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When Forced Fabrications Become Truth: Causal Explanations and False Memory Development

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Studies of text comprehension have amply demonstrated that when reading a story, people seek to identify the causal and motivational forces that drive the interactions of characters and link events (e.g., Zwaan, Langston, & Graesser, 1995), thereby achieving explanatory coherence. In the present study we provide the first evidence that the search for explanatory coherence also plays a role in the memory errors that result from suggestive forensic interviews. Using a forced fabrication paradigm (e.g., Chrobak & Zaragoza, 2008), we conducted 3 experiments to test the hypothesis that false memory development is a function of the explanatory role these forced fabrications served (the explanatory role hypothesis). In support of this hypothesis, participants were more likely to subsequently freely report (Experiment 1) and falsely assent to (Experiment 2) their forced fabrications when they helped to provide a causal explanation for a witnessed outcome than when they did not serve this explanatory role. Participants were also less likely to report their forced fabrications when their explanatory strength had been reduced by the presence of an alternative explanation that could explain the same outcome as their fabrication (Experiment 3). These findings extend prior research on narrative and event comprehension processes by showing that the search for explanatory coherence can continue for weeks after the witnessed event is initially perceived, such that causally relevant misinformation from subsequent interviews is, over time, incorporated into memory for the earlier witnessed event.

Keywords: false memory, eyewitness memory, source monitoring, causal processing, text comprehension

Eyewitness events, like most consequential real-world experiences, do not occur in isolation, but are followed by a series of related experiences (e.g., interactions with other eyewitnesses, conversations with friends and family, media coverage). One postevent experience that is common to eyewitnesses is forensic interviews with police and legal professionals. Although such interviews are essential to the investigative process, they also provide an opportunity for witnesses to be exposed to new, or potentially misleading, information that may not coincide with the events they actually witnessed. Many studies have shown that exposure to misinformation in the context of forensic interviews has the potential to contaminate eyewitness memory, a phenomenon that is commonly referred to as *eyewitness suggestibility*.

Much of the research on eyewitness suggestibility has involved variants of an experimental paradigm developed by Loftus and colleagues in the 1970s (e.g., Loftus, 1975, 1977; Loftus, Miller, & Burns, 1978; Loftus & Palmer, 1974). In the standard misinformation experiment, participants view an eyewitness event, are subsequently interviewed, and at some later point receive a final memory test about the events they witnessed. At the time of the interview, participants are exposed to information that was not depicted in the original event (e.g., participants who viewed a house theft by two unarmed men are later falsely informed that one of the thieves was carrying a gun). The consistent finding across numerous experiments of this type is that participants are likely to report the misinformation when later tested on their memory for the original event. Subsequent research has verified that exposure to misinformation not only influences what participants report, but can also lead to the development of genuine false memories that are held with a high degree of confidence (for reviews, see, e.g., Ayers & Reder, 1998; Loftus, 2005; Zaragoza, Belli, & Payment, 2007). Demonstrations of the surprising ease with which people can be led to report objects and events they had not witnessed has challenged prevailing views about the validity of memory and raised serious concerns about the reliability of eyewitness testimony.

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Although the literature on misinformation effects is highly relevant to real-world forensic situations, one limitation of this research is that forensic suggestive interviews are not restricted to situations where an interviewer provides or implants some piece of false information (e.g., suggesting that a suspect carried a gun when he did not). Rather, in some forensic interviews, interviewers may attempt to elicit testimony about events that the witness did not see, does not remember, or that did not actually take place. This may happen, for example, in situations where investigators are looking for information that corroborates their preconceived notions about how events transpired, or when investigators press suspects to confess to crimes they did not commit (see, e.g., Kassin, 2006; Lassiter & Meissner, 2010). In such cases, interviewers may push witnesses to go beyond their actual memory, pressuring them to speculate or even fabricate information about events that never happened. In such coercive interview contexts, witnesses may succumb to this pressure in an attempt to satisfy the interviewer and knowingly provide a fabricated account (i.e., they are forced to fabricate). Recent research using the *forced fabrication paradigm* has sought to address whether witnesses who are pressed to fabricate fictitious events might come to believe they remember witnessing the events they had earlier knowingly fabricated.

The forced fabrication paradigm (Ackil & Zaragoza, 1998, 2011; Chrobak & Zaragoza, 2008; Frost, Lacroix, & Sanborn, 2003; Hanba & Zaragoza, 2007; Memon, Zaragoza, Clifford, & Kidd, 2010; Zaragoza, Payment, Ackil, Drivdahl, & Beck, 2001) is similar to the traditional misinformation paradigm, in that participants view an eyewitness event, are subsequently suggestively interviewed about the event, and are later tested on their memory for the witnessed event. Where the forced fabrication paradigm differs from the traditional misinformation paradigm is in the nature of the suggestive interview: Rather than having the interviewer provide, or implant, some piece of false or misleading information, in the forced fabrication paradigm, participant-witnesses are pressed to answer questions about fictitious objects or events, and hence generate the false information themselves. Importantly, participants are not permitted to evade the interviewer's request to provide an answer to the false-event questions. Rather, they are informed ahead of time that they must respond to all questions, even if they have to guess. Although participants typically resist answering these false-event questions (either by refusing to respond or by overtly stating that the false event did not happen or that they do not remember), the interviewer forces them to comply by repeatedly insisting that they just "give their best guess" until participants eventually acquiesce by providing a relevant, fabricated response (for related paradigms that involve telling participants to guess or speculate, without forcing them to do so, see Pezdek, Sperry, & Owens, 2007; Pezdek, Lam, & Sperry, 2009; for studies with children, see Compo & Parker, 2010; Schreiber & Parker, 2004; Schreiber, Wentura, & Bilsky, 2001).

Intuitively, it would seem that the experience of being forced to fabricate information under duress would be salient and highly memorable to participants, and thus they would remember that the fabricated items were mere conjectures they had been pressed to provide. Contrary to this notion, however, there is now considerable evidence that after retention intervals as short as 1 week, participants are prone to developing false memories for information they had earlier been forced to fabricate knowingly[1] (Ackil & Zaragoza, 1998, 2011; Frost et al., 2003; Hanba & Zaragoza, 2007; Memon et al., 2010; Zaragoza et al., 2001).

Whereas initial studies of forced fabrication had participants fabricate isolated items or details that were incidental to the story line (e.g., participants were pressed to describe the type of hat someone was wearing when he was not wearing a hat), a recent study by Chrobak and Zaragoza (2008) extended these results to situations where participants were forced to fabricate entire fictitious events that were extended in time and involved people, actions, and locations that were never actually witnessed. In the Chrobak and Zaragoza study, unlike all previous studies of forced fabrication, the events participants were pressed to fabricate were central to the story line and were linked to salient outcomes participants had witnessed. Next, we describe the Chrobak and Zaragoza study in detail, because it serves as the basis for the studies reported here.

Participants first witnessed a film clip depicting the adventures of two brothers at a summer camp. In one scene, two camp counselors sneak out at night and are depicted getting into canoes. The clip then cuts to the next day and depicts the counselors getting severely reprimanded and punished by the camp director. When interviewed about this scene during the postevent interview, participants were pressed to answer the false-event question: "Where did the counselors go and what did they do that caused them to get in trouble the next day?" To answer this question, participants were required to make up, or fabricate, a fictitious event, because the video clip did not depict them going anywhere. The following excerpt from an interview illustrates how participants in that study resisted fabricating these extended fictitious events:

P: . . . (long pause) . . . You know, I really don't remember. I don't remember that scene.

E: I just need your best guess then.

P: Um (long pause) . . . I'm drawing an absolute blank. I can't even formulate it in my mind . . .

E: Ok just your best guess.

P: Um, they went to the girls' camp, I don't, I don't know . . .

E: Ok, and once they were at the girls' camp, what specifically were they doing?

[1] In this article, the term *false memory* is operationally defined as those cases where participants incorrectly claim they witnessed their forced fabrications when tested on their memory for the witnessed event (by either freely recalling the fabricated event or falsely assenting to it). In some cases participants may claim they remember witnessing their fabrications because they believe they were part of the witnessed event, and not because they have a specific recollection of having witnessed them (see, e.g., Zaragoza et al., 2007, for a discussion of the false-belief/false-memory distinction and the methodological difficulties inherent in distinguishing between high-confidence false beliefs and false memories). Although there is some evidence that participants can distinguish between false beliefs and false memories if directed to do so (Frost et al., 2003; Lane & Zaragoza, 1995, 2007; Roediger, Jacoby, & McDermott, 1996; Zaragoza & Mitchell, 1996; Zaragoza, Mitchell, Payment, & Drivdahl, 2011), such measures of phenomenological experience were not employed in the current experiments. Hence, the false memory effects reported herein may reflect confidently held false beliefs rather than false recollections, per se.

P: . . . (long pause) . . . Hmm . . .

E: I just need your best guess.

P: Um, let's say they stole something, probably completely wrong. But why not?

E: What did they steal?

P: Um . . . I haven't a clue, let's say clothes, they stole clothes.

One week later participants returned to the lab, and half of the participants were warned that they may have been interviewed about events that never happened. All participants were then given a recognition test of the witnessed event that included the events they had earlier been pressed to fabricate (e.g., "When you watched the video, did you see *the counselors go to the girls' camp and steal clothes?*"). Warned participants showed no evidence of false memory for their forced fabrications on this test—presumably because they accurately remembered that they had been forced to fabricate them.

The finding of interest occurred when all participants returned 6–8 weeks later for a final free-recall test. Participants were instructed to recall the events they had seen in the video as accurately and completely as possible—as if they were providing testimony in a court of law. They were not given any additional prompts or cues, and had complete freedom to discuss as much or as little of the video as they wished. Prior research has shown that free reports tend to by highly accurate (although often incomplete), as people are quite good at limiting their free recall to those aspects of the event that they remember with high confidence (see, e.g., Koriat & Goldsmith, 1996; Weber & Brewer, 2008). In this case, however, participants' free recall was far from accurate: Overall, both warned and unwarned participants freely reported their forced fabrications nearly half (i.e., 47%) of the time—and this rate of false recall was nearly identical for those fabrications that participants had correctly and publicly rejected as "not seen" on the 1-week recognition test. This latter finding is especially surprising given that correct performance on initial recognition tests has been shown to increase accuracy and reduce distortions on subsequent free-recall tests (e.g., Roediger & Karpicke, 2006).

Why did participants freely report their forced fabrications at such a high rate on a delayed free-recall test? Although participants must have, over time, forgotten that they had been forced to make up the fabricated events (as in the *sleeper effect*; e.g., Hovland & Weiss, 1951; Pratkanis, Greenwald, Leippe, & Baumgardner, 1988; see also Underwood & Pezdek, 1998), we propose that a second factor contributed to the development of these false memories. Specifically, we hypothesize that participants were prone to developing false memories for their forced fabrications (e.g., going to the girls' camp) because they provided a more complete causal explanation for outcomes they had actually witnessed (e.g., getting in serious trouble the next day). In the next section, we review evidence from outside the domain of eyewitness suggestibility that shows that achieving causal coherence is a fundamental aspect of event comprehension processes.

Causality and Coherence

One domain where the centrality of causal processing has been extensively documented is in the narrative text comprehension literature. Although the experience of reading narrative stories differs on several dimensions from the experience of witnessing video or live events (e.g., in modality, verbal vs. analog format), narrative texts are similar to witnessed events in that both involve the unfolding of events over time and space. Moreover, recent evidence shows that the same general cognitive mechanisms are involved in the comprehension of narrative and witnessed events (see, e.g., Magliano, Radvansky, & Copeland, 2007; Zacks, Speer, & Reynolds, 2009), thus suggesting that event comprehension processes are largely modality independent (for similar claims, see Kintsch, 1998; Gernsbacher, 1990).

Theories of narrative comprehension posit that causal relationships have a special status in the comprehension of narratives (e.g., causal network model, Trabasso, van den Broek, & Suh, 1989; constructionist theory, Graesser, Singer, & Trabasso, 1994; event-indexing model, Zwaan, Langston, & Graesser, 1995; see McNamara & Magliano, 2009, for a comprehensive review). These theories share the assumption that building a coherent representation of a text involves identifying the implicit and explicit causal relationships that link the elements of a story together, thereby achieving explanatory coherence.

Also relevant to the current discussion is the nature of the mental representation that results from narrative comprehension process. Considerable evidence shows that when comprehending a narrative, readers mentally simulate the implied situation described by the text and construct a higher level, modality-independent representation referred to as a *situation model* (van Dijk & Kintsch, 1983; or *mental model*, Johnson-Laird, 1983; see Zwaan & Radvansky, 1998, for an extensive review). Situation model theories posit at least three temporally distinct processes that contribute to situation model construction: (a) foundation-laying processes that, in concert with the reader's prior knowledge, are involved in the initial interpretation and construction of the model; (b) maintenance-related processes involved in keeping information accessible for the duration of the narrative; and (c) updating processes that are invoked when encountering information that no longer fits with the current situation model. Although readers routinely track several dimensions of situations in constructing the situation model (time, space, causation, intentionality, and protagonist; see, e.g., Zwaan et al., 1995; cf. Gernsbacher, 1990), there is widespread agreement that causal dimensions and the intentions of the protagonist (i.e., goal structures) form the backbone of situation models (Black & Bower, 1980; Fletcher & Bloom, 1988; Magliano & Radvansky, 2001; Trabasso, Secco, & van den Broek, 1984). Finally, and of particular relevance to eyewitness memory, there is evidence that when remembering the event, people later rely on the situation model they have constructed, rather than the original text itself (see, e.g., Zwaan & Radvansky, 1998).

Causal Explanations and False Memories for Entire Fabricated Events

Because situation models are high-level, modality-independent representations, this construct can readily account for the finding that participant-witnesses integrate the events they had earlier been forced to fabricate with their memory of the witnessed event. What is less clear is why participants would update their situation models with the forcibly fabricated information, given that they were fully aware that these fictitious events were mere fabrications

at the time they generated them, and their fabrications were generated 1 week after the witnessed event. We propose that participants did so because updating the original situation model with their forcibly fabricated events served to increase the explanatory coherence of their event representation.

To understand how explanatory coherence may have influenced the high levels of false recall documented by Chrobak and Zaragoza (2008), it is useful to examine the relationship between the fabrications participants were required to provide and the events depicted in the movie. Specifically, in all cases, the events that participants were required to fabricate helped to provide a causal explanation for events they had witnessed. For example, as described above, one of the false-event interview questions required participants to describe in detail where two counselors went and what they did there after sneaking out on canoes, even though the video did not depict the counselors going anywhere after sneaking out. The fabrications participants provided (e.g., "They went to the girls' camp and stole their clothes") helped to explain an outcome participants actually witnessed (the two counselors getting severely reprimanded).

It is important to note that, in this case, there was no glaring "causal gap" in the video, and for this reason, the forcibly fabricated events were not required in order for the events of the video to make sense. To the contrary, the events depicted in the movie provided an adequate causal explanation for the depicted outcomes (e.g., sneaking out at night provides an adequate explanation for getting in trouble) insofar as they met the conditions of temporal priority and operativity, and hence provided explanations that met minimum levels of necessity and sufficiency (van den Broek, 1990). Thus, it was possible for participants to provide a coherent account of the witnessed event without mentioning the events they had been forced to fabricate, and, indeed, many participants did so (e.g., "They snuck out at night on canoes and got in big trouble the next day").

Additional evidence that participants did not experience a "coherence break" comes from Chrobak and Zaragoza's (2008) finding that participants who viewed the video, but were not asked the false-event questions, very rarely spontaneously inferred events similar to the forcibly fabricated events on the final memory test. It is well established that when people encounter a causal gap in a story or event they experience, they are especially likely to infer the causes of poorly explained outcomes and later misremember their causal inferences as part of the events they experienced (Hannigan & Reinitz, 2001; van den Broek, 1990; see Principe, Guiliano, & Root, 2008, for a similar demonstration in children).

In summary, it was not the case that participants' fabrications were needed to explain the witnessed events, as an adequate causal explanation was provided by the events they had observed. Rather, we propose that participants' fabrications provided a richer, more complete, and more satisfying causal explanation of the observed outcomes. First, the causal explanations provided by the fabricated events (e.g., going to the girls' camp and stealing their clothes) were more similar in magnitude to the actual outcomes (e.g., a severe reprimand and harsh punishment) than the causes depicted in the movie (e.g., sneaking out at night; see, e.g., Einhorn & Hogarth, 1986, for evidence that people expect causes to be similar in magnitude to their outcomes). Consequently, relative to the events depicted in the movie, the fabrications generated by participants provided explanations for the witnessed events that better met the criteria of necessity and sufficiency (e.g., an infraction as serious as going to the girls' camp is more likely to result in a severe punishment than sneaking out). Second, the accounts participants were forced to fabricate provided richer explanations of the observed outcomes in that they also offered further insight into the motivations and intentions of the characters—thus establishing these motivations as additional causes for events that were witnessed (see Zwaan & Radvansky, 1998, for the importance of intentional relations in event memory). In short, incorporating their forcibly fabricated events into their mental representations increased the explanatory coherence of their event representations, by creating a more complete, well-specified account of the intentions and events that caused the witnessed outcomes.

The goal of the current series of experiments was to test the hypothesis that the development of false memory for forcibly fabricated events is a function of the explanatory role the fabricated event serves (hereinafter referred to as the *explanatory role hypothesis*). In Experiment 1, the primary manipulation involved the nature of the relationship between the forcibly fabricated information and the witnessed events. In the fabrication–outcome condition, which was essentially a replication of Chrobak and Zaragoza (2008), participants were required to fabricate events that helped to explain outcomes that had been witnessed in the video. In contrast, participants in the fabrication/no-outcome condition were asked to fabricate the same events, but in this case the video had been edited so that there was no witnessed outcome for the fabricated event to help explain. It was predicted that participants would be more likely to freely report their fabrications when they helped to explain a witnessed outcome than when they did not serve this explanatory function.

Experiment 1

Method

One hundred ninety (130 female, 60 male) undergraduates completed the experiment in fulfillment of a course requirement. The materials and procedure were similar to those employed by Chrobak and Zaragoza (2008), with the exception of the changes noted below.

Phase 1: Eyewitness event. Participants came to the lab in pairs, and each pair viewed one of two edited versions of an 18-min clip from the movie *Looking for Miracles* (Grant & Sullivan, 1989), which portrayed the adventures of two brothers, Delaney and Sullivan, at summer camp. Each clip depicted only one of the two consequential outcomes (a counselor falling flat on his face in the dining hall or a counselor getting severely reprimanded by the director of the camp) that were in the original clip employed in the Chrobak and Zaragoza (2008) study (see Figure 1). Across the experiment, an equal number of participants viewed each version.

Phase 2: Postevent interview. All participants returned to the lab 1 week later and engaged in individual, face-to-face interviews about the film clip. All interviews were audio recorded. Before the interview began, participants were instructed to provide an answer to every question, and were explicitly instructed to guess if they did not know the answer to a question. They were also told that they should answer all questions in as much detail as possible, including information about where the events took place, who was present, and what transpired.

Video 1: Outcome for Prank, No Outcome for Exploit				
	Antecedent	*Outcome*	*Post-Event Interview Question*	*Condition*
Prank	Delaney stands up to make announcement	Delaney falls on floor	What prank did somebody pull that caused him to fall?	[a] Fabrication / Outcome
			OR	
			Not asked about scene	[b] Not Asked / Outcome
Exploit	Counselors sneak out on canoes	------	Where did they go/what did they do that caused them to get in trouble?	[b] Fabrication / No Outcome
			OR	
			Not asked about scene	[a] Not Asked / No Outcome
Video 2: No Outcome for Prank, Outcome for Exploit				
	Antecedent	*Outcome*	*Post-Event Interview Question*	*Condition*
Prank	Delaney humiliated by cook	------	What prank did Delaney pull that caused the Cook to fall?	[c] Fabrication / No Outcome
			OR	
			Not asked about scene	[d] Not Asked / No Outcome
Exploit	Counselors sneak out on canoes	Counselors get in big trouble	Where did they go/what did they do that caused them to get in trouble?	[d] Fabrication / Outcome
			OR	
			Not asked about scene	[c] Not Asked / Outcome

Figure 1. Experimental design of Experiments 1 and 2. Participants viewed one of two versions of the video, and for each version, every participant was asked to fabricate only one of the two critical events (prank or exploit). For each critical event (prank or exploit), the experimental condition was defined by whether or not the participant was asked to fabricate the event (fabricated vs. not asked) and whether or not the video the participant had seen depicted an outcome relevant to the critical event (outcome vs. no outcome). For each participant, the fabricated and not-asked items were always in different outcome conditions (the shared superscripts indicate which fabrication and not-asked conditions were always paired together). (In Experiment 3, the video depicted both outcomes for all participants, and hence only the outcome conditions were used, and fabrication versus not asked was manipulated between participants.)

All participants were asked the same five true-event questions about highly salient and memorable events from the video. In addition, all participants were asked one false-event question (drawn from a set of two) about an event that was never depicted in the video (fabrication condition) and were not asked the other false-event question (not-asked condition). The purpose of the not-asked condition was to ascertain to what extent participants who had not been asked the fabrication questions would spontaneously infer events similar to the fabricated events.

To answer the false-event questions, participants had to make up, or fabricate, a response. As in Chrobak and Zaragoza (2008) and described in more detail below, one of the false-event questions (hereinafter referred to as *prank*) required participants to fabricate a fictitious prank, and the other false-event question (hereinafter referred to as *exploit*) required participants to fabricate where two camp counselors went after sneaking out on canoes. Across the experiment, an equal number of participants were asked the prank and exploit false-event questions (a full list of interview questions is included in the Appendix).

For both true- and false-event questions, participants were required to provide detailed accounts of the target event that met predetermined criteria of scope and specificity (who, what, where, etc.). Interviewers were trained to prompt participants with follow-up questions designed to elicit answers that met these criteria. Participants frequently overtly resisted answering the false-event questions (both initially and when asked the follow-up questions) by bluntly refusing to answer (e.g., "I didn't see that" or "That wasn't in the video"). In other cases, participants evidenced more passive forms of resistance, such as sitting in silence and refusing to provide an answer, or by evading the question by talking about true, but irrelevant, information that actually occurred in the video. In response to all these forms of resistance, experimenters prompted participants to "Give me your best guess" (sometimes repeatedly), until they eventually complied. In those cases where participants evaded the false-event question, they were prompted to answer the specific question being posed to them (e.g., a participant who responded, "They went out on the lake," would be asked the follow-up question, "Yes, but where did they go and what did they do?"). All participants eventually acquiesced and complied with the request to generate a detailed account of the fictitious event.

Experimental design. As illustrated in Figure 1, the prank and exploit events served in one of four conditions that resulted from a combination of two variables: (a) whether or not there had been an outcome depicted in the video that the fabricated event could help to explain (outcome vs. no outcome) and (b) whether or not the participant was forced fabricate the event during the postevent interview (forced to fabricate vs. not asked). Across the experiment, the prank and exploit events served in each condition equally often.

Fabrication/outcome condition. The fabrication/outcome condition was a replication of Chrobak and Zaragoza's (2008), with the exception that the current study did not have an intervening recognition test at 1 week. For the prank item, participants witnessed a counselor (Delaney) stand up to make an announcement (antecedent) and then inexplicably lose his balance and fall face down on the floor, with the entire dining room bursting into laughter (outcome). At the time of the interview, participants were required to fabricate an intervening fictitious event that helped to explain the witnessed outcome: "What practical joke was pulled on him that caused him to

fall?" To ensure that participants produced a fabricated event of sufficient scope, they were also asked follow-up questions that pressed them to describe who pulled the practical joke and how they did so. For the exploit item, participants witnessed the counselors sneak out at night (antecedent) and then get in serious trouble with the camp director the next day (outcome). When later interviewed, participants were required to fabricate an intervening fictitious event that helped to explain the witnessed outcome: "Where did they go and what did they do that caused them to get in trouble?" Again, to ensure that participants fabricated an event of sufficient scope, they were asked follow-up questions that pressed them to describe where they went, who they were with, and what happened. For both the prank and exploit fabrications, the experimenter did not terminate the interview until the participant had provided a fabricated answer that addressed all the required elements of specificity and scope.

Fabrication/no-outcome condition. Our goal in implementing the fabrication/no-outcome condition was to have participants fabricate the same events as participants in the fabrication/outcome condition (i.e., a prank or an exploit), but selectively remove the outcome from the video that the fabrication helped to explain. The procedure for interviewing witnesses was therefore identical to that employed in the outcome conditions.

For the exploit item, participants once again witnessed the counselors sneak out at night on canoes (antecedent). However, in the immediately succeeding scene, they did not see the counselors get in trouble with the camp director the next day; rather, that scene was replaced by a scene unrelated to their fabrication—a counselor horseback riding through the camp (see Figure 1). Hence, in the fabrication/no-outcome condition, the event they were forced to fabricate was linked to an antecedent they had witnessed, but there was no consequential outcome that the fabricated event helped to explain.

For the prank fabrication, it was not possible to selectively remove the outcome associated with the prank (a counselor falling on floor) without causing a visible break in the movie. As a result, a different approach was taken to implementing the fabrication/no-outcome condition for the prank fabrication. To maintain comparability with the corresponding outcome condition, we asked participants to fabricate a prank, but the prank was carried out on a different person. Specifically, the video was modified to add a scene from the movie where the chef plays a joke on Delaney and makes him a laughing stock in front of all the campers, thus humiliating him publicly. This scene was used as the antecedent to motivate a slightly different false-event question: "In order to get back at him, what practical joke did Delaney pull on the cook that caused him to fall on the kitchen floor?" This was a forced fabrication, because the video did not depict Delaney pulling a prank on the cook to get back at him. In addition, no outcome was witnessed, as participants did not see the cook fall at any point in the video. So, the prank that participants were forced to fabricate in the fabrication/no-outcome condition was strongly linked to an antecedent they had witnessed, but not to an observed outcome (see Figure 1).

Note that because each version of the video contained only one outcome (prank or exploit) and each participant was asked to fabricate only one critical event (prank or exploit) for every participant, the fabricated and not-asked critical events were in opposite outcome conditions (see Figure 1).

Phase 3: Measure of false memory: Free recall of the witnessed event after 6 weeks. Approximately 6 weeks later, participants returned for a final, audio-recorded memory test. They were interviewed, face to face, by a different experimenter than the one who had interviewed them earlier. Participants were instructed to report the details of the video exactly as they remembered them and to provide as much detail as possible. To further encourage accurate recollection, we told them to assume that they were eyewitnesses whose testimony could be used in a court of law. Importantly, participants were not given any additional cues or prompts. Rather, they were free to report as much or as little of the original video as they wished. The dependent variable of primary interest was the extent to which participants freely recalled the events they had been pressed to fabricate earlier.

Results and Discussion

Manipulation check: Were participants truly forced to fabricate? The assumption in studies of forced fabrication is that participants would not have reported the fabricated events at test had they not been pressed to do so by the interviewer. One indication that participants were forced to fabricate these events at interview is the extent to which they resisted doing so. As reported below, the majority of participants strongly resisted answering the false-event questions (cf. Chrobak & Zaragoza, 2008). Importantly, the fabrication/outcome and fabrication/no-outcome conditions did not differ on any measure of resistance (all $ps > .10$), thus ruling out the possibility that participants would show greater resistance when asked to fabricate events that were not linked to a witnessed outcome. On average, it took 2.42 conversational turns between the experimenter and the participant before participants provided the first part of a fabricated answer, and 6.14 turns before participants described a fabricated event of the required scope and specificity. In contrast, participants almost always provided relevant information about true-event questions immediately after the initial prompt ($M = 1.04$ conversational turns) and took only 2.36 conversational turns, on average, to provide a full and detailed account of true events that met the predetermined criteria.

Further, participants frequently overtly resisted answering the false-event questions by offering statements such as "I don't know" or "I didn't see that," whereas participants never voiced such resistance in response to true-event questions. On average, participants voiced overt resistance to answering false-event questions in at least one conversational turn (mean number of conversational turns accompanied by overt resistance = 1.4), and there were often multiple expressions of overt resistance in a single conversational turn. In sum, there was clear evidence that participants were well aware that their responses to false-event questions were fabrications at the time they generated them.

Previous studies have documented that overt resistance (but not passive resistance) is associated with lower levels of false memory development (e.g., Zaragoza et al., 2001). However, a similar analysis of overt resistance and false memory in the present study revealed no evidence of a relationship. Fabricated events that were accompanied by expressions of overt verbal resistance were falsely recalled at the same rate as fabricated events that were generated without such resistance (mean false recall = .19 vs. .16, respec-

tively, $p > .10$).[2] One possible explanation for the discrepancy with previous findings is that participants in the current investigation were tested after a much longer delay than in previous studies (6 weeks as opposed to 1 week), thus resulting in poorer memory for having resisted answering the false-event questions.

Finally, an examination of the types of events participants provided as fabricated responses revealed that the vast majority of participants provided highly plausible fabricated explanations. For example, participants' fabrications to the exploit false event can be grouped into four categories: sneaking over to the girls' camp and engaging in some activity (e.g., going to the girls' camp for a bonfire; $M = .28$), playing a practical joke on someone else at the camp (e.g., putting snakes in someone's cabin; $M = .29$), engaging in questionable behavior at some other part of the camp (e.g., drinking on an island; $M = .31$), and spying on the camp nurse ($M = .11$). Participants' fabrications for the prank false-event item can similarly be grouped into three categories: putting something on the floor to be tripped over or slipped on (e.g., putting grease on the floor so Delaney would slip; $M = .46$), physically interacting with a character (e.g., tripping Delaney with an outstretched foot; $M = .33$), or rigging a more elaborate trap that would cause a person to fall (e.g., tying Delaney's shoelaces together; $M = .21$). It is also worth noting that the type of fabrication provided by participants did not systematically differ as a function of condition (i.e., outcome vs. no outcome). Thus any differences in error rate cannot be attributed to differences in the types of items fabricated by participants.

Were participants more likely to develop false memories when their fabrications helped explain witnessed events?[3] The dependent measure of primary interest was the proportion of participants who falsely recalled their forced fabrication on the free-recall test of the witnessed event, which took place 6 weeks after the forced fabrication interview. Two raters coded free-recall transcripts for reporting of forcibly fabricated events. For each of the two fabricated events, the coder assessed whether participants reported information that they had earlier been forced to fabricate (either "yes" or "no"). Overall, the interrater reliability for the coding of recall for both fabricated and not-asked data was 91% (discrepancies were resolved by discussion).

Raters used a set of predetermined guidelines to assess whether a participant's response constituted mentioning his or her prior fabrication. Mentioning of false presuppositions that had been provided by the experimenter (e.g., someone pulled a prank, they did something when they snuck out on canoes) were not counted in the analysis; only reports of fictitious information that the participants had earlier generated themselves were counted. Specifically, participants had to mention some specific aspect of their original, self-generated fabrication. Consider, for example, a participant who provided the following fabrication at the time of the interview: "Delaney and Moe went drinking at the girls' camp." The following types of responses would have been counted as recall of a fabricated response: "They went over to the girls' camp," "Delaney and Moe went drinking," and "They met up with some girls." More generic responses (e.g., "They went out on the lake") or a reiteration of the presupposition (e.g., "They went somewhere and did something") were not counted. For the not-asked condition, participants had to mention a fictitious event that was typical of events provided for fabricated items.

Preliminary analyses revealed that performance for the two false-event items (prank and exploit) did not differ on any dependent measure (all $ps > .10$). More importantly, the difference in false memory rates between the outcome and no-outcome conditions was nearly identical for both the prank and exploit items. For this reason, we report the results collapsed across item.

Of primary relevance to the goals of this study, the results support the predictions of the explanatory role hypothesis. As illustrated in Figure 2, participants were almost 3 times more likely to report their fabrications in the fabrication/outcome condition ($M = .27$) than in the fabrication/no-outcome condition ($M = .10$), $\chi^2(1, N = 179) = 8.155$, $p = .004$, Cramér's $V = .213$. However, the results also showed that pressing participants to fabricate these events resulted in false memories, even when the fabrications did not explain a witnessed outcome. Free recall of forced fabrications in the fabrication/no-outcome condition ($M = .10$) significantly exceeded the base rate (i.e., not-asked/no-outcome condition; $M = .01$), $\chi^2(1, N = 179) = 6.78$, $p = .009$, Cramér's $V = .195$).

Finally, consistent with the findings of Chrobak and Zaragoza (2008), the base rate of spontaneously reporting the fabricated events in the not-asked condition was very low and did not vary for the not-asked/outcome ($M = .02$) and not-asked/no-outcome ($M = .01$) conditions. These findings show that when participants were not forced to fabricate these events, they almost never inferred them spontaneously.

The results of Experiment 1 support the prediction that false memory development would increase as a function of the fabricated event's explanatory role. Although participants freely reported their forced fabrications in both the fabrication/outcome and fabrication/no-outcome conditions, they were more likely to do so in the former—when their fabricated accounts helped to explain an outcome they had witnessed. Importantly, this effect cannot be attributed to differential levels of resistance to answering the false-event questions at the time of the initial interview, or to differences in the types of events participants fabricated.

Experiment 2

Although the results of Experiment 1 are consistent with the predictions of the explanatory role hypothesis, an alternative possibility is that participants in the outcome and no-outcome conditions of Experiment 1 developed false memories of their forced fabrications to the same extent, but participants in the no-outcome condition were simply less likely to retrieve and/or report them on the free-recall test. Research has shown that recall of narrative events is organized around the causal and logical sequence of

[2] The resistance evidenced by participants in the fabrication conditions of Experiments 2 and 3 were virtually identical to those reported for Experiment 1, and there were no differences in the outcome and no-outcome conditions of Experiment 2 ($p > .10$). Moreover, as in Experiment 1, we found no evidence for a relationship between overt verbal resistance and false memory development in Experiments 2 and 3. For these reasons, we do not report the resistance date for Experiments 2 and 3.

[3] Data from nine participants were removed from the analyses because the experimenter had accepted a fabricated response that did not meet study criteria for scope and specificity during the forced fabrication interview. It is worth noting that across experiments, such errors were not committed by one "poor" experimenter, but occasionally occurred for each of the different experimenters. The data from two additional participants were removed because of equipment failure (e.g., a damaged audiotape).

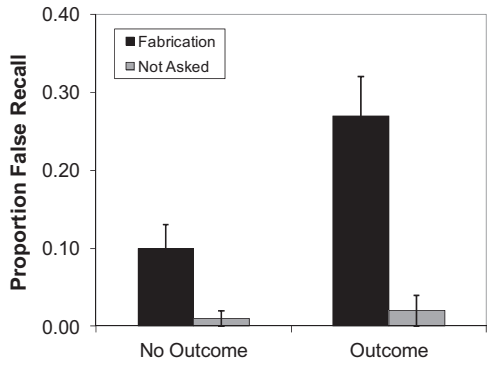

Figure 2. Experiment 1. Proportion of participants in the outcome and no-outcome conditions who freely reported their forcibly fabricated events 6 weeks later on the final recall test. The corresponding not-asked conditions represent the base rate at which participants who witnessed the same events, but were never asked the false-event questions, spontaneously reported events similar to the fabrications generated by other participants. Error bars represent standard errors of the mean.

events, such that events that are less well integrated into the causal chain of events are less likely to be reported. As discussed earlier (see Figure 1), in the outcome condition, the fabricated events could be readily integrated into a causal chain (i.e., they were linked to an observed antecedent and observed consequence), but in the no-outcome condition, the fabricated events were part of a causal dead end (i.e., they were linked to an antecedent only; Trabasso et al., 1984). Hence, the finding that participants were less likely to report their fabrications in the no-outcome condition of Experiment 1 may reflect retrieval and reporting strategies, rather than a lack of false memory, per se.

To address this possibility, Experiment 2 was a replication of Experiment 1, with the exception that the measure of false memory was a recognition test (rather than recall). That is, rather than assess whether participants would incorporate the forcibly fabricated events when asked to free recall the witnessed events, we presented participants their forced fabrications at the time of test, and asked whether or not they had witnessed these forcibly fabricated events. This yes/no recognition test format minimized the impact of retrieval structures and the demands of good storytelling on memory performance, as participants were provided with their fabricated event at the time of test (cf. Marsh, Tversky, & Hutson, 2005).

A second change introduced in Experiment 2 was the provision of a warning prior to the final memory test explicitly informing participants that the person who had earlier interviewed them had asked about events that never actually happened. The purpose of the warning was to provide a more stringent test of false memory development, as warnings typically lead participants to engage in more careful evaluation of the source of their memories and reduce overreliance on familiarity (for evidence that warnings reduce false memory in the forced fabrication paradigm, see, e.g., Ackil & Zaragoza, 2011; Chrobak & Zaragoza, 2008). Note, however, that demand cannot explain why false recall differed in the fabrication/outcome and fabrication/no-outcome conditions of Experiment 1.

Method

One hundred thirty-three (90 female, 43 male) undergraduates completed the experiment in fulfillment of a course requirement. Materials and procedures were identical to those in Experiment 1, with the exception of the Phase 3 memory test. Rather than a final free-recall test, participants in Experiment 2 were read an 11-item yes/no recognition test. In addition, all participants were read a pretest warning. Specifically, participants were told that the original interviewer had asked them about some things that had not actually occurred in the video, and that their task in the current phase of the experiment was to indicate which things occurred in the video and which things did not.

All participants were asked questions in the form of "When you watched the video, did you see ____?" The test queried participants about the events of the video in chronological order and included questions about the fictitious events that they had been forced to fabricate during the Phase 2 interviews. For purposes of the test, each participant's fabricated answer was condensed into a single sentence that highlighted the key elements of their earlier forced fabrication (e.g., "When you watched video, did you see Delaney and Moe go to the girls' camp and drink with the girls there?"). Since participants were only questioned about one of the two false-event items during the Phase 2 interview, the fabricated answer for the other false-event question on the recognition test was provided by a yoked participant. Thus, participants' false assents to the items they had earlier been forced to fabricate provided the measure of false memory development. In contrast, false assents to the yoked (other-fabricated) items provided the base rate of false assents to fabrications when participants had never been asked the corresponding false-event question (this was the not-asked condition). The remaining nine items consisted of four true events that participants had also been interviewed about, three true events that participants were not interviewed about, and two false events that participants had not been interviewed about.

As the main focus of this study is false memory for forcibly fabricated events, we report only (a) false assents to self-generated forced fabrications and (b) false assents to yoked (other-generated) fabrications, which were new at the time of test and hence provide a base rate measure of false assents to the fabricated items (i.e., we assessed false assents in the not-asked condition).

Results

Were participants more likely to develop false memories when their fabrications helped explain witnessed events?[4] The dependent measure of interest was the proportion of participants who falsely assented to their fabricated event 6 weeks after the postevent interview. As in Experiment 1, performance on the two false-event items (prank and exploit) did not differ on any measure (all $ps > .10$), and differences in performance between the outcome and no-outcome conditions were nearly identical for both items. Hence, we report the results collapsed across item.

As illustrated in Figure 3, the provision of a warning and the change to a recognition test did not alter the main findings of

[4] Seven data points were removed from the analyses because the experimenter had accepted a fabricated account that did not meet study criteria during the forced fabrication interview.

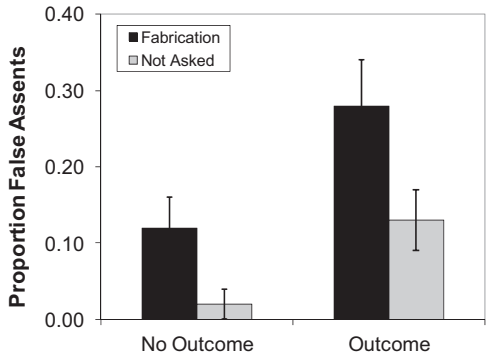

Figure 3. Experiment 2. Proportion of participants in the outcome and no-outcome conditions who falsely assented to their forcibly fabricated events 6 weeks later on the final recognition test. The corresponding not-asked conditions represent the base rates at which participants who were never asked the false-event question falsely assented to fabrications generated by other participants (and hence were new) at the time of test. Error bars represent standard errors of the mean.

Experiment 1: Participants were more likely to falsely assent to having witnessed their fabrications in the outcome condition (M = .28) than in the no-outcome condition (M = .12), $\chi^2(1, N = 126) = 4.791$, $p = .029$, Cramér's $V = .195$. Once again, the base rate of false assents to the fabricated events was low. However, unlike Experiment 1, the base rate of errors in the not-asked/outcome condition (M = .13) exceeded the base rate in the not-asked/no-outcome condition (M = .02), $\chi^2(1, N = 133) = 6.056$, $p = .013$, Cramér's $V = .213$. Nevertheless, forcing participants to fabricate resulted in false memories in both conditions, as false assents to forced fabrications exceeded the base rate in both the fabrication/outcome condition, $\chi^2(1, N = 131) = 4.617$, $p = .032$, Cramér's $V = .188$, and the fabrication/no-outcome condition, $\chi^2(1, N = 128) = 5.625$, $p = .018$, Cramér's $V = .210$.

Discussion

The results of Experiment 2 replicated the main findings of Experiment 1: Participants were more likely to falsely assent to having witnessed their forced fabrications on a recognition test when they helped to explain a witnessed outcome than when they did not serve this function, and they did so in spite of a pretest warning. Hence, the results of Experiment 2 show that greater reporting of forced fabrications in the outcome condition is not unique to situations (such as free recall) where performance is heavily influenced by reporting strategies and the demands of good storytelling. Rather, the results are consistent with the conclusion that participants are more likely to develop false memories of their forced fabrications when they serve an explanatory role.

One difference between the results of the current experiment and those of Experiment 1 was the finding that the base rate of false assents was higher in the not-asked/outcome than the not-asked/no-outcome condition. However, this finding is also consistent with the explanatory role hypothesis. Presumably, participants assented to these novel fictitious events in the not-asked/outcome condition precisely because they helped to provide a more complete explanation of the events they had witnessed (cf. Hannigan & Reinitz, 2001). We note, however, that when participants in Experiment 1 were given a free-recall test, the base rate of reporting such events in the not-asked/outcome condition was extremely low (M = .02), thus showing that participants did not spontaneously infer the fabricated events. The finding that participants falsely assented to these novel items when encountered on a recognition test suggests that this misattribution occurred at the time of test.

Experiment 3

Although the results of Experiments 1 and 2 are clearly consistent with the predictions of the explanatory role hypothesis, it is also the case that the explanatory role of participants' fabrications was always confounded with whether or not the fabricated event was part of a causal chain (e.g., Trabasso et al., 1984; see Figure 1). In both experiments, fabrications in the outcome condition were linked to both an observed antecedent and an observed consequence, but those in the no-outcome condition were linked only to an observed antecedent. This resulted in a sparser number of connections between the fabricated and witnessed events in the fabrication/no-outcome condition relative to the fabrication/outcome condition.

In addition, relative to the fabrication/no-outcome condition, participants in the fabrication/outcome condition had more opportunities to generate elaborations that linked their fabricated events to the witnessed event. Although participants in both conditions likely elaborated on the connection between the antecedent (sneaking out at night) and their fabricated event (e.g., going to the girls' camp; see, e.g., Myers, Shinjo, & Duffy, 1987), only the fabrication/outcome condition provided participants with opportunities to generate elaborations that linked their fabrications (going to the girls' camp) to an outcome from the video (getting in serious trouble). When later tested on their memory for the witnessed events, the denser interconnectivity between the witnessed and fabricated events in the fabrication/outcome condition could have led the fabricated events to come to mind more quickly and fluently (e.g., due to automatic memory activation processes; see, e.g., van den Broek, Rapp, & Kendeou, 2005). Thus, more fluent retrieval of fabricated events in the fabrication/outcome condition could well have contributed to greater false memory for the fabrications in the fabrication/outcome relative to the fabrication/no-outcome condition.

Hence, what is unclear from the results of Experiments 1 and 2 is whether the finding of greater false memory in the fabrication/outcome condition is due to the greater number of connections between the fabricated and witnessed events, or whether the explanatory nature of these connections might also play a role. Although explanatory role and interconnectivity often covary, in Experiment 3 we sought to assess whether the explanatory function of a fabrication contributes to false memory development independent of its interconnectivity with the witnessed event.

Experiment 3 employed a different approach to evaluating the explanatory role hypothesis. In Experiment 3, participants were forced to fabricate events that were always linked to an outcome they had actually witnessed (i.e., all fabrications were in the fabrication/outcome condition; see Figure 1). What varied was whether or not participants were provided with a possible alternative explanation (e.g., Delaney had an inner ear disorder that caused balance problems) for the witnessed outcome (e.g., Delaney falling) after they had been forced to fabricate a cause. Re-

search on causal reasoning has shown that the strength of a perceived causal relationship is highly influenced by the presence of alternative explanations, such that multiple possible explanations for a particular consequence reduce the extent to which people view any one event as causally related to that outcome (Einhorn & Hogarth, 1986; Kelley, 1973). By the same token, having only one causal explanation for an event increases the perceived strength of a causal relationship. Hence, the presence of a potential alternative explanation for the witnessed outcome should reduce the explanatory strength of the fabricated event. According to the explanatory role hypothesis, a reduction in the explanatory strength of a fabricated event should result in lower false memory for the fabrication.

Method

Unless otherwise noted, the materials and procedures were identical to those of the outcome conditions of Experiments 1. The primary innovation in Experiment 3 was the introduction of a second source of postevent information about the witnessed event. After the postevent interview, participants read vignettes that provided background information about three of the main characters in the video. In the alternative explanation condition the vignette contained information that could plausibly explain the critical outcome from the video, whereas in the no-alternative explanation condition the information provided similar information about the characters that could not be used to serve this explanatory role.

Another change introduced in Experiment 3 was the inclusion of measures of participants' memory for the postevent sources of information. That is, in addition to assessing free recall of the witnessed event (the measure of false memory of the fabricated events), we assessed (a) participants' ability to remember the events they had been forced to fabricate and (b) participants' ability to remember the critical information introduced in the vignettes.

One hundred seventy-five participants (132 female, 43 male) completed the experiment in fulfillment of a course requirement.

Phase 1: Eyewitness event. All participants viewed the 18-min clip from the movie *Looking for Miracle*s that was used in Chrobak and Zaragoza (2008). The primary difference between this clip and the ones used in Experiments 1 and 2 (see Figure 1) was that both of the critical outcomes related to the prank and exploit fabrications (falling in the dining hall and the counselors getting in trouble) were depicted in the video clip.[5]

Phase 2a: Forced fabrication manipulation: One-week postevent interview. In contrast to Experiments 1 and 2 (see Figure 1), the fabrication versus not-asked conditions were manipulated between subjects. Participants in the fabrication group (N = 134) were required to fabricate both the prank and exploit fictitious events, and those in the not-asked group (N = 41) were asked neither of these false-event questions. We tested a very small group of participants in the not-asked group because the results of Experiment 1 showed that participants almost never spontaneously reported events similar to the fabricated events on a delayed free-recall test.

Phase 2b: Alternative explanation manipulation: One-week postevent vignettes. Immediately after the forced fabrication interview, participants were instructed that they would hear a series of vignettes that provided additional information about Sullivan (Delaney's younger brother), Delaney, and the Chief (the director of the camp). In general, these vignettes provided insight into additional facets of the characters' backgrounds and experiences. Participants were given typed copies of the three vignettes and instructed to read along as prerecorded versions of the narratives played. The three vignettes were all of approximately the same length (four paragraphs, approximately 375 words) and were always presented in the same order (Sullivan, Delaney, the Chief).

The alternative explanation and no-alternative explanation conditions were created by manipulating information in paragraphs 2 and 4 of the vignette about Delaney. In the alternative explanation condition, the critical paragraph provided a potential alternative explanation for the outcome that participants' fabrications helped to explain. In those cases where prank was assigned to the alternative explanation condition, participants read the following text as paragraph 2 of the vignette, which provides a potential alternative explanation for why Delaney had fallen in the dining hall:

> Making matters worse, Delaney suffers from a rare inner ear disorder known as Ménière's disease. Resulting from an imbalance of fluid in the inner ear, Delaney experiences unexpected periods of vertigo or dizziness, where he has difficulty maintaining his balance. In the past, occurrences have frequently caused Delaney a significant amount of social embarrassment. The condition was so bad that Delaney had to lie about it in order to receive his job at the camp. As a result, Delaney is very concerned about the possibility of an unexpected occurrence while working at the camp.

In this case, the vertigo associated with Ménière's disease provides a viable causal explanation as to why Delaney fell unexpectedly. Here participants' fabrications (e.g., another counselor snuck under the table and tied Delaney's shoelaces together) no longer provided the lone explanation for the outcome they had witnessed. It is worth noting, however, that participants were not specifically told his disease was responsible for the incident in the dining hall.

In the no-alternative explanation condition (for the fabricated prank), paragraph 2 of the vignette was similar, in that it also described a medical condition that Delaney suffered from:

> Making matters worse, Delaney suffers from a rare skin disorder known as pemphigus. Resulting from an autoimmune deficiency, Delaney occasionally experiences unexpected blisters over his face, neck and back. In the past, occurrences have frequently caused Delaney a significant amount of social embarrassment. The condition was so bad, that Delaney had to lie about it in order to receive his job at the camp. As a result, Delaney is very concerned about the possibility of an unexpected occurrence while working at the camp.

Although pemphigus, like Ménière's disease, is a medical condition, the skin disorder could not be used to explain why Delaney fell in the dining hall. Hence, pemphigus did not offer an alternative explanation to the prank fabricated by the participant.

A similar manipulation was implemented for the exploit fabrication. In those cases where the fabricated exploit served in the

[5] The final scene of the movie also differed somewhat in Experiment 3. In Experiments 1 and 2, the movie ended with a relatively innocuous scene depicting the camp owner teaching Delaney's younger brother, Sullivan, how to swim. In an attempt to create a more engaging and memorable end to the video, the final scene used in Experiment 3 depicted Delaney crying by the water because he had lost an unspecified scholarship.

alternative explanation condition, participants read the following text as paragraph 4 of the vignette. It provides a potential alternative explanation why Delaney got in so much trouble with the camp director:

> For all of his strengths, Delaney frequently managed to get in a fair amount of trouble at the camp. In part, it seems to stem from the fact that Delaney is somewhat bored with his job a counselor. Delaney's relationship with the camp director has deteriorated in recent weeks. The Chief recently discovered numerous pornographic magazines in Delaney's cabin. He was concerned by the pornography for several reasons. First of all, it was highly illegal in this state at the time and the Chief feared that if the ladies who donated to the camp found out about it, it would endanger the funding for the camp. He also worried that the younger campers might be exposed to Delaney's dirty magazines. As a result, he warned Delaney about what would happen if the magazines were found again. Despite the warning, Delaney refused to get rid of the magazines, and keeps them hidden beneath his mattress.

In this case, the fact that the Chief had found pornographic magazines in Delaney's cabin provides a plausible alternative other than participants' forced fabrications for why Delaney got in trouble. Note once again, however, that the vignette does not explicitly link the problem with pornography to the witnessed scene where the Chief reprimands Delaney harshly.

When the fabricated exploit was assigned to the no-alternative explanation condition, paragraph 4 of the vignette described a similar problem with pornography, but in this case it could not explain why Delaney got in so much trouble with the camp counselor:

> For all of his strengths, Delaney frequently managed to get in a fair amount of trouble at home. In part, it seems to stem from the fact that Delaney is somewhat bored with school. In fact, money was not the only reason Delaney took the job as a counselor at the camp. His relationship with his mother has deteriorated in recent months, in part due to Delaney's trouble making. Delaney's mother had recently discovered numerous pornographic magazines in his room. She was concerned by the pornography for several reasons. First of all, it was highly illegal in this state at the time and she feared that if anyone found out about it, Delaney would get in serious trouble. She was also embarrassed by her son's behavior and worried that Sullivan might be exposed to the dirty magazines. As a result, she encouraged Delaney to work at the camp Sullivan is attending, as she believes it will help Delaney mature. In fact, because of his new found sense of responsibility at the camp, Delaney has thrown out all of his magazines and has not been tempted since.

Because the information in the no-alternative explanation condition was described as a problem that had been resolved prior to attending camp, participants should not have viewed Delaney's earlier problem with pornography as being responsible for the outcome depicted in the movie.

Each version of the vignette about Delaney was constructed such that it contained an alternative explanation for only one of the two fabricated events (prank or exploit). Thus, the alternative explanation condition was manipulated within subjects. Across participants, both fabricated events (exploit and prank) served equally often in the alternative explanation and no-alternative explanation conditions.

Participants in the not-asked group received the same postevent interview vignettes as participants in the fabrication group. However, not-asked participants had not generated potential explanations for the witnessed outcomes prior to reading the vignettes, as they had not fabricated answers to the prank and exploit false-event questions during the postevent interview. For this reason, the information provided in the alternative explanation conditions for not-asked participants did not constitute "alternative" explanations as they did for fabrication participants. Nevertheless, the alternative explanation vignettes (e.g., Delaney had an inner ear disorder) did provide plausible explanations for the outcomes not-asked participants had witnessed (Delaney falling in the dining hall).

Phase 3a: Measure of false memory: Six-week recall of the witnessed event. Participants returned 6 weeks after the interview and were given the same free-recall test described in Experiment 1. Unlike in Experiment 1, after participants had provided their initial free recall, they were then given general prompts reminding them of the nine major scenes from the video (e.g., a counselor getting bitten by a poisonous snake, a birthday celebration in the dining hall) and asked if they could recall any additional information. Reminding participants of the major scenes helped to provide a more complete measure of participants' memory for the witnessed events, as participants in Experiment 1 sometimes omitted entire scenes from the video clip in their 6-week free recall for reasons that appeared to be unrelated to their memory (e.g., a desire to complete the experiment quickly). Importantly, participants were not specifically prompted to report their fabricated events nor any other specific events.

The primary dependent measure was the extent to which participants reported the events that they had earlier been forced to fabricate. In accord with the explanatory role hypothesis, we predicted that participants would be less likely to freely report their forced fabrications in the alternative explanation condition relative to the no-alternative explanation condition.

Phase 3b: Memory for postevent information: Six-week tests of accurate memory for fabrications and vignettes. Immediately after recall of the witnessed event, participants in the fabrication group were tested on their memory for the events they had fabricated 6 weeks earlier during the face-to-face postevent interview. Participants were reminded about the interview and asked to recall the answers they had provided to the two false-event questions (e.g., "We asked you to describe the practical joke that caused Delaney to fall and end up on the floor. Please describe the answer you provided").

Next, participants in both the fabrication and not-asked groups were asked to recall the critical information contained in the vignettes about Delaney (e.g., Ménière's disease or pemphigus). Participants were provided with prompts that were similar in nature to those used to assess memory of participants fabricated responses (e.g., "Please tell me everything you can remember in the vignette about Delaney's medical condition").

Pilot testing of materials. Before conducting the study proper, a pilot test was conducted to verify that participants who had never been asked the false-event questions would view the alternative explanation information in the postevent vignettes as plausible explanations for the outcomes they had earlier observed in the video.

Seventy-four participants completed the pilot study and were tested in groups of approximately 15. All participants viewed the

video clip used in Experiment 3, but were not interviewed about the witnessed event and hence were never asked to fabricate answers to the false-event questions. Rather, immediately after the video, participants listened to audio recordings of the vignettes about Delaney (only the version of the narratives that contained the relevant alternative explanation information was used), Sullivan, and the Chief.

After a 15-min filler task (a personality rating scale), participants were given a surprise test that consisted of two questions: "What caused Delaney to fall in the dinning hall? and "Why did Delaney get in trouble with the camp director?" In response, 77% of participants reported that Delaney fell because of his Ménière's disease, and 86% reported Delaney got in trouble because of his problem with pornography.

Participants were then asked to rate, on a scale of 1–6, the likelihood that the information from the explanatory vignettes could explain the critical outcomes in the video (1 = *impossible it was the cause* to 6 = *certain it was the cause*). The average likelihood scores were 4.92 for Ménière's disease causing him to fall and 5.08 for pornography at camp causing him to get in trouble with the Chief.

In sum, the results from the pilot study showed that when asked whether the information provided in the vignettes could explain the critical outcomes witnessed in the video, participants viewed these accounts as plausible explanations. However, it should be noted that for pilot participants, the vignettes were read 15 min after viewing the video, and they provided the sole source of additional information relevant to the witnessed outcomes. Hence, the pilot study could not address whether participants would spontaneously link the information provided in the vignettes to the witnessed events when the vignettes were read 1 week after the video and following an intervening postevent interview.

Results

Were participants less likely to develop false memories for their forced fabrications when provided with potential alternative explanations?[6] The dependent measure of primary interest was the proportion of fabricated events falsely recalled 6 weeks after interview on a test of memory for the witnessed event. Because performance for prank and exploit never differed (all ps $> .10$), results are collapsed across item. Data were coded in the same fashion and with the same criteria as in Experiment 1. The interrater reliability for the coding of recall for both fabricated and not-asked data was 95% (discrepancies were resolved by discussion).

As illustrated in Figure 4, the results support the explanatory role hypothesis: Fabrication participants were less likely to report their forced fabrications in the alternative explanation condition ($M = .20$) than in the no-alternative explanation condition ($M = .31$), $z = 2.04$, $p < .05$. The base rate of spontaneously reporting the fabricated events was at floor (only one participant in the not-asked conditions did so) and did not differ as a function of explanation condition ($p > .10$). Overall, forcing participants to fabricate resulted in false memories in both conditions, as recall of the forced fabrications exceeded the base rate in both the alternative explanation condition, $\chi^2(1, N = 175) = 9.768$, $p = .002$, Cramér's $V = .236$, and the no-alternative explanation condition, $\chi^2(1, N = 169) = 11.564$, $p < .001$, Cramér's $V = .262$.

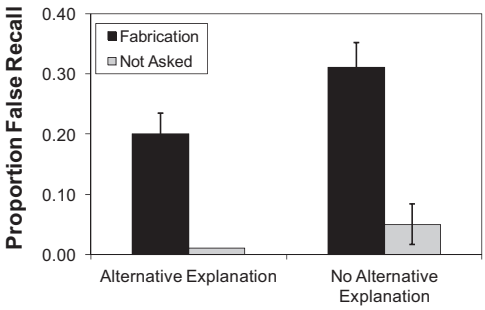

Figure 4. Experiment 3. Proportion of forcibly fabricated events freely reported 6 weeks later by participants in the alternative and no-alternative explanation conditions. The base rate of false reporting for the corresponding not-asked conditions is provided for comparison. Error bars represent standard errors of the mean.

Did fabrication participants develop false memories for the alternative explanations contained in the vignettes? Pilot data suggested that participants viewed the relevant explanatory information from the vignettes (e.g., Ménière's disease) as providing a possible explanation for the critical outcomes (e.g., Delaney falling). Given these findings, it seems reasonable to expect that participants in Experiment 3 would incorporate the vignette information into their memory for the originally witnessed event and thus provide it at test. Indeed, fabrication participants were more likely to mention the explanatory vignette information (e.g., Ménière's disease; $M = .22$) than the nonexplanatory vignette information (e.g., pemphigus; $M = .00$), as not one participant mentioned the nonexplanatory information during recall. Although not explicitly predicted, these data also fit with the explanatory role hypothesis. Presumably, participants were more likely to mention the relevant vignette information in the alternative explanation condition precisely because it could be used to explain events in the video.

Did the provision of an alternative explanation interfere with memory for the fabricated events? Overall, when explicitly asked, participants were quite good at recalling the events they had fabricated in response to the false-event questions ($M = .89$). More importantly, however, there were no differences in participants' recall of their fabricated answers in the alternative ($M = .87$) and no-alternative ($M = .90$) explanation conditions ($p > .10$). These results provide evidence that the differences in false memory between the alternative and no-alternative explanation conditions reported above cannot be attributed to differences in memory for the content of the fabricated events (although it should be noted that performance was close to ceiling, and hence subtle differences as a function of condition may have been difficult to detect).

Did participants have accurate memory for information contained in the vignettes? In keeping with the explanatory role hypothesis, we predicted that participants would have better memory for the relevant vignette information provided in the alternative explanation conditions (e.g., Ménière's disease) because it pro-

[6] Six data points were removed from the analyses because the experimenter had accepted a fabricated response that did not meet study criteria during the forced fabrication interview.

vided a potential explanation for outcomes depicted in the clip (e.g., Delaney falling in the dining hall), whereas the corresponding information in the no-alternative explanation condition (e.g., pemphigus) did not. Interestingly, this prediction was confirmed for participants in the fabrication group (mean recall = .43 and .23 for the alternative and no-alternative explanation conditions, respectively, $z = 3.46$, $p < .05$.) but not for participants in the not-asked group (mean recall = .29 and .26 for the alternative and no-alternative explanation conditions, respectively, $p > .10$). At first blush, the failure to observe better memory for the alternative explanation vignettes in not-asked participants is surprising. Not-asked participants witnessed the same outcomes as fabrication participants (e.g., Delaney falling in the dining hall, the counselors getting in serious trouble)—outcomes that were only minimally explained by the events of the video. Moreover, not-asked participants were not asked to generate a fabricated event that could compete with the vignettes as an explanation for the witnessed outcome; hence the vignettes provided the sole source of additional explanatory information.

We speculate that as a consequence of having been forced to fabricate an explanation of the observed outcomes, fabrication participants processed the vignettes differently from not-asked participants. The forced fabrication interview may have made them aware that they did not have a complete explanation for the relevant viewed outcomes. Not-asked participants, who were not asked to explain the cause of these outcomes, may have been satisfied with the minimally coherent account provided by the events they had witnessed. As a result, only fabrication participants were motivated to search for potentially explanatory information (which the vignettes provided), thus improving memory for the alternative explanation vignette in the fabrication group only, a phenomenon similar to that documented in studies of the retrieval enhanced suggestibility effect (e.g., Chan & Langley, 2011; Chan, Thomas, & Bulevich, 2009).

Discussion

Experiment 3 provided a strong test of the explanatory role hypothesis. In contrast to Experiments 1 and 2, here participants' fabrications were always part of a causal chain. Thus, for all participants the events they fabricated helped to explain an outcome that they had earlier witnessed. Results indicated that participants were less likely to report their forced fabrications on a delayed test of memory for the original event if an alternative cause had been presented. Presumably, the presence of the alternative explanation reduced the necessity and, hence, the explanatory strength of their fabrications.

The results of Experiment 3 are related to the finding in studies of the *continued influence effect* (CIE; Ecker, Lewandowsky, & Tang, 2010; H. M. Johnson & Seifert, 1994, 1998, 1999; Wilkes & Reynolds, 1999), that retractions of causal misinformation have little effect unless the retraction is accompanied by an alternative causal explanation. For example, in a study by H. M. Johnson and Seifert (1994), participants read a story about a fire that was linked to the careless storage of volatile materials. A later correction stating that no such materials had been found was ineffective in reducing participants' reliance on this explanation, unless the correction was also accompanied by an alternative explanation—namely, that the fire was caused by arson and arson-related materials had been found (H. M. Johnson & Seifert, 1994; Rapp & Kendeou, 2007). The dominant interpretation of these findings is that a retraction alone leaves a causal "gap" in the situation model of the warehouse fire. Hence, unless the retraction is accompanied by an alternative explanation that can fill this causal gap, participants continue to rely on the discredited information. Hence, studies of the CIE, like the present study, have shown that the presence of alternative explanations can reduce reliance on misinformation that serves an explanatory function (cf. Anderson, Lepper, & Ross, 1980, for related findings in studies of belief perseverance).

However, the alternative explanation manipulation that is typically used in CIE studies also differs in potentially important ways from the present manipulation. In studies of CIE, participants are explicitly informed that the alternative explanation (arson) should substitute for the original explanation (volatile materials), which is explicitly discredited as untrue. Moreover, both the original and alternative explanation are presented close together in time and in the context of a single story that participants read (see, e.g., H. M. Johnson & Seifert, 1994). In contrast, the information that served as alternative explanations in the present study was presented in the context of general background information about three of the characters. As such, this information was not presented to participants as an explanation for the outcomes they had witnessed, nor was it explicitly linked to specific events they had seen or fabricated. In addition, for participants in the fabrication group, there were no causal gaps that needed to be filled, as their fabricated events resulted in a well-specified, causally coherent situation model of the witnessed outcomes (as evidenced by the fact participants incorporate their fabrications into their accounts of the witnessed events). Hence, for purposes of building a causally coherent situation model, there was little need to integrate this additional vignette information with memory for the video events. Our finding that the availability of a potential alternative explanation nevertheless reduced reliance on the fabricated events suggests that participants continued to actively search for explanations of the witnessed outcomes, perhaps because they had just been pressured into fabricating these events and were unsure of their validity (for evidence that retractions are more effective when people are suspicious or skeptical of the retracted information's validity, cf. Fein, McCloskey, & Tomlinson, 1997; Lewandowsky, Stritzke, Oberauer, & Morales, 2005).

General Discussion

Why are participant-witnesses prone to developing false eyewitness memories for entire fictitious events they had earlier been forced to fabricate knowingly? According to the explanatory role hypothesis, one factor that contributes to false memory development is the explanatory function the fabricated event serves. Three experiments were conducted to test this hypothesis. In line with the predictions of the explanatory role hypothesis, participants were more likely to freely report (Experiment 1) their forced fabrications when they helped to explain an outcome that had been witnessed (fabrication/outcome condition) than when they did not (fabrication/no-outcome condition). Experiment 2, which replicated the results of Experiment 1 with a recognition test, confirmed that greater reporting of forced fabrications in the fabrication/outcome condition cannot be attributed to the demands of good storytelling alone. Rather, the finding in Experiment 2 that partic-

ipants were more likely to falsely assent to having witnessed their forcibly fabricated events in the fabrication/outcome condition is consistent with the conclusion that participants were more likely to develop false memories of their forced fabrications when they served an explanatory role. However, what could not be discerned from the results of Experiments 1 and 2 was the extent to which higher false memory in the fabrication/outcome relative to the fabrication/no-outcome condition might have been due to the greater number of connections between the fabricated and witnessed events in the fabrication/outcome condition, as opposed to the explanatory nature of these connections, per se. Hence, Experiment 3 employed a different approach to testing the explanatory role hypothesis that circumvented this interpretive ambiguity. In Experiment 3, participants' fabrications always explained a witnessed outcome (and hence always served an explanatory function). However, the explanatory strength of the fabrication was manipulated by the presence or absence of an alternative explanation for the same witnessed outcome. The finding that participants were less likely to report their explanatory fabrications when their explanatory strength had been reduced by the availability of an alternative explanation provides clear evidence in support of the explanatory role hypothesis.

Of course, the current findings need to be replicated and extended, and additional research is needed to assess whether the current findings generalize to other kinds of fabrications (e.g., fabrications that describe a physical cause as opposed to a person-generated cause; e.g., Hilton, McClure, & Sutton, 2010) and other kinds of outcomes (e.g., self relevant, positive). In this study, all three experiments used the same video as the eyewitness event and only two fabricated events (prank and exploit). It is worth noting, however, that false memory rates for the two forcibly fabricated events employed in these studies were strikingly similar despite the fact that they were in some ways quite different from one another (e.g., in temporal scope and complexity). This suggests that the explanatory role hypothesis may be able to predict false memory development over a wide range of situations.

Explanatory Function Is Not a Precondition for False Memory Development

A consistent finding across all three experiments was that participants demonstrated reliable false memory for their fabrications, even when their explanatory role was minimal. For example, participants in the fabrication/no-outcome conditions of Experiments 1 and 2 evidenced reliable false memory effects even though the fabrications did not explain any of the outcomes they had witnessed. Similarly, participants in Experiment 3 evidenced reliable false memory for their forced fabrication even when there was an alternative explanation that could also explain the witnessed outcomes. Hence, having an explanatory function is not a precondition for false memory development. Rather, it appears that when a fabricated event serves an explanatory function, it can further exacerbate participants' tendency to confuse fabricated events for events they witnessed.

What factors may have contributed to false memory development in those cases where the explanatory role of their fabrications was minimal? Consistent with the source monitoring framework, many of the basic mechanisms that have been shown to increase source monitoring difficulty are present in the forced fabrication paradigm (e.g., M. K. Johnson, Hashtroudi, & Lindsay, 1993; Lindsay, 2008). First, as in all eyewitness suggestibility situations, there is a great deal of overlap between the witnessed event and forensic interviews about the event, thus rendering the two sources highly confusable (see, e.g., Mitchell & Zaragoza, 1996, for a discussion). In addition, pressing participants to describe fictitious events in a great amount of detail forced them to create concrete, perceptually detailed, and well-specified memory representations that had characteristics typical of events that had actually been witnessed (M. K. Johnson et al., 1993).

Several other mechanisms may have also contributed to the demonstrated false memory effects. Given the well-documented mnemonic advantage enjoyed by self-generated information (e.g., Hirshman & Bjork, 1988; Slamecka & Graf, 1978), the content of participants' self-generated fabrications was likely well remembered and highly familiar at the time of test (see Experiment 3 for evidence that supports this contention). This increased familiarity may have made them particularly confusable for events that had actually occurred in the video (e.g., Jacoby, Kelley, & Dywan, 1989; Whittlesea, 1993). In addition, the fabrications that participants generated were likely constrained by their own idiosyncratic knowledge, making them particularly plausible when encountered or retrieved at the time of test. Finally, the long retention interval between interview and test (6 weeks) likely resulted in participants forgetting that they had been forced to fabricate these events. Hence, over the long retention interval, many participants likely forgot a useful diagnostic cue that could have been used to reject their fabricated events as not witnessed (cf. Gallo, 2004).

In summary, in the forced fabrication paradigm, as in many real-world eyewitness memory situations, there are many reasons why participants are prone to confusing their forced fabrications for events they witnessed. The contribution of the present study is the demonstration that the goals of the rememberer—in this case, the effort to fully understand the causes of the events they experienced—can further increase participants' tendency to misattribute their fabrications to the eyewitness event. From a source monitoring perspective, there are several mechanisms by which the goal of "seeking causal explanations" could increase misattribution errors for fabrications that serve an explanatory role. For example, participants may adopt looser criteria when evaluating the source of information that fits with their goals. Alternatively, they may engage in less effortful search and retrieval of information that could potentially identify these fabrications as not witnessed and may even discount such information if it is retrieved. Clearly, understanding the specific mechanisms by which the search for causal explanations contributes to these false memory errors remains an important question for future research.

Relationship of Current Findings to the Broader Literature

The current findings converge with a large body of empirical evidence showing that when perceiving, comprehending, and remembering events, people seek to understand the underlying causes of the events they experience (Weiner, 1985). For example, numerous studies have shown that when reading a story, people seek to identify the causal and motivational forces that drive the interactions of characters and that link events (e.g., Zwaan et al., 1995). However, most studies of narrative comprehension focus on the situation model that is created and stored in memory immedi-

ately after a text has been processed. Although some theorists explicitly acknowledge that later processes (e.g., later ruminations about a story) can alter the original situation model (see Zwaan & Radvansky, 1998), to date, the effects of these postcomprehension experiences have received relatively little empirical attention in the text comprehension literature. The eyewitness suggestibility phenomena we investigated in the present studies extends this research by examining how information encountered long after initial encoding, and in a very different context, can influence the situation model of the originally witnessed event. Indeed, the present findings demonstrate that this drive for explanation or "effort after meaning" (e.g., Auble & Franks, 1978; Bartlett, 1932; Graesser et al., 1994) can continue weeks after the witnessed event is initially perceived, and underscore the dynamic nature of situation models and their susceptibility to influence from a variety of experiences.

It should be noted that the comprehension goals of the participants in the current experiments, like those of eyewitnesses in the real world, were likely influenced by the experience of having been interviewed about the witnessed event and the expectation that, as eyewitnesses, they should be able to provide a full explanation of the events they witnessed. Specifically, as a consequence of the forensic interview, participants were likely alerted to the fact that they did not fully understand the causes of the target outcomes, and this realization likely encouraged participants to engage in a more effortful, strategic search for causal explanations than they might have otherwise (see discussion of Experiment 3 for evidence in support of this contention). As such, the active search for explanations evidenced by participants in the current experiments may not be representative of comprehension in all situations, as comprehension processes are heavily influenced by the person's goals, motivations, and standards of coherence in a given situation (see, e.g., McNamara & Magliano, 2009, for a discussion).

Finally, the present findings also fit with research documenting that people's goals and desires can contribute to source monitoring errors. For example, studies of the "wishful thinking" bias (Gordon, Franklin, & Beck, 2005) have shown that people are prone to misattributing desired predictions (e.g., an improved economy) to sources that are more reliable (e.g., the *New York Times*) than the actual source of the wished for outcome (e.g., the *National Enquirer*). As another example, our motivation to believe that we have made the right choice (e.g., the decision to buy a Hyundai rather than a Volkswagen) can lead to choice-supportive misattributions, such that we falsely attribute more positive features to the chosen option than its competitor, and vice versa (e.g., Henkel & Mather, 2007). The present results are related, insofar as people's motivation to fully understand the causes of the events they have experienced predisposed them to confuse a fabricated event for a real one (see also Sharman & Calacouris, 2010).

Forensic Implications

The findings of the current investigation are of particular relevance to real-world forensic situations. In most cases, the purpose of eyewitness testimony is to provide an explanation for an outcome (e.g., an accident, robbery, or murder) that does not have a well-determined cause. In such situations, the stakes associated with solving a crime can be very high (e.g., conviction of the offender eliminates the likelihood of additional crimes being committed). As a result, forensic interviewers may push witnesses beyond their actual memories, encouraging them or even coercing them to describe events they do not remember or never witnessed. The results reported here suggest that because of the explanatory function eyewitness testimony serves, witnesses may be especially predisposed to developing false memories for events that were at one time mere speculation or even forced fabrications. Indeed, the results reported here may underestimate the extent to which eyewitnesses are prone to false memory development, as research has shown that people are especially likely to seek causal explanations for negative, unexpected, and consequential outcomes (e.g., Weiner, 1985)—characteristics typical of forensically relevant outcomes.

Conclusion

Since Münsterberg's (1908) classic work on the reliability of eyewitness memory, substantial progress has been made in understanding the mechanisms underlying eyewitness suggestibility errors. Much of this research has focused on identifying the characteristics of a mental experience that lead people to confuse a fabricated or suggested memory for a "real" memory. For example, it is well established that memories of fabricated or suggested events that are highly familiar, clear, vivid, and rich in sensory and emotional detail are particularly likely to become false memories (M. K. Johnson, 2006). The research reported here adds to this body of research by showing that the relationship between the fabricated or suggested event and other information in memory also plays an important role in false memory development. In particular, the present studies are the first to show that the causal explanatory relationship between fabricated events and observed events is a powerful predictor of false memory development.

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(*Appendix follows*)

Appendix

Questions Asked in the Phase 2 Postevent Interview

Questions 1, 2, 4, and 5 were true-event questions and asked of all participants in all three experiments. The last true-event question for participants in Experiments 1 and 2 was 7a, and for participants in Experiment 3 it was 7b. The parenthetical information that follows each main true- and false-event question indicates the most common follow-up questions asked by experimenters.

Question 3 was the prank false-event question, and Question 6 was the exploit false-event question (the false portion of the question is underlined). The version of the prank question varied by outcome condition, but the exploit question was identical in both conditions. When prank and or exploit served in the not-asked condition, participants were not asked the false-event question. In Experiments 1 and 2, all participants were asked only one of the two false-event questions (with the alternative item serving in the not-asked condition). In Experiment 3, participants in the fabrication group were asked both false-event questions, and participants in the not-asked group were not asked either question.

Interview Questions: Experiments 1–3

1. True Event

The opening scene of the movie takes place outside. The woman who founded the camp talks a little about its history. A boy nicknamed "Ratface" causes some trouble. What did he do? (*How specifically was he picking on the child? How did the camp founder respond? How did the scene end?*)

2. True Event

In the next scene, one of the counselors is giving a lesson about poisonous snakes and is bitten by the snake. What happens in the rest of the scene? (*How specifically did they treat the wound? Where did the Chief go? What did Delaney do to help out?*)

3. False Event

The next scene takes place in the dining hall. Delaney is asked to stand up and make an announcement.

Outcome condition. A practical joke is pulled on him that caused him to fall and end up on the floor. What was it? (*Example involving an initial fabricated response of "He was tripped": Who tripped Delaney? How specifically did Ratface trip Delaney? How did Ratface tie Delaney's shoelaces together without him noticing?*)

No-outcome condition. The cook deliberately gave him a broken chair to stand on. The chair broke and Delaney fell on the floor. Then Delaney decided to get back at the cook. What practical joke did Delaney pull on the cook later, causing the cook to fall and end up on the floor? (*Example involving an initial fabricated response of "Delaney did something to his chair": What did he do to the chair? How did he make one of the legs weak? How did he do this without the cook noticing?*

4. True Event

Later, all of the ladies and boys walk down to the water to take a tour on the canoes. While on the boats, what happened that caused a huge commotion? (*How specifically did Delaney kill the snake? What happened to the ladies that were in the boats?*)

5. True Event

The next scene takes place on the dock. Delaney is forced to run down and pull his little brother Sullivan out of the water, and the two have a talk. What happened that caused Sullivan to end up in the water? (*What happened when Delaney came down to the water? What did Delaney and Sullivan talk about? What did Sullivan do at the end of the scene?*)

6. False Event

Towards the end of the movie, Delaney and Moe use a canoe and sneak off at night. After sneaking out, where did they go and what did they do that caused them to get in big trouble? (*Example involving an initial fabricated response of "They went to the girls' camp": Who were they with? What were they doing? What type of games were they playing?*)

7a. True Event

In the final scene, Sullivan interrupts the owner of the camp, Mrs. Gibson, by the water, as she is swimming. What happens in this scene? (Experiments 1 and 2) (*What did the two of them talk about? How specifically did she help him learn how to swim? What did she give to Sullivan and why?*)

7b. True Event

In the final scene, Delaney was sitting by the water and was very upset. What happened in this scene? (Experiment 3) (*Who was there? What did Delaney and Sullivan talk about? What happened at the end of the scene?*)

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