibility, all participants will be tested on their memory of having encountered the suggested items in the postevent questions. If emotional elaboration interferes with the encoding of source-specifying information, participants in the Emotion-Self and Emotion-Other groups should be less able to remember that the suggestions were from the question set than the other misled groups.

EXPERIMENT 1

Method

Participants and design

Data from 271 psychology students were analyzed. All participants received course credit, and were randomly assigned to one of five experimental groups: Emotion-Self, Emotion-Other, Perceptual Elaboration, Repeated Exposure and No Misinformation. All groups had 60 participants with the exception of the No Misinformation group, which had only 31 (this is because large numbers of participants are not necessary to demonstrate that participants who are not misled rarely assent to the suggested items). Participants were tested in groups ranging in size from 1 to 10 people.

Materials and procedure

All participants viewed a 7 minute video excerpt from the movie 'Looking for Miracles' which depicts the adventures of two brothers at summer camp, where the older brother is a camp counsellor (cf., Zaragoza, Payment, Ackil, Drivdahl, & Beck, 2001). The movie clip is rich with adventure and drama, including a scene where a fight breaks out among the campers by the dock and another where a large snake appears in a canoe full of passengers while they are out in the middle of a lake. After watching the video, participants worked on a word search puzzle during a 10-minute filler interval. They then read a narrative description of the video clip while the experimenter read it aloud. For participants in the four misled groups (Emotion-Self, Emotion-Other, Perceptual Elaboration, Repeated Exposure), five of the statements in the narrative were misleading in that they presupposed the existence of objects or events that, although plausible, were clearly not in the video (listed below). Participants in the No Misinformation group, who received no misinformation, read the same narrative with the five misleading suggestions deleted.

Immediately after reading the entire narrative description, participants completed one of the five questionnaires depending on their experimental group. The questionnaire consisted of 11 paraphrased segments of the narrative followed by a question regarding the last statement in the segment. For participants in the four misled groups, five of these segments contained a misleading suggestion (e.g. the suggestion that Delaney injured himself when he fell), and these segments were identical for the four misled groups. However, as described below, the focus of the follow-up questions (e.g. whether they focused on emotional or perceptual aspects) varied as a function of experimental group, though participants in all groups used the same rating scale to provide their response. When the segment contained a misleading suggestion, the question always focused on the suggested event (in all other cases the question focused on true events).

Participants in the Emotion-Other group were asked to imagine how strongly a character in the video felt a particular emotion as a consequence of the suggested event. For example, participants in the Emotion-Other group received the question: 'After that, Delaney stood on the chair to get everyone's attention. However, the chair broke, and *he injured himself* as he fell to the floor. Imagine how *embarrassed he felt* at having *injured himself* in front of the other campers'. For each question, participants were instructed to rate how strongly the character felt the emotion using a 5-point Likert scale that ranged from 'very' to 'not at all'. Participants in the Emotion-Self group were treated identically to participants in the Emotion-Other group, with the exception that they were asked to imagine how they would

have felt if they had been the character in the video. For example, for participants in the Emotion-Self group the last statement read, 'Imagine how embarrassed you would have felt if you had been Delaney and injured yourself in front of all the campers', and then they provided ratings using the same scale. The five misleading suggestions and the emotions associated with each were as follows: (1) visitors ate an overcooked casserole (disgusted) (2) Delaney injured himself (embarrassed), (3) a lady lost her purse (upset), (4) the boys accused Sullivan of stealing (irate), and (5) Delaney grounded the boys as punishment (resentful). As in the example provided above, in each case, participants were instructed to imagine how strongly the character felt the particular emotion (or in the Emotion-Self group, how strongly they would have felt the emotion had they been the character) and to provide a rating. Once again, recall that none of the suggested events actually happened; hence participants were being asked to elaborate on the emotional consequences of events that never actually transpired. Note that participants performed the same task for the six questions referring to true events, except that the emotional elaboration referred to events participants had actually seen in the video (e.g. . . . 'Imagine how frightened the ladies felt when they saw the snake in their boat').

In contrast to the Emotion-Other and Emotion-Self groups, participants in the Perceptual Elaboration group were asked follow-up questions that encouraged them to elaborate on perceptual correlates or consequences of the suggested (or true) events. For example, participants were asked 'After that, Delaney stood on the chair to get everyone's attention. However, the chair broke, and *he injured himself* as he fell to the floor. Imagine how hard he fell on the floor when he *injured himself*'. Again they were asked to provide a rating using the same 5-point rating scale described above.

Participants in the Repeated Exposure group engaged in a task that did not encourage any additional elaboration of the misleading suggestion, namely, they were asked to rate the grammatical correctness of the statement containing the misinformation (or true information for segments containing only true info). For example, one of the questions read as follows: 'After that, Delaney stood on the chair to get everyone's attention. However, the chair broke, and he *injured himself* as he fell to the floor. How grammatically correct is the statement: "However, the chair broke and he *injured himself* as he fell to the floor"'. Hence, participants in the Repeated Exposure group, like participants in the other misled groups, encountered the misleading suggestion three times: once in the postevent narrative and two additional times in the subsequent questionnaire (in the paraphrased segment from the narrative, and in the statement they rated for grammatical correctness). To ensure that participants were processing all of the information in the segments, the experimenter read each segment aloud while the participants read along. Participants then rated the grammaticality of the statement using the same rating scale employed by the other groups. (For each of the misled groups in this experiment, the five misleading statements and their corresponding questions are provided in the Appendix.)

Finally, participants in the No Misinformation group were treated identically to participants in the other groups with the exception that neither the postevent narrative nor the questionnaire contained misleading suggestions. The follow-up questions answered by participants in this group most closely resembled those answered by participants in the Perceptual Elaboration group, insofar as they focused on encouraging participants to elaborate on observable aspects of events, although in this case they had actually witnessed the events they were asked to elaborate on. For example, participants were asked: 'After that, Delaney stood on the chair to get everyone's attention. However, the chair broke, and he fell to the floor. Imagine how dirty he got from falling on the floor'. As in the other

groups, participants were asked to provide a rating using the same 5-point scale that ranged from 'very' to 'not at all'.

One week later, all participants returned to the lab and were given a final source memory test consisting of 20 items, with five items from each of four source categories: five items that were seen in the video only, five suggested items that, for participants in the misled groups, were read in the postevent narrative/questions only (note that these were novel items at test for participants in the No Misinformation group), five test items that were both seen in the video and mentioned in the postevent narrative/questions, and five test items that were new (neither in the video nor postevent narrative). Importantly, the test items were the same for participants in all groups. Hence, for all participants, the suggested items were presented on the test *without* any elaboration (e.g. Delaney injured himself).

Before completing the source test, participants in the misled groups were correctly informed that the narrative and questionnaire they had read contained items that were not in the video they had seen. They were also correctly informed that there were items on the source test from four different sources (video only, postevent narrative/questionnaire only, video and questionnaire, neither video nor questionnaire). Their task, they were told, was to indicate what they remembered about the source of each test item. These instructions were designed to help minimize any tendency participants may have had to claim they remembered/believed events they did not witness simply because they assumed the questionnaire was accurate.

Participants were asked to make two decisions about the source of each test item: (1) whether the item came from the video ('In Video?') and (2) whether the item came from the postevent narrative/questionnaire ('In Questionnaire?'). However, rather than simply responding 'yes' or 'no' to each source probe, participants were asked to indicate whether they 'remembered' the item coming from that source, 'believed' the item was from that source, or 'neither believed nor remembered' that the test item came from that source. 'Remembering' was defined as the ability to consciously recollect the source of the test item (i.e. could consciously recollect seeing the item in the video or reading about it in the postevent narrative/questionnaire, cf. Gardiner, 1988). In contrast, 'believing' was defined as not being able to specifically remember the test item from the video yet nevertheless thinking that it had been in the video. Participants were given the following instructions to clearly define the difference between remembering and believing, and participants read the instructions as the experimenter read them aloud:

An example might help clarify the distinction between REMEMBERING and BELIEVING. Let's assume for the sake of this example that you believe that once, when you were only two years old, you got lost in a mall. Let's further assume that although you have a strong belief that this happened to you, you can't remember any of the specific details of this event (for example, exactly how you got lost, what the mall looked like, how you were found, etc.). This would be an example of BELIEVING something happened but not being able to consciously recollect the original experience. It is important to note that you can be extremely confident that an event happened, even though you can't recall the specific details. So BELIEVING is not the same as low confidence. It simply means that you can't consciously recollect the details of the original experience. Another possibility, of course, is that you believe you got lost in a mall when you were two years old because you consciously recollect the details of that particular incident. The latter would be an example of REMEMBERING.

Our primary interest was in the effects of emotional elaboration on the development of false belief and false memories for the suggested items. We note, however, that for all dependent measures, there were no group differences in performance on the filler test items from the other three source categories (items from the video only, items that were both in the video and the postevent questionnaire and items that were in neither the video nor the questionnaire), thus verifying that the elaboration manipulation selectively influenced performance on the suggested items, and did not have more global effects on memory performance. Hence, only participants' responses to the misleading suggestions are reported below.

RESULTS

For each misleading suggestion, participants provided two responses on the source test: whether the suggestion was from the video (remember, believe or neither), and whether the suggestion was from the postevent narrative/questionnaire (remember, believe, or neither). Because the misleading suggestions appeared only in the postevent narrative and questionnaire, a 'remember' or 'believe' response to the 'In Video?' source probe reflects a false recollection/belief regarding the suggestions' source, and a 'remember' or 'believe' response to the 'In Questions?' probe reflects accurate memory/belief regarding the suggestions' actual source. Note that for any given suggestion, it was possible for participants to falsely remember seeing the misleading suggestion in the video even though they accurately remembered reading about the misleading suggestion in the postevent questionnaire. Indeed, the evidence reported below shows they often did so.

All dependent measures were submitted to separate one-way ANOVA's with group (Emotion-Self, Emotion-Other, Perceptual-Elaboration, Repeated Exposure, No-Misinformation) as a between subjects factor. Fisher's LSD tests were used for all planned comparisons.

Does emotional elaboration increase false belief in suggested events?

Because participants who claim to remember witnessing the suggested items also presumably believe they saw the suggested details, both 'remember' and 'believe' responses to the 'In Video?' test probe were taken as evidence of false belief. Hence, for each participant, the measure of false belief was the proportion of suggested items (out of five) to which he/she responded either 'remember' or 'believe' in response to the 'In Video' probe (i.e. remember + believe). The results are illustrated in Figure 1. As expected, false belief in the suggested events varied as a function of group ($F(4, 266) = 35.75$, $MSe = .05$, $p < .001$). Inspection of Figure 1 clearly shows that the base rate of false assents in the No Misinformation group was low, and that exposure to misleading suggestions led to large increases in false belief regardless of elaboration condition. Hence, it is clear that when participants were not exposed to the suggestions, they were unlikely to infer that the suggested events had transpired.

The results also replicate the previous finding (Zaragoza & Mitchell, 1996) that repeated exposure to suggestion (i.e. simply reading the suggestion repeatedly) leads to large increases in false belief as evidenced by the fact that false belief in the suggested items in the Repeated Exposure group was much higher than in the No Misinformation group ($t(89) = 7.146$, $p < .0001$).

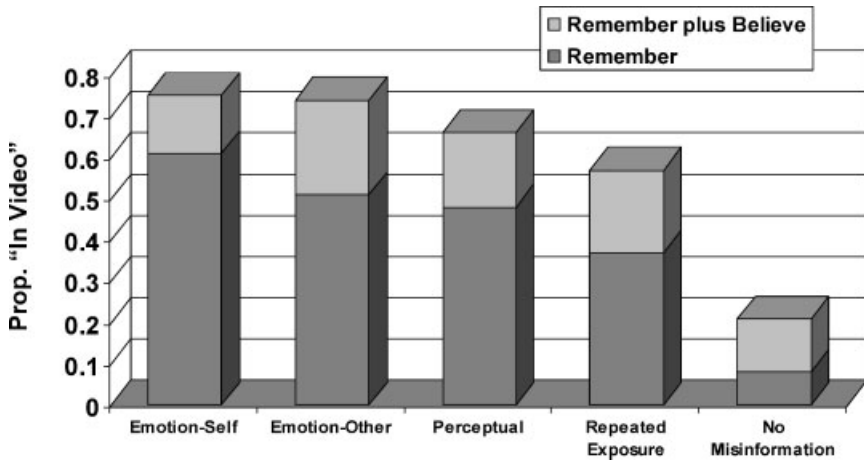


Figure 1. Mean proportion of 'remember' responses (darker shading of bar) and mean proportion of 'remember' + 'believe' responses to the 'In Video?' probe as a function of group in Experiment 1

Of primary relevance to the main hypothesis, the results also support the conclusion that emotional elaboration increased false belief over and above the effects of repeated suggestion, as false belief errors in both the Emotion-Self and Emotion-Other groups exceeded those of the Repeated Exposure group ($t(118) = 4.462, p < .0001$, and $t(118) = 4.145, p < .0001$ for the Emotion-Self and Emotion-Other groups, respectively), and the emotional elaboration groups did not differ from each other ($t(118) = .317, p > .05$). The results also replicated the finding (Drivdahl & Zaragoza, 2001) that perceptual elaboration increased false belief, as the Perceptual Elaboration group evidenced higher false belief than the Repeated Exposure group ($t(118) = 2.195, p < .05$). Interestingly, in this study, both the Emotion-Self and Emotion-Other groups had higher levels of false belief than the Perceptual Elaboration group ($t(118) = 2.268, p < .05$ and $t(118) = 1.951, p = .054$, respectively).

Does emotional elaboration increase false memory for suggested events?

The measure of false memory was the proportion of suggested items (out of five) which the participants claimed to 'remember' seeing in the video. The false memory results paralleled those of the false belief measure with the exception that the Emotion-Self group had higher rates of false memory than all of the other groups (see Figure 1). Once again the main effect of group was highly reliable ($F(4, 266) = 26.84, \text{MSE} = .060, p < .001$), and planned comparisons were conducted to assess the locus of the group differences. Inspection of Figure 1 shows that the base rate of 'remember in Video' responses in the No Misinformation group was exceedingly low, showing that participants who were not misled correctly rejected the misleading suggestions as not seen. The results once again replicate the finding that repeated exposure to misleading suggestions—even in the absence of elaboration—leads to large increases in false recollection, as participants in the Repeated Exposure group had a much higher rate of false memory errors than participants in the No Misinformation group ($t(89) = 5.365, p < .0001$).

As hypothesized, the results support the conclusion that emotional elaboration increased false memory, even when controlling for the effects of repeated exposure: both the

Emotion-Self and Emotion-Other groups made more false memory errors than the Repeated Exposure group ($t(118) = 5.303, p < .0001$ and $t(118) = 3.094, p < .01$ for the Emotion-Self and Emotion-Other groups, respectively). In addition, the Emotion-Self group had higher false memory rates than the Emotion-Other group ($t(118) = 2.210, p < .05$), thus suggesting that self-reference may increase false memory errors. Consistent with previous research, perceptual elaboration also increased false memory, as evidenced by the finding that the Perceptual Elaboration group made more false memory errors than the Repeated Exposure group ($t(118) = 2.210, p < .03$). Finally, the Emotion-Self group made more false memory errors than the Perceptual group ($t(118) = 2.939, p < .01$), but the Emotion-Other and Perceptual Elaboration groups did not differ from each other ($t(118) = .073, p > .05$).

Does emotional elaboration impair memory for the suggested items' actual source?

We next assessed whether participants in the emotional elaboration groups had poorer memory for the suggested items' actual source, as evidenced by their responses to the 'In Questions?' probe. The results revealed that the opposite was the case: with one exception, participants in the emotional elaboration groups had better memory for the source of the suggestions than the other misled groups, and this was true for both the 'remember' and the 'remember' + 'believe' measures. With regard to 'remember' responses there was a main effect of group ($F(4, 266) = 18.53, MSe = .06, p < .001$), with the Emotion-Self ($M = .48$) and the Emotion-Other ($M = .44$) groups exceeding performance in the Perceptual Elaboration group ($M = .35; t(118) = 3.0, p < .01$ and $t(118) = 2.1, p < .05$, respectively). However, only the Emotion-Self group exceeded performance in the Repeated Exposure group ($M = .38; t(118) = 2.276, p < .05$); the Emotion-Other and Repeated Exposure groups did not differ ($t(118) = 1.392, p > .05$).

With regard to the 'remember + believe' measure, there was again a main effect of group ($F(4, 266) = 47.57, MSe = .05, p < .001$), with both the Emotion-Self ($M = .74$) and Emotion-Other ($M = .73$) groups exceeding performance in the other misled groups (for Perceptual Elaboration, $M = .63, t(118) = 2.7, p < .01$ and $t(118) = 2.5, p < .05$, respectively, and for Repeated Exposure, $M = .60, t(118) = 3.5, p < .001$ and $t(118) = 3.2, p < .01$, respectively). In summary, increased false memory/false belief in the emotional elaboration groups was not associated with poorer memory for having encountered the suggestions in the postevent questions.

Finally, not surprisingly, participants in the No Misinformation group (who were never exposed to the misleading suggestions) rarely attributed them to the questions ($M = .04$ for 'remember' and $M = .14$ for 'remember' + 'believe' responses).

DISCUSSION

The results of Experiment 1 demonstrated that participants in the Emotion-Self and Emotion-Other groups evidenced both higher false belief and higher false memory for the suggested events than participants in the Repeated Exposure Group, who read the same misleading narratives and answered questions about the same suggested events, but were not encouraged to elaborate on them. Thus, these findings provide clear evidence that emotional elaboration, like perceptual elaboration, increases false belief and even false

recollections of having witnessed the suggested events. However, one question left unanswered by this finding is whether the emotional content of the elaborations, per se, contributed to the increases in false memory/false belief. Although the finding that emotional elaboration tended to produce higher false memory/false belief than perceptual elaboration would appear to support the conclusion that emotional content has effects over and above the effects of elaboration alone, it is unclear whether the differences in performance between the emotional elaboration and perceptual elaboration groups are due solely to differences in emotional content. This is because the elaborations produced by participants in the perceptual and emotional elaboration groups differed on several dimensions. For example, whereas the emotional elaboration questions asked participants to speculate on the reactions of the character to the suggested events (or how participants would react if they were the character) the perceptual elaboration questions asked participants about observable consequences of the suggested events or the physical context in which they occurred. Hence, it is possible that thinking about a character's likely reactions to an event is a more meaningful, engaging task than speculating about the physical surroundings or physical characteristics of a fictitious event. Moreover, the finding that only the Emotion-Self task produced higher false memory than the Perceptual Elaboration task (i.e. the Emotion-Other task did not result in higher false memory than Perceptual Elaboration) raises the possibility that the higher false memory rates in the Emotion-Self group were due to self-reference rather than emotion.

EXPERIMENT 2

In Experiment 2, we sought to assess whether the emotional content of the elaborations has effects on false memory/false belief over and above the effects of elaboration alone. To this end, we attempted to devise as 'elaboration controls' elaboration tasks that matched the tasks performed by participants in the Emotion-Self and Emotion-Other groups except for the emotional content of the elaboration, and named these the Self and Other groups. Emotional reactions to a situation are evaluative reactions that are both arousing and valenced (in the case of Experiment 1, negatively valenced). Participants in the Self and Other groups, were, like participants in the corresponding Emotion groups, asked to speculate about the reactions of the characters in the video to the suggested events (or in the Self condition, how they would react if they were the character in the video), but instead of asking participants to rate their likely emotional reactions, we asked them about specific, non-emotional (or affectively more neutral) reactions (e.g. the likelihood that the character expected, noticed or did something in response to the suggested event). For example, whereas participants in the Emotional-Other group were asked 'How embarrassed do you think Delaney felt at having injured himself in front of all the campers?', the participants in the Other group were asked, 'What is the likelihood Delaney expected someone to help him up after injuring himself in front of all the other campers?'. If emotional elaborations are more potent than non-emotional elaborations in promoting false memories, we would expect the Emotion-Self and Emotion-Other groups to have higher rates of false belief/false memory than the corresponding Self and Other groups.

In summary, Experiment 2 was a partial replication and extension of Experiment 1. There were a total of five groups, all of which were exposed to the misleading suggestions: Emotion-Self, Emotion-Other, Self, Other, and Repeated Exposure. The goals of this experiment were three-fold: (1) To replicate the finding that emotional elaboration

increases false memory and false belief in the misleading suggestions (as evidenced by higher rates of false belief/false memory in both the Emotion-Self and Emotion-Other groups relative to the Repeated Exposure group), (2) To assess if Self-reference increases false memory/false belief (as evidenced by higher rates of false belief/false memory in the 'self' groups (Emotion-self and Self) relative to their corresponding 'other' groups (Emotion-Other and Other), and (3) To assess if the emotional content of the elaborations contribute to the increase in false belief/false memory, as evidenced by higher rates of false belief/false memory in the emotion groups (Emotion-self and Emotion-other) relative to their non-emotional elaboration controls (Self and Other).

METHOD

Participants

Two hundred and nineteen undergraduate students participated in this study for course credit. Each subject was randomly assigned to one of the five experimental groups: Emotion-Self ($N=49$), Emotion-Other ($N=48$), Self ($N=42$), Other ($N=46$) and Repeated Exposure ($N=34$).

Materials and procedure

The design, materials and procedures were identical to Experiment 1 with the following modifications: (1) the addition of two groups: Self and Other, and (2) the removal of two groups: Perceptual Elaboration and No Misinformation. This resulted in 4 elaboration groups (Emotion-Self, Emotion-Other, Self, and Other) and a Repeated Exposure group. Hence, all participants in Experiment 2 were exposed to the misleading suggestions; what varied was the way they elaborated (or didn't elaborate) on the suggested items.

The tasks performed by participants in the Self and Other groups were identical to those performed by participants in the Emotion-Self and Emotion-Other groups, except that the reactions to the suggested events that they were asked to rate were more neutral in content. For example, all participants were exposed to the misleading suggestion that *Delaney grounded the boys as punishment* (the video shows Delaney yelling at the boys, but he does not punish them). Whereas participants in the Emotion-Self and Emotion-Other groups were asked to rate how *resentful* they/the boys likely felt at having been grounded as punishment, participants in the Self and Other conditions rated the likelihood that they/the boys would have *obeyed* the punishment (the complete listing of elaboration questions for the Self and Other groups are provided in the Appendix).

RESULTS

As in Experiment 1, the measures of primary interest were false belief in having witnessed the suggested events and false memory of having witnessed the suggested events. As in experiment 1, both 'remember' and 'believe' responses to the 'In Video?' probe were taken as evidence of false belief, whereas only 'remember' responses to the 'In Video?' probe were taken as evidence of false memories. Both measures were first submitted to separate one-way ANOVA's with group (Emotion-self, Emotion-other, Self, Other, Repeated

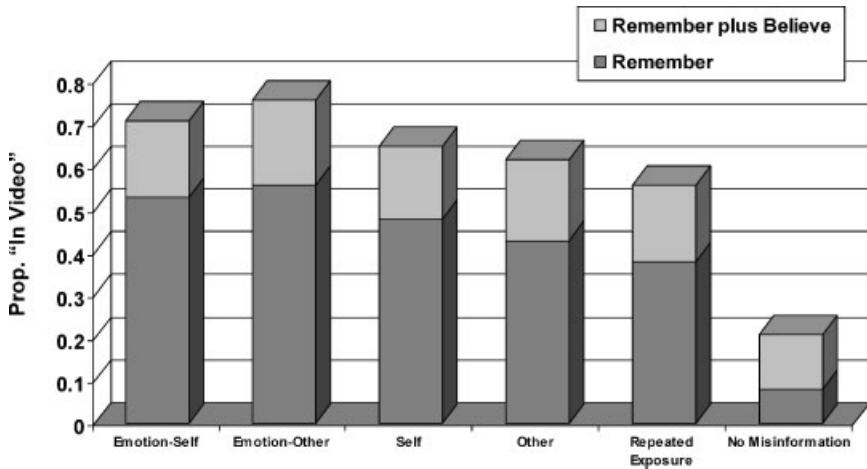


Figure 2. Mean proportion of 'remember' responses (darker shading of bar) and mean proportion of 'remember' + 'believe' responses to the 'In Video?' probe as a function of group in Experiment 2

Exposure) as a between subjects factor. The results are illustrated in Figure 2 (the results from the No Misinformation control group in Experiment 1 are included in the figure to provide an estimate of base rate errors, but this group was not included in the analyses reported below).

Inspection of Figure 2 reveals three observations that were supported by the statistical analyses, and the outcome was the same for both measures (false memory and false belief): (1) as in Experiment 1, there was clear evidence of an emotional elaboration effect, in that false belief and false memory in the emotion groups (Emotion-Self and Emotion-Other) exceeded that of the Repeated Exposure group, (2) in contrast to Experiment 1, there was no evidence of a self-reference effect, insofar as false assents in the 'self' groups did not exceed those of their corresponding 'other' groups, and (3) emotional elaboration led to higher levels of false belief/false memory than other types of elaboration such that false memory and false belief in the emotion groups (Emotion-Self and Emotion-Other) exceeded that of the other elaboration groups (Self and Other).

Does emotional elaboration increase false belief in misleading suggestions?

As can be seen in Figure 2, false belief in having witnessed the suggested events (i.e. the sum of 'remember' and 'believe' in video responses) varied as a function of group ($F(4, 214) = 3.662$, $MSe = 1.698$, $p < .01$). Planned comparisons confirmed that self-reference did not increase false belief; performance in the Emotion-Self and Emotion-Other groups did not differ ($t(95) = .983$, $p > .05$) nor did performance in the Self and Other groups differ ($t(86) = .612$, $p > .05$). For this reason, we collapsed across this variable in subsequent analyses, which resulted in three groups: Emotional Elaboration (Emotion-Self and Emotion-Other combined), Non-emotional Elaboration (Self and Other combined) and Repeated Exposure.

As in Experiment 1, we found that emotional elaboration increased false belief as evidenced by higher false belief in the Emotional Elaboration groups ($M = .73$) than in the Repeated Exposure group ($M = .56$; $F(1,129) = 13.881$, $MSe = 1.359$, $p < .001$).

Importantly, the results also revealed that Emotional Elaboration led to higher false belief ($M = .73$) than Non-emotional Elaboration ($M = .63$; $F(1,183) = 6.735$, $MSe = 1.641$, $p < .05$), thus providing evidence that the emotional content of the elaboration contributed to the increase in false belief. Finally, although the Non-emotional Elaboration groups evidenced numerically higher false belief rates ($M = .63$) than the Repeated Exposure group ($M = .56$), this difference did not reach statistical significance ($F(1,121) = 1.6$, $p > .20$). (The results remained the same when the Self and Other groups were each compared to the Repeated Exposure group separately, all p 's $> .10$).

Does emotional elaboration increase false memory?

The pattern of results for false memory (i.e. 'remember' in video responses) mirrored those obtained for false belief (see Figure 2). Participants' claims that they 'remembered' witnessing the suggested items varied as a function of group ($F(4, 214) = 2.870$, $MSe = 2.07$, $p < .05$). Planned comparisons confirmed that self-reference did not increase false memory: In contrast to the results of Experiment 1, false memory rates in the Emotion-Self and Emotion-Other group did not differ ($t(95) = .547$, $p > .05$; in fact they were numerically lower in the Emotion-Self group), nor did false memory rates in the Self and Other groups differ ($t(86) = .814$, $p > .05$). Accordingly, the data were collapsed across this variable in subsequent analyses in the manner described above.

We once again replicated the finding from Experiment 1 that emotional elaboration increased false memory as evidenced by higher false memory in the Emotional Elaboration groups ($M = .55$) than in the Repeated Exposure group ($M = .38$; $F(1,129) = 13.881$, $MSe = 1.359$, $p < .05$). In addition, the results converge with those of the false belief measure in showing that Emotional Elaboration led to higher false memory rates ($M = .55$) than Non-emotional Elaboration did ($M = .45$, $F(1, 183) = 5.168$, $MSe = .2074$, $p < .05$), thus providing evidence that the emotional content of the elaborations increased false memory over and above the effects of elaboration alone. Finally, although false memory rates were somewhat higher in the Non-emotional Elaboration groups ($M = .45$) than in the Repeated Exposure group ($M = .38$), this difference was not significant ($p > .20$). (The results remained the same when the Self and Other groups were each compared to the Repeated Exposure group separately, both p 's $> .10$).

Does emotional elaboration impair memory for the suggestions' actual source?

As in Experiment 1, we also assessed whether, relative to their controls, participants in the emotional elaboration groups had poorer memory for the suggested items' actual source as evidenced by their responses to the 'In Questions?' probe. Consistent with the results of Experiment 1, there was no evidence that emotional elaboration impaired memory for the suggestions' actual source, and this was true for both the 'remember' measure (M 's = .50, .46, .45, and .44 for the Emotion-Self, Emotion-Other, Self, and Other groups, respectively, $F(3,180) = 0.38$, $p > .70$), and for the 'remember + believe' measure (M 's = .73, .75, .70, and .68 for the Emotion-Self, Emotion-Other, Self, and Other groups, respectively, $F(3, 180) = 0.76$, $p > .50$). If anything, memory for actual source was slightly *better* in the emotional elaboration groups, but this difference was not statistically reliable, even when collapsing across the self and other variable (for 'remember' responses: $F(1,182) = 0.60$, $p > .4$; for 'remember + believe': $F(1,182) = 1.9$, $p > .10$). In summary, as in Experiment 1, increased false memory and false belief in the emotional elaboration groups was not

associated with poorer memory for having encountered the suggestions in the postevent questions.

DISCUSSION

In summary, the results of Experiment 2 reinforce and extend those of Experiment 1. We once again obtained clear evidence that emotional elaboration of suggested events increases both false belief and false memory of having witnessed the suggested events. More importantly, the results of Experiment 2 provide evidence that the emotional content of the elaborations plays a role in the development of these false memory errors, insofar as emotional elaboration led to higher false memory than non-emotional elaboration. One remaining puzzling aspect of the data is the inconsistency in the findings for the Emotion-Self group across the two experiments. Whereas the Emotion-Self group had higher errors than the Emotion-Other group in Experiment 1, there was absolutely no evidence of such a difference in Experiment 2. Indeed, Experiment 2 found no evidence for a self-reference effect in false memory, even in the non-emotional elaboration groups. Perhaps this is because participants assigned to the 'other' groups in Experiment 2 were especially likely to think about how they would react in making judgments about how others would react in these situations. When considered collectively, the results of these experiments do not provide compelling evidence for a self-reference effect in this suggestibility paradigm.

Finally, although it is somewhat surprising that the Self and Other conditions did not produce statistically significant increases in false memory and false belief relative to the Repeated Exposure group, it is nevertheless the case that numerically, the Self and Other groups had higher error rates than the Repeated Exposure group. It is also important to keep in mind that participants in the Repeated Exposure group had very high false memory rates (mean 'remember' in video responses was .38), especially when compared to the rate of false memory errors among participants who were not exposed to these suggestions ($M = .08$). The high level of falsely recollected suggested items in the Repeated Exposure group likely reflects the fact that participants in the Repeated Exposure group engaged in spontaneous elaborations of the suggested items. Recall that participants in the Repeated Exposure group first encountered the misleading suggestions embedded in a coherent, narrative description of the witnessed event, and then later read the misleading suggestions (twice) embedded in the context of sentences that described actual scenes from the video. It is likely that in the process of reading and comprehending these meaningful texts participants developed a 'mental model' that incorporated some of the misleading suggestions, thus leading to false memories in the Repeated Exposure group. Given the relatively high rate of false memories in the Repeated Exposure groups, it is all the more striking that emotional elaboration led to additional increases in false memory and false belief.

GENERAL DISCUSSION

The results of the present studies support the conclusion that emotional elaboration is a powerful catalyst for false memory creation. Participants in both studies who elaborated on the emotional consequences of fictitious suggestions were more likely to later report having

witnessed these suggestions than participants who received the same repeated suggestions but were not encouraged to elaborate on them. Moreover, the results of Experiment 2 support the conclusion that elaborating on the emotional consequences of suggested events is more potent than other kinds of meaningful elaboration in producing false beliefs and false memories. It should be noted, however, that in this study, the emotional elaborations all focused on negative emotions (disgusted, embarrassed, upset, irate, resentful). Whether elaborating on the potential *positive* emotional consequences of fictitious events would similarly increase false memory cannot be addressed by the present study, and remains an important question for future research.

Why might emotional elaboration be especially likely to increase false memories? The results of both experiments ruled out the possibility that emotional elaboration impaired encoding of the suggestions' true source. This result may seem surprising in light of prior evidence that an emotional focus can impair source memory (e.g. Hashtroudi et al., 1994; Johnson et al., 1996). Recall, however, that participants in our study did not engage in emotional elaboration of the suggested events until they had been exposed to the misleading suggestions twice. That is, participants were not asked to reflectively elaborate on the emotional consequences of the misleading suggestions until after they had first read a coherent postevent narrative containing the misleading suggestions, and then read segments of the narrative (several of which contained the statements containing the suggestions). The questions that induced them to elaborate on the likely emotional consequences of the suggested events followed these misleading statements. Hence, in this study participants had ample opportunity to encode the source of the postevent suggestions before engaging in emotional focus, such that any trade-offs between emotional and perceptual processing may not have interfered with an already established memory for the suggestions' actual source. Furthermore, because most of the information contained in the postevent narrative and questions accurately described the witnessed event, knowledge that some piece of information appeared in the postevent source did not necessarily imply that it was false. Hence, as shown here, it was possible for emotional elaboration to increase false recollections of having witnessed the misleading suggestions without impairing participants' ability to remember that the suggestions were encountered in a postevent source.

One possibility is that there is something especially vivid, distinctive or compelling about affective or emotional detail, that makes it more salient and perhaps more memorable than other types of elaborations (cf., Ochsner, 2000). Moreover, because rich emotional detail is a quality that is often associated with real events, adding plausible emotional detail to a fictitious event that was lacking in such detail may make it especially confusable for a real one. Although emotional stimuli are often arousing, it seems unlikely that arousal contributed to the false memory results presented here. The events depicted in the movie should have been of little personal significance to the participants, and the fictitious events and their emotional consequences (e.g. getting punished and feeling resentful, losing a purse and getting upset) are relatively 'mild', everyday experiences. Rather, it would seem that the effects of emotional elaboration observed in the present study were due to the negative valence of the elaborations. Negatively valenced emotional elaborations may be inherently more meaningful than neutral elaborations, as emotionally charged situations are usually more consequential than those that are not. Moreover, because emotions have rich interconnections with other semantic information in memory (Kensinger, 2004) emotional stimuli may lead to more spontaneous and extensive elaboration than non-emotional stimuli. If it was easier or more natural for participants to engage in

emotional elaboration relative to other types of elaboration, participants' memory of having self-generated the elaborations may have been lower in the emotion groups, thus predisposing them to greater misattribution of the suggested items' source (see, e.g. Johnson & Raye, 1981, for evidence that effortful generation increases memory for the cognitive operations that can serve as cues to source). Hence, it is possible that although we attempted to equate amount of elaboration across groups, it was nevertheless the case that participants engaged in less effortful or more extensive elaboration when performing emotional elaboration as compared to the other elaboration tasks (e.g. self-reference or perceptual elaboration). Clearly, understanding the mechanisms by which emotional elaboration of suggested events increases false memory remains an important question for future research.

The results of the present study add to the growing body of evidence that *reflective processes* play an important role in promoting the development of false memories for suggested events (cf., Johnson, 1992). Although exposure to misleading suggestions can set the stage for false memory development, reflectively embellishing suggested events in ways that increase their similarity to real events further increases the incidence of false recollections. Whereas previous research has focused on the role of visual imagery and perceptual elaboration in promoting false memory, the present studies show that reflectively elaborating on the likely emotional correlates and consequences of a fictitious event will similarly increase false memory development. Given that emotional detail is one of the characteristics that distinguishes real from imagined events (Suengas & Johnson, 1988) a suggested memory that has relevant emotional detail is more likely to be confused for a real memory than a comparable one that is devoid of such emotional content.

The results of the present studies have potentially important implications for real-world therapeutic and forensic interview situations. Therapists sometimes suspect that a client is a victim of childhood abuse even when he or she claims to have no memory of such abuse (e.g. Loftus & Ketcham, 1994). In an effort to help clients recover these alleged memories of abuse, they are sometimes encouraged to imagine how such abuse may have transpired and to reflect on how they feel when doing so (see, e.g. Lindsay & Read, 1994). As the focus of therapy may be on dealing with emotions rather than on historical accuracy, clients may not use very stringent criteria when evaluating the validity of their memories. In line with this, certain popular self help books even suggest that what matters most is not so much what people remember initially but rather what they feel. The present findings suggests that reflectively elaborating on the emotional implications of fictitious childhood events is likely to create a representation of the event that is compelling and vivid and shares many of the characteristics of a memory for an experienced event, thus increasing the chances that it would be confused for a real memory.

Of course, there are many important differences between the present study and real-world therapeutic and forensic interview situations, and these differences limit our ability to generalize the present findings to these real-world scenarios. The events studied here were not autobiographical events, but rather videotaped events that were viewed by participants in the context of the laboratory, and that had minimal personal significance for them. Moreover, due to ethical considerations, it was impossible to replicate the types of suggestions and suggestive practices that often occur in real world therapeutic and forensic interviews. Nevertheless, the benefit of the controlled laboratory setting used in the present study is that it provides clear evidence that emotional elaboration has an impact on false memory development. Given that emotional details of relatively low intensity are capable of producing the increases in false memory documented here, it is possible that such

false memory phenomena would be amplified in real-world situations characterized by more extreme emotion and personal significance.

ACKNOWLEDGEMENTS

Portions of this research were included in a doctoral dissertation submitted by Sarah B. Drivdahl in partial fulfilment of the requirements for the Doctor of Philosophy degree. We thank Kristie Payment, Bill Merriman and Dan Levin for helpful discussions about this project. This work was supported in part by NSF grant SES-9819303 to M.S.Z.

REFERENCES

- Ceci, S. J., Loftus, E. F., Leichtman, & Bruck, M. (1994). The possible role of source misattributions in the creation of false beliefs among preschoolers. *The International Journal of Clinical and Experimental Hypnosis*, *42*, 304–320.
- Dobson, M., & Markham, R. (1993). Imagery ability and source monitoring: Implications for eyewitness memory. *British Journal of Psychology*, *32*, 111–118.
- Doyle, J. (2005). *True witness: Cops, courts, science, and the battle against misidentification*. New York: Palgrave MacMillan.
- Drivdahl, S. B., & Zaragoza, M. S. (2001). The role of perceptual elaboration and individual differences in the creation of false memories for suggested events. *Applied Cognitive Psychology*, *15*, 265–281.
- Gardiner, J. M. (1988). Functional aspects of recollective experience. *Memory and Cognition*, *16*, 309–313.
- Garry, M., Manning, C. G., Loftus, E. F., & Sherman, S. J. (1996). Imagination inflation: Imagining a childhood event inflates confidence that it occurred. *Psychonomic Bulletin & Review*, *3*, 208–214.
- Goff, L. M., & Roediger, H. L. (1998). Imagination inflation for action events: Repeated imaginings lead to illusory recollections. *Memory & Cognition*, *26*, 20–33.
- Gonsalves, B., Reber, P. J., Gitelman, D. R., Parrish, T. B., Mesulman, M. M., & Paller, K. A. (2004). Neural evidence that vivid imaging can lead to false remembering. *Psychological Science*, *15*, 655–660.
- Hashtroudi, S., Johnson, M. K., & Chrosniak, L. D. (1990). Aging and qualitative characteristics of memories for perceived and imagined complex events. *Psychology and Aging*, *5*, 119–126.
- Hashtroudi, S., Johnson, M. K., Vnek, N., & Ferguson, S. A. (1994). Aging and the effects of affective and factual focus on source monitoring and recall. *Psychology and Aging*, *9*, 160–170.
- Hyman, I. R., & Pentland, J. (1996). The role of mental imagery in the creation of false childhood memories. *Journal of Memory and Language*, *35*, 101–117.
- Jacoby, L. L., Kelley, C. M., & Dywan, J. (1989). Memory attributions. In H. L. Roediger, III, & F. I. M. Craik (Eds.), *Varieties of memory and consciousness: Essays in honour of Endel Tulving*. Hillsdale, NJ: Erlbaum.
- Johnson, M. K. (1992). MEM: Mechanisms of recollection. *Journal of Cognitive Neuroscience*, *4*, 268–280.
- Johnson, M. K., Bush, J. G., & Mitchell, K. J. (1998). Interpersonal reality monitoring: Judging the sources of other people's memories. *Social Cognition*, *16*, 199–224.
- Johnson, M. K., Foley, M. A., Suengas, A. G., & Raye, C. L. (1988). Phenomenal characteristics of memories for perceived and imagined autobiographical events. *Journal of Experimental Psychology: General*, *117*, 371–376.
- Johnson, M. K., Hashtroudi, S., & Lindsay, D. S. (1993). Source monitoring. *Psychological Bulletin*, *112*, 3–28.
- Johnson, M. K., Nolde, S., & DeLeonardis, P. (1996). Emotional focus and source monitoring. *Journal of Memory and Language*, *35*, 135–156.

- Johnson, M. K., & Raye, C. L. (1981). Reality monitoring. *Psychological Review*, 88, 67–85.
- Kensinger, E. A. (2004). Remembering emotional experiences: The contribution of valence and arousal. *Reviews in the Neurosciences*, 15, 241–251.
- Kensinger, E. A., & Schacter, D. L. (2006). Reality monitoring and memory distortion: Effects of negative, arousing content. *Memory & Cognition*, 34, 251–260.
- Klein, S. B., & Kihlstrom, J. F. (1986). Elaboration, organization, and self-reference in memory. *Journal of Experimental Psychology: General*, 115, 26–38.
- Lane, S. M., & Zaragoza, M. S. (2007). A little elaboration goes a long way: The role of generation in eyewitness suggestibility. *Memory & Cognition*, 35, 1255–1266.
- 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., & Read, J. D. (1994). Psychotherapy and memories of childhood sexual abuse: A cognitive perspective. *Applied Cognitive Psychology*, 8, 281–338.
- Loftus, E. F. (2003). Make-believe memories. *American Psychologist*, 58, 864–873.
- Loftus, E. F., & Ketcham, K. (1994). *The myth of repressed memory*. New York: St. Martin's Press.
- Mather, M. (2007). Emotional arousal and memory binding: An object-based framework. *Perspectives on Psychological Science*, 2, 33–52.
- Mitchell, K. J., & Johnson, M. K. (2000). Source monitoring: Attributing mental experiences. In E. Tulving, & F. I. M. Craik (Eds.), *Oxford handbook of memory* (pp. 179–195). New York: Oxford University Press.
- Ochsner, K. N. (2000). Are affective events richly “remembered” or simply familiar? The experience and process of recognizing feelings past. *Journal of Experimental Psychology: General*, 129, 242–261.
- Rogers, T. B., Kuiper, N. A., & Kirker, W. S. (1977). Self-reference and the encoding of personal information. *Journal of Personality and Social Psychology*, 35, 677–688.
- Suengas, A., & Johnson, M. K. (1988). Qualitative effects of the rehearsal of memories for perceived and imagined complex events. *Journal of Experimental Psychology General*, 117, 377–389.
- Thomas, A. Y., Bulevich, J. B., & Loftus, E. F. (2003). Exploring the role of repetition and sensory elaboration in the imagination effect. *Memory & Cognition*, 31, 630–640.
- Zaragoza, M. S., Belli, R. S., & Payment, K. E. (2007). Misinformation effects and the suggestibility of eyewitness memory. In M. Garry, & H. Hayne (Eds.), *Do justice and let the sky fall: Elizabeth F. Loftus and her contributions to science, law, and academic freedom* (pp. 35–64). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Zaragoza, M. S., & Mitchell, K. J. (1996). Repeated exposure to suggestion and the creation of false memories. *Psychological Science*, 7, 294–300.
- Zaragoza, M. S., Payment, K. E., Ackil, J. K., Drivdahl, S. B., & Beck, M. (2001). Interviewing witnesses: Forced confabulation and confirmatory feedback increase false memories. *Psychological Science*, 12, 473–477.

APPENDIX

Follow-up Questions for the 5 Suggested Items (underlined) Used in Experiments 1 and 2 as a Function of Group.

After that, Delaney stood on a chair to get everyone's attention. However, the chair broke and he injured himself as he fell to the floor.

Emotion-self

(Exp. 1, 2*): Imagine how embarrassed you would have felt if you had been Delaney and had just injured yourself in front of all of the campers.

Emotion-other

(Exp. 1, 2*): Imagine how embarrassed Delaney felt at having injured himself in front of all of the campers.

Perceptual elaboration

(Exp. 1): Imagine how hard he fell on the floor when he injured himself. How hard did he fall?

Grammaticality rating (Repeated Exposure)

(Exp. 1, 2): After that, Delaney stood on a chair to get everyone's attention. However, the chair broke and he injured himself as he fell to the floor.

Self

(Exp. 2): If you had been Delaney, what is the likelihood you would have expected someone to help you up after injuring yourself?

Other

(Exp. 2): What is the likelihood Delaney expected someone to help him up after injuring himself?

The ladies swam to the other boats safely. However one lady lost her purse.

Emotion-self

(Exp. 1, 2*): Imagine how upset you would have felt if you had been the lady who lost her purse.

Emotion-other

(Exp. 1, 2*): Imagine how upset she felt at having lost her purse.

Perceptual elaboration

(Exp. 1): Imagine how much confusion there was in the scene where the lady lost her purse. How much confusion was there?

Grammaticality rating (Repeated Exposure)

(Exp. 1): The ladies swam to the other boats safely. However one lady lost her purse.

Self

(Exp. 2): If you had been the lady, what is the likelihood you would have given up looking for your purse right away?

Other

(Exp. 2): What is the likelihood the lady gave up looking for her purse right away?

In the next scene, the visitors were seated at long tables eating an overcooked casserole for lunch.

Emotion-self

(Exp. 1, 2*): Imagine how disgusted you would have felt if you had been one of the visitors eating the overcooked casserole.

Emotion-other

(Exp. 1, 2*): Imagine how disgusted they felt at having to eat an overcooked casserole.

Perceptual elaboration

(Exp. 1): Imagine how crowded the dining hall was as everyone tried to eat the overcooked casserole in these cramped surroundings. How crowded was it?

Grammaticality rating (Repeated Exposure)

(Exp. 1, 2): In the next scene, the visitors were seated at long tables eating an overcooked casserole for lunch.

Self

(Exp. 2): If you had been one of the visitors, what is the likelihood you would have noticed the casserole was overcooked?

Other

(Exp. 2): What is the likelihood the visitors noticed the casserole was overcooked?

In the next scene, several boys were shown picking on Sullivan. They accused him of stealing from them and pushed him into the water.

Emotion-self

(Exp. 1, 2*): Imagine how irate you would have felt if the boys had accused you of stealing from them.

Emotion-other

(Exp. 1, 2*): Imagine how irate Sullivan felt that the boys had accused him of stealing from them.

Perceptual elaboration

(Exp. 1): Imagine how hard they dunked Sullivan under the water after accusing him of stealing from them. How hard did they dunk him?

Grammaticality rating (Repeated Exposure)

(Exp. 1): In the next scene, several boys were shown picking on Sullivan. They accused him of stealing from them and pushed him into the water.

Self

(Exp. 2): If you had been Sullivan, what is the likelihood you would have told an adult that the boys had accused you of stealing from them?

Other

(Exp. 2): What is the likelihood Sullivan told an adult that the boys had accused him of stealing from them?

Next Delaney yelled at the boys and grounded them as punishment.

Emotion-self

(Exp. 1, 2*): Imagine how resentful you would have felt if you had been one of those boys as they were punished at summer camp.

Emotion-other

(Exp. 1, 2*): Imagine how resentful the boys felt to have been punished at summer camp.

Perceptual elaboration

(Exp. 1): Imagine how quickly the boys left the scene after being punished. How quickly did they leave?

Grammaticality rating (Repeated Exposure)

(Exp. 1): Next Delaney yelled at the boys and grounded them as punishment.

Self

(Exp. 2): If you had been one of these boys, what is the likelihood you would have obeyed the punishment?

Other

(Exp. 2): What is the likelihood the boys obeyed the punishment?

**Note:* In Experiment 2 the word ‘imagine’ was deleted from the questions in the Emotion-self and Emotion-other conditions so as to make the wording comparable to that used in the corresponding Self and Other conditions.