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False Memories for Suggestions: The Impact of Conceptual Elaboration

Maria S. Zaragoza,
Kent State University

Karen J. Mitchell,
Yale University

Kristie Payment, and
Ohio Northern University

Sarah Drivdahl
Northwest University

Abstract

Relatively little attention has been paid to the potential role that reflecting on the meaning and implications of suggested events (i.e., conceptual elaboration) might play in promoting the creation of false memories. Two experiments assessed whether encouraging repeated conceptual elaboration, would, like perceptual elaboration, increase false memory for suggested events. Results showed that conceptual elaboration of suggested events more often resulted in high confidence false memories (Experiment 1) and false memories that were accompanied by the phenomenal experience of *remembering* them (Experiment 2) than did surface-level processing. Moreover, conceptual elaboration consistently led to higher rates of false memory than did perceptual elaboration. The false memory effects that resulted from conceptual elaboration were highly dependent on the organization of the postevent interview questions, such that conceptual elaboration only increased false memory beyond surface level processing when participants evaluated both true and suggested information in relation to the same theme or dimension.

Keywords

eyewitness memory; suggestibility; false memory; conceptual elaboration

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Our memories for specific life events are influenced by the related events that follow them. We discuss event memories with others (Marsh, Tversky, and Hutman, 2005), reflect and ruminate about them, and sometimes reinterpret or reappraise them from a different perspective. These post-event experiences (both internal and external) have the potential to

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Address correspondence to: Maria S. Zaragoza Department of Psychology Kent State University Kent, OH 44242 mzaragoz@kent.edu
Phone: 330-672-2167 Fax: 330-672-3786.

Authors' Notes Maria S. Zaragoza, Department of Psychology, Kent State University; Karen J. Mitchell, Department of Psychology, Yale University; Kristie Payment, Department of Psychology, Ohio Northern University; Sarah Drivdahl, Department of Psychology, Northwestern University.

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enhance memory, by, for example, preserving and reinforcing accurate elements of the original experience (see, e.g., Bergman & Roediger, 1999, for a discussion). However, they also have the potential to contaminate memory with falsehoods and distortions. One well-studied example of memory errors caused by post-event experiences is the false memories that can result from suggestive forensic or therapeutic interviews. Many studies have documented that misleading suggestions provided by an interviewer can result in confidently held recollections of having witnessed fictitious items and even entire fictitious autobiographical events (see, e.g., Loftus, 2003; Zaragoza, Belli, & Payment, 2007, for recent reviews).

Although mere exposure to suggestive interviews can lead to false memory development, *reflectively elaborating* on misleading suggestions in ways that make the memories for suggested information more similar to memories of actually witnessed events can increase both the incidence and magnitude of the resulting false memory effects (e.g., Drivdahl, Zaragoza, & Learned, 2009; Zaragoza et al., 2007). By reflective elaboration we mean any post-perceptual cognitive processing that embellishes the representation in some way. Such reflective elaboration can occur during the initial encoding episode or at later points in time, when thinking about, reviewing (e.g., Lane, Mather, Villa, & Morita, 2001), or reevaluating a prior event.

Evidence that reflective elaboration can contribute to false memory development comes from research on the role of imagery as a catalyst to false memory creation. Many studies have shown that encouraging participants to imagine fictitious events can increase false memory development, even when the imagined events are rather bizarre (such as proposing marriage to a Pepsi machine, see, e.g., Thomas & Loftus, 2002; Seaman, Philbin, & Harrison, 2006). Moreover, *repeatedly* imagining how things might have happened can further increase false memory for fictitious events (see also, e.g., Goff & Roediger, 1998; Suengas & Johnson, 1988), and even for entire autobiographical events (e.g., Ceci, Crouteau Huffman, Smith, & Loftus, 1994; Hyman & Pentland, 1996; Loftus & Pickrell, 1995).

Control over exactly what participants imagine (and how) is somewhat limited in these studies, but in general, the focus is on encouraging percept-like images that contain sensory and spatio-temporal details. Instructions often include encouragement to imagine specific details (e.g., “include familiar places, people, and things in the imagined event”, Garry et al., 1996, p. 210), and both the language of the instructions (e.g., “picture the event”, “you will answer some questions about your image”, Garry et al., 1996, p. 210) and intermittent prompts (e.g., “... describe the image in detail... what the objects, people, and locations looked like”, Hyman & Pentland, 1996, p. 106) often encourage focusing on sensory and spatio-temporal details in particular. The assumption, even if implicit, is that false memories for events are most likely to occur because of confusion about the source of percept-like qualities, such as perceptual and spatio-temporal details. Indeed, more direct evidence that mentally elaborating on the sensory/perceptual characteristics of suggested events increases false memories comes from studies that have asked participants questions specifically about the sensory/perceptual aspects of the suggested or imagined events rather than simply asking participants to imagine them more generally (see, e.g., Drivdahl & Zaragoza, 2001; Thomas, Bulevich, & Loftus, 2003; see also Lane & Zaragoza, 2007).

From the perspective of the Source Monitoring Framework (SMF, Johnson, Hashtroudi, & Lindsay, 1993; Lindsay, 2008) the finding that visual imagery is a catalyst to false memory creation is perfectly understandable. According to the SMF, memory representations do not have labels or tags that specify their sources; rather, mental events are attributed to particular sources on the basis of their qualitative and quantitative characteristics. The more that the thoughts and images that come to mind have characteristics of an actually witnessed event, the more likely they are to be experienced as a memory of an actually-experienced event. Thus,

imagining perceptual aspects of suggested events often promotes the development of false memories because such imagery induces participants to create a representation of the fictitious event that is rich in vivid sensory/perceptual and contextual details, characteristics that render it similar to, and hence confusable with, a memory for a “real” event (e.g., Johnson et al., 1993; Suengas & Johnson, 1988; see also, Johnson, Raye, Mitchell, & Ankudowich, in press, for a recent review and discussion of neuroimaging evidence). In addition, during reflection, perceptual details can be “borrowed” or “imported” from similar real events and become associated with the false event thereby making it seem more veridical (e.g., Henkel, Franklin, & Johnson, 2000; Lampinen, Meier, Arnal, & Leding, 2005; Lyle & Johnson, 2006). Of course, regardless of where the details originate, it is only when erroneous information is *taken as evidence of a real memory* that a source memory error occurs (Johnson et al., 1993; Johnson & Raye, 2000; Lindsay, 2008; Mitchell & Johnson, 2000).

Much less attention has been paid to the potential role that conceptual or evaluative reflective processes might have in false memory development in this context (although see Drivdahl et al., 2009, for an exception). However, imagining fictitious events involves more than simply creating a perceptually detailed representation. Imagining how a fictitious event might have transpired also likely involves more abstract sorts of reasoning about the meaning and implications of the fictitious event, and the creation of a plausible scenario that fits with other information in memory. This sort of meaningful elaborative processing may serve to establish stronger and more numerous connections between the suggested fictitious information and other related information in memory, and thereby promote the development of a false memory. In sum, it seems likely that false information that is well-embedded in a coherent network of true memories and knowledge is especially likely to be confused for “real” memories (Johnson, Foley, Suengas, & Raye, 1988). If this is the case, it is possible that reflectively elaborating on the meaning and implications of fictitious events might be an especially potent path to false memory.

The goal of the present study was to assess whether repeatedly elaborating on the meaning and implications of suggested events (hereafter referred to as *conceptual elaboration*), would, like repeated perceptual elaboration (e.g., Drivdahl & Zaragoza, 2001), increase false memory for having witnessed suggested fictitious events. To this end, a modification of the repeated eyewitness suggestibility paradigm was used in which participants were asked questions that encouraged either perceptual or conceptual elaboration of misleading suggestions (e.g., the suggestion that the thief had a gun, when in fact he had no weapon). Participants in a *Conceptual Elaboration Condition* were asked questions that encouraged them to think about the meaning and implications of suggested events (e.g., they were asked how incriminating a jury would find it that the thief had a gun). Participants in a *Perceptual Elaboration Condition* were asked questions that encouraged them to reflect on the visuo/spatial characteristics of the suggested item (e.g., Was the gun tucked in the front or back of the thief’s jeans?). And, because previous studies have shown that false memory for suggested items increases as a function of number of exposures to the misleading suggestion even without prompts to elaborate (Mitchell & Zaragoza, 1996, 2001; Zaragoza & Mitchell, 1996), participants in a *No Elaboration Condition* read the misleading suggestions but did not elaborate on them further. To minimize spontaneous perceptual and conceptual elaboration in this group, they answered follow-up questions that focused on superficial aspects of the misleading suggestion, such as its rhyming characteristics (e.g., what word in this sentence rhymes with “sun”). We note that our use of the terms “conceptual elaboration”, “perceptual elaboration”, and “no elaboration” does not imply that the elaboration carried out in each condition was “process pure”. To the contrary, we assume that all attempts to answer questions about a previously experienced meaningful event will involve reflecting on both the perceptual and meaningful aspects of the event at least to some minimal extent. This is because the perceptual and conceptual dimensions of our experiences cannot be segregated from each other entirely, and all attempts to retrieve a past

experience will involve some meaningful processing. Hence, the condition labels refer to the type of reflective elaboration emphasized by the postevent questions in those groups; they are intended as relative terms. As such, we assume primarily meaningful elaboration in the Conceptual Elaboration group, primarily sensory/perceptual elaboration in the Perceptual Elaboration group, and minimal elaboration of either type in the No Elaboration group.

Consistent with prior research (e.g., Drivdahl & Zaragoza, 2001), we predicted that reflectively elaborating on the sensory/perceptual aspects of suggested events will increase false memory, such that participants in the Perceptual Elaboration group would be more likely to misattribute the suggested events to the video than those in the No Elaboration group (although the present study employed an immediate test and Drivdahl & Zaragoza [2001] assessed false memory after a one week delay). The question of primary interest in this study is whether conceptual elaboration also increases false memory for suggested events. If reflectively elaborating on the meaning and implications of suggested events increases false memory development, participants in the Conceptual Elaboration group also should be more likely to incorrectly claim they remember witnessing the suggested events in the video than participants in the No Elaboration group. More important, inclusion of both a conceptual elaboration and perceptual elaboration condition in the same study allowed us to compare the relative potency of encouraging perceptual versus conceptual elaboration in promoting false memory.

Methods

Participants and Design

The experiment involved a 3 (Elaboration Type: No Elaboration, Perceptual Elaboration, Conceptual Elaboration) $\times$ 2 (Number of Exposures to Postevent Suggestion: 0, 3) mixed-factorial design with elaboration group a between-subjects variable and number of exposures to suggestion a within-subjects variable. The 180 undergraduate participants were randomly assigned to the three elaboration groups (n 's = 60). Participants received course credit.

Materials and Procedure

Participants were run in groups ranging in size from 1 to 10.

Phase 1-The Eyewitness Event—The eyewitness event was a 5 min segment of a police training video (Zaragoza & Mitchell, 1996). It depicts a burglary of a home by two youths and an ensuing police car chase. Participants were told to watch the video for an upcoming test, which was left unspecified.

Phase 2-Misleading Postevent Questions—Immediately after seeing the video, participants were told that they would hear questions presented on audiotape (in a female voice), and that they would have 15 sec to answer each question on the answer sheet provided. Participants also received a printed copy of the questionnaire so that they could read along while listening to the tape. Participants were instructed to use the answer sheet to cover the printed questionnaire, and to reveal each question (by sliding the answer sheet down the page) only when the audiotape instructed them to do so (e.g., "Question #2"). They were explicitly instructed not to read ahead, and an experimenter monitored compliance. In this way, the amount of time spent on each question was equated across groups and across items.

The 27-item questionnaire probed participants about each of 9 scenes from the video in chronological order 3 times by going through the events in the video 3 times in succession, each time probing participants about slightly different aspects of the same item from each scene (see Table 1 for an example). Each question consisted of a one or two sentence description of the scene, which contained the critical (i.e., misleading or actually witnessed) information,

followed by a multiple choice or yes/no question that requested additional information about an item or event mentioned in the description.

We assessed the effects of repeated elaboration on two types of critical items: (1) misleading suggestions (items that, although plausible, were never seen in the video but were suggested in the postevent questionnaire) and (2) actually seen items (objects or events that were seen in the video and then elaborated on in the questions). Across participants a total of 6 misleading suggestions were used (with one suggestion from each of 6 scenes: the thief pulled a blind, the thief stole a ring, the driver smoked a cigarette, the thief had a gun, there was a barking dog, the driver jumped a curb with the car). For each participant, 3 of these suggestions were assigned to the 3-postevent exposure condition (the misleading suggestion was embedded in all 3 descriptions of the corresponding scene) and the other half were assigned to the 0-postevent exposure condition (i.e., the subject was never exposed to these items and hence these items served as never presented control items for this person on the test). In a similar fashion, across participants, a total of 6 actually seen items were used (there was a nightstand, the driver wore a hat, the thief left through the back door, the thief carried a bag, there was a shrub in the neighbors yard, there was a stop sign at the corner) and these corresponded to the same scenes as the suggested items. For each participant, 3 of these actually seen items were assigned to the 3-postevent exposure condition (the actually seen items were mentioned in all 3 descriptions of the corresponding scene and hence served as items that were both in the video and the postevent questionnaire on the final test), and the other 3 actually seen items were assigned to the 0-postevent exposure condition (i.e., they were never mentioned in the postevent questionnaire and hence served as items participants had only seen in the video). Counterbalancing ensured that, across participants, all critical items (both misleading and actually-seen) served equally often in the 3-postevent exposure and 0-postevent exposure conditions. The follow-up question was always about the critical item (whether suggested or actually seen). Thus, any one question contained *either* a critical suggestion or critical actually viewed item, but not both. There were also 3 questions in each subset that served as filler items to maintain the narrative structure of the events.

The nature of the questions varied as a function of elaboration group (see Table 1 for examples). For participants in the Perceptual Elaboration Group, the questions always requested further information about the sensory/perceptual or spatial/contextual characteristics of the target item. As illustrated in Table 1, each time the questionnaire cycled through the sequence of 9 scenes, it probed participants for different perceptual characteristics of the same target items (e.g., location, physical context, physical description).

For participants in the Conceptual Elaboration group, the questions were designed to encourage participants to reflectively elaborate on the meaning and implications of the suggested events, but not their perceptual characteristics. Each subset of 9 questions focused on a distinct theme, or dimension, and asked participants to either: rate how incriminating a jury would find the target item or event in each of the scenes, evaluate how central the target item or event in each scene was to the overall story line, or speculate about the characters' internal reactions and motivations with respect to the target item/event in each scene.

Finally, for participants in the No Elaboration Group, the follow-up questions ensured participants spent additional time processing the target items without further elaborating on perceptual features or meaning. Participants made a decision about the rhyming characteristics of the target item/event, unscrambled letters to form the target item, or decided whether the statement was grammatically correct if the target item was removed from the sentence (see Table 1 for examples).

In all conditions, the subsets of questions were given in the order described above to all participants.

Phase 3-Source Memory Test—A surprise source memory test followed a 10 min filled interval. Participants were given both written and verbal instructions informing them that they were going to receive a 12-item source test, and that for each test item they were to make two judgments regarding the source of the test item: (1) whether they saw the test item in the video; (2) whether they read the test item in the postevent questions. Participants responded on an answer sheet that contained two columns labeled “VIDEO” and “QUESTIONS”. Each column contained 7-option Likert-type scales: definitely yes, probably yes, maybe yes, unsure, maybe no, probably no, definitely no.

Before they began, participants were accurately informed that some of the test items were in the video but not mentioned in the questions, some of the test items were not in the video but were mentioned in the questions they answered, some test items were both in the video and in the questions, and finally, that some of the test statements contained information that was in neither the video nor the questions. Furthermore, participants were told that they were to base their source judgments on their own memory of the events. Including the explicit warning that the questionnaire contained information that was not in the video increases confidence that we were measuring false memory and not a perceived demand to go along with information provided in the questionnaire.

The source test was comprised of 12 statements read on a cassette recorder in a male voice with an interitem interval of 8 sec (e.g., “The thief stole a ring.” “There was a nightstand in the bedroom.”). No two consecutive probes were from the same source category. The list was presented in the same random order to all participants. For each participant, there were 3 items from each of the four possible source categories: *video only* (i.e., the witnessed items that were not elaborated upon in the postevent questionnaire: 0-postevent exposure actually seen items), *questions only* (i.e., the suggested items that were elaborated upon: 3-postevent exposure suggested items), *both* (i.e., the actually-seen items that were elaborated upon in the questionnaire : 3-postevent exposure actually seen items), and *neither* (i.e., 0-postevent exposure suggested items). Whereas the test items were the same for all participants, the specific items that served in each of the aforementioned source categories varied across participants, depending on the version of the postevent questionnaire they had received.

Results

Our primary interest was in assessing the impact of conceptual and perceptual elaboration on the development of false memories for suggested events, and for this reason the dependent variable of main concern is participants’ memory for the source of the suggested items. Specifically, the measure of false memory was participants’ claims that they remembered witnessing in the video items that were only suggested to them, as indicated by “yes” responses to suggested items in the *Video* column. A “yes” response to a suggestion in the *Questions* column served as the measure of memory for the suggested items’ actual source. These responses were not mutually exclusive; participants could accurately remember encountering the suggestions in the postevent questions yet develop a false memory of having also witnessed the suggested item in the video, and past research suggests they often do (see, Mitchell & Johnson, 2000; Zaragoza et al., 2007, for discussion).

Does Conceptual Elaboration Increase False Memory for Repeatedly Suggested Events?

Figure 1 shows the mean proportion of “yes in video” responses for the suggestions (collapsed across “definitely yes”, “probably yes”, and “maybe yes”) as a function of elaboration group (No Elaboration, Perceptual, Conceptual) and number of exposures to the suggested items (0

or 3). As verified by the analyses reported below, both conceptual elaboration and perceptual elaboration increased false memory for repeatedly suggested items relative to no elaboration, and conceptual elaboration led to a larger increase in false memory than perceptual elaboration (see the black bars in Figure 1).

The data were submitted to a 3 (Elaboration Type: No Elaboration, Perceptual, Conceptual) $\times$ 2 (Postevent Exposure to Suggestion: 0, 3) mixed model ANOVA with elaboration type as the between subjects variable and number of exposures as a within-subjects factor. Consistent with expectations, the main effect of exposures was highly reliable ($F[1,177] = 273.14$, $MSe = .08$, $p < .0001$), and planned comparisons confirmed that the effect of exposures was reliable in all three groups (all p 's $< .0001$). There was also a main effect of elaboration ($F[2,177] = 7.60$, $MSe = .09$, $p < .001$), and planned comparisons showed that overall, conceptual elaboration led to more errors ($M = .39$) than did perceptual elaboration ($M = .31$; $p < .05$) which led to marginally more errors than did no elaboration ($M = .24$; $p = .09$). Most important, as predicted, the magnitude of the false memory effect varied significantly as a function of elaboration group, as evidenced by the significant Group $\times$ Exposures interaction ($F[2,177] = 11.22$, $MSe = .08$, $p < .0001$). To assess the locus of the interaction, simple effects analyses were conducted on 0-exposure and 3-exposure items separately. As can be seen in Figure 1, the base rate of false assents to the 0-exposure items was very low (overall $M = .07$), and did not vary as a function of group ($p > .10$), thus showing that the elaboration manipulation did not lead to a general shift in criterion or response bias. Importantly, for the repeatedly suggested (3-exposure) items, the main effect of elaboration type was highly reliable ($F[2,177] = 10.92$, $MSe = .14$, $p < .0001$) and planned comparisons confirmed that the Conceptual Elaboration group made more false memory errors than the Perceptual Elaboration group, who in turn made more false memory errors than the No Elaboration group (all p 's $< .03$; see Figure 1). The pattern of results is identical when only "definitely yes" responses are used as the dependent variable (M 's for 3-exposure items = .59, .39, and .24 for the Conceptual, Perceptual, and No Elaboration groups respectively; $F[2,177] = 12.84$, $MSe = .14$, $p < .0001$; all pairwise p 's $< .05$).

One possible explanation for the increased source misattributions in the Conceptual and Perceptual Elaboration conditions is that the elaboration manipulations led to improved memory for the *content* of the suggested items. Put another way, it is possible that, relative to the No Elaboration group, participants in the Perceptual and Conceptual Elaboration groups were less likely to have forgotten the misleading suggestions at the time of the final source test. Because participants can only make a source identification for information they recognize as having occurred in the experiment, group differences in recognition memory for the suggested information could lead to group differences in source misattributions. To examine this possibility, we assessed whether there were group differences in recognition memory for the suggested items, as measured by the proportion of suggested items that were identified as either in the video or in the questions, or both; that is, any "yes" to suggested items. The results confirmed that whereas item recognition of the thrice-suggested information was near ceiling in all groups (M 's = .91, .98, .99, for the No Elaboration, Perceptual, and Conceptual groups, respectively) the Perceptual and Conceptual Elaboration groups had better memory for having encountered the suggested items in the context of the experiment than the No Elaboration group ($F[2, 177] = 7.90$, $MSe = .01$, $p < .001$; posthoc pairwise p 's $< .002$), and perceptual did not differ from conceptual ($p > .10$). We thus examined whether conceptual and perceptual elaboration increase false memory when controlling for these group differences in item recognition. That is, we analyzed misattributions to the video conditionalized on item recognition (i.e., for each participant, we computed the proportion of recognized suggestions that were misattributed to the video). The results showed that conditionalizing the data on recognition did not alter the pattern of results reported above: Mean conditionalized misattributions of the thrice-suggested items to the video were .45, .58, .72, for the No Elaboration, Perceptual, and Conceptual groups, respectively ($F[2, 177] = 7.33$; $MSe = .15$,

$p < .001$). Planned comparisons confirmed that the Conceptual Elaboration had higher false memory than both the Perceptual Elaboration and No Elaboration groups (p 's $< .05$), and the difference between the Perceptual and No Elaboration groups was marginally significant ($p = .08$). The results were identical when conditionalized “definitely yes” in video was used as the dependent measure. In sum, when the data were conditionalized on recognition, the pattern of findings was virtually identical suggesting that the increase in false memories with elaboration was not due to item recognition differences.

Does Conceptual Elaboration Impair Memory for the Suggested Items' Actual Source?

Another possibility is that conceptual elaboration of the suggested items led to increased source misattributions because it impaired participants' memory for the actual source of the misleading suggestions (i.e., the postevent questionnaire). This may have come about if, for example, reflectively elaborating on the meaning and implications of suggested events consumed more processing resources than did the perceptual elaboration and no elaboration tasks, thereby disrupting encoding of information that could later be used to identify the questionnaire as the actual source of the suggested items. To assess this possibility, we examined whether there were group differences in participants' memory of having encountered the suggested items in the postevent questions, as measured by “yes” responses (collapsed across confidence) to the “In Questions?” probe. The results provide strong evidence that meaningful elaboration did not impair memory for the actual source of the suggestions, in fact the opposite appears to have been the case.

Although participants in all three groups had highly accurate memories of having encountered the suggestions in the questionnaire, there was a main effect of condition for 3-exposure items ($F[2,177] = 4.07$, $MSe = .02$, $p < .02$) and planned comparisons confirmed that performance in both elaboration groups was near ceiling (M 's = .97 for both the Perceptual and Conceptual groups) and reliably higher than performance in the No Elaboration group ($M = .91$; both p 's $< .02$). The pattern of “definitely yes” responses was nearly identical (M 's = .97, .96 and .86 for the Conceptual Elaboration, Perceptual Elaboration, and No Elaboration conditions, respectively; main effect of condition for 3-exposure items: $F[2,177] = 7.31$, $MSe = .03$, $p < .01$; planned comparisons showed that Conceptual = Perceptual $>$ No Elaboration, both p 's $< .02$). In sum, the results show that the increase in false memory development that resulted from conceptual elaboration cannot be attributed to impaired memory for the suggested items' actual source.

Does Conceptual Elaboration Affect Memory for True (i.e., Actually-Witnessed) Items?

It is also of interest whether type of postevent elaboration affected participants' source memory for items they actually did see in the video. Recall that these are 3-exposure items that participants both saw in the video and subsequently elaborated upon in the questionnaire. Hence, we separately assessed whether type of elaboration affected correct “yes in video” responses, and correct “yes in questions” responses by submitting each dependent variable to a 3 (Type of elaboration: No Elaboration, Perceptual, Conceptual) $\times$ 2 (Postevent Exposures to actual items: 0, 3) mixed ANOVA.

Unlike the pattern observed with suggested items - where the type of postevent elaboration influenced the extent to which participants misattributed suggested items to the video - type of postevent elaboration had no discernible effect on the extent to which participants attributed actually witnessed items to the video (see Figure 2). Overall, repeatedly questioning participants about the actually seen items increased correct attributions to the video (overall M 's = .78 and .91 for the 0- post-event exposure and 3-post-event exposure conditions, respectively; $F[1, 177] = 35.57$, $MSe = .04$, $p < .00001$), but type of postevent elaboration had no effect on correct attributions to the video, as suggested by the lack of a main effect of

condition ($F < 1$). Although the Number of Postevent Exposures $\times$ Condition interaction was significant ($F[2, 177] = 3.32$, $MSe = .04$, $p < .05$), follow-up analyses revealed there was no effect of condition in either the 0-exposure ($F[2, 177] = 1.78$, $MSe = .05$, $p > .10$) or 3-exposure case ($F[2, 177] = 1.47$, $MSe = .03$, $p > .10$). Nevertheless, inspection of Figure 2 reveals that for the No Elaboration group, there was a somewhat smaller difference in accurate memory between the 0- and 3-exposure conditions than in the other two groups, due to numerically (though not significantly) higher memory in the 0-exposure condition, and numerically (though not significantly) lower memory in the 3-exposure condition relative to the other elaboration groups. We interpret this finding as spurious given that we did not observe a similar interaction when we restricted the analyses to “definitely yes” responses. In every other way the “definitely yes” responses mirrored the findings with total “yes” responses insofar as the effect of exposures was significant (overall M 's = .65 and .86 for the 0-postevent exposure and 3-postevent exposure conditions, respectively; $F[1, 177] = 81.10$, $MSe = .05$, $p < .0001$), but type of elaboration was not ($F < 1$).

Similar to the pattern observed with suggested items, elaboration did improve memory for having also encountered the actually seen items in the postevent questionnaire, and it did so for perceptual and conceptual elaboration equally. Specifically, participants in the Conceptual ($M = .92$) and Perceptual Elaboration ($M = .97$) groups did not differ ($p > .10$), but both had better memory for encountering the 3-exposure items in the postevent questionnaire than those in the No Elaboration group ($M = .75$; p 's $< .001$), $F(2, 177) = 22.01$, $MSe = .04$, $p < .0001$. When participants had not encountered the actually seen items in the postevent questionnaire (0-exposure conditions) incorrect “yes in questions” responses were low ($M = .07$) and did not vary as a function of elaboration group ($F[2, 177] = 1.31$, $MSe = .02$, $p > .10$).

In sum, it appears that the conceptual and perceptual elaboration tasks improved memory for having read about actually-witnessed items in the questions more than the no elaboration task, but type of elaboration did not influence the rate at which participants correctly attributed actually seen items to the video. It is somewhat surprising that type of elaboration did not influence memory for actually seen items given the well-established effects of “levels of processing” on memory (e.g., Craik & Lockhart, 1972). We note, however, that memory for the actually seen items was already near ceiling even in the No Elaboration condition (see Figure 2), thus providing limited opportunity to detect potential effects. Moreover, the set of items that served as actually seen items was different from those items that served as misleading suggestions, thus raising the possibility that the suggested items were different from the actually seen items in the extent to which they were amenable to meaningful elaboration. At this juncture, pinpointing the reason(s) why elaboration increased false memory but not true memory remains a question for future research.

Discussion

The results of Experiment 1 provide evidence that inducing participants to reflectively elaborate on the meaning and implications of suggested events increases false memory for those events. Participants in the Conceptual Elaboration group had a higher false memory rate than participants in the No Elaboration group who were also repeatedly exposed to statements containing the misleading suggestions, but were not encouraged to reflectively elaborate on the suggested events in any meaningful way. Most relevant for current purposes, conceptual elaboration also led to more errors than did perceptual elaboration, even though perceptual elaboration also resulted in increased false memories. The results further verify that the effects of conceptual and perceptual elaboration on false memory development cannot be attributed to impaired item recognition or memory for having encountered the suggestions in the questionnaire. To the contrary, both elaboration manipulations served to *improve* participants' memory for the actual source of the suggestions. Although this finding may at first glance seem

somewhat paradoxical, it is important to recognize that in the eyewitness suggestibility paradigm (as in real-world forensic investigations) knowing that some piece of information came from a post-event interview does not necessarily imply that it was not witnessed (i.e., this information is not *disqualifying*, see Gallo, 2004). Because much of the information encountered in the postevent session is true of the witnessed event, accurate memory for the suggested items' postevent source does not necessarily prevent the development of a false memory for having witnessed the suggested item (see Mitchell & Zaragoza, 2001 for a discussion of this issue).

When attributing items to the video, the perceptual and conceptual elaboration manipulations did not have general effects on memory performance or induce shifts in response bias (cf., e.g., Mazzoni, & Kirsch, 2002; Nash, Wade, & Lindsay, 2009). Whereas perceptual and conceptual elaboration led to pronounced increases in misattributions of the suggested items to the video (as compared to no elaboration), these elaboration manipulations did not increase the base rate at which new items (i.e., 0-exposure items) were misattributed to the video (see Figure 1), hence reflective elaboration selectively influenced participants' tendency to misattribute suggested items to the video. Together, the results of Experiment 1 support the conclusion that, like perceptual elaboration, conceptual elaboration increases false memory for suggested events by producing a representation of the suggested events whose qualitative features (e.g., plausibility, embeddedness) resemble those of actually perceived events.

Experiment 2

Perhaps the most interesting and novel finding in Experiment 1 was that conceptual elaboration led to higher false memory than perceptual elaboration. It is possible that the structure of the postevent interview questions employed in Experiment 1 was maximally conducive to false memory development resulting from conceptual elaboration. In the conceptual elaboration task, evaluating both actually witnessed and suggested events in relation to the same/or similar dimensions (e.g., how incriminating) in chronological order may have served to link the true and suggested events to each other along this dimension, as well as to the overall temporal and causal structure of the storyline. For example, when rating how incriminating a jury would find it that the thief had a gun (a misleading suggestion), participants likely considered the preceding actual (and suggested) events from the video, as well as the other events of the video they had yet to rate. This process of repeatedly reactivating and evaluating various aspects of the actual video representation in order to evaluate the implications of the suggested events might have led to the actual and suggested events becoming better integrated (e.g., Johnson, 1992), and the suggestions becoming more embedded in the context of the actual video events (Johnson et al., 1988) and the overall narrative storyline. In addition, the encoding variability that resulted from repeating this task from three different perspectives most likely served to further reinforce the links between the suggested events and the narrative story line while blurring the distinction between the originally witnessed event and these postevent reflections (Mitchell & Zaragoza, 1996). On the other hand, the mechanisms that are thought to underlie false memories resulting from perceptual elaboration involve creating a vivid, concrete, and perceptually detailed image of the suggested items/events themselves (e.g., Drivdahl & Zaragoza, 2001). Such item-based processing should be less affected, if at all, by how the questions are grouped.

In Experiment 2, we assessed whether the grouping of the postevent elaboration questions influences the extent to which conceptual and perceptual elaboration promote the development of false memories. Participants were once again assigned to one of three elaboration groups: Conceptual Elaboration, Perceptual Elaboration, or No Elaboration, and the elaboration questions were identical to those employed in Experiment 1. Approximately half of the participants in each elaboration group received the postevent questions Grouped by Episode, in a manner identical to Experiment 1 (see Table 1). What differed in Experiment 2 was that

the other half of the participants answered the questions Grouped by Scene, that is, they were queried about each scene in chronological order, but answered all three elaboration questions corresponding to a given scene/item in immediate succession, and only then proceeded to answer three questions about the next scene, and so forth (see Table 2). We hypothesized that the grouping of the postevent questions would interact with type of elaboration such that with conceptual elaboration, grouping the questions by episode would lead to higher false memory than grouping the questions by scene. We had no reason to expect grouping would lead to different effects with perceptual elaboration.

A second goal of Experiment 2 was to more directly probe whether conceptual elaboration increased false recollection of the suggested events. Although, relative to the No Elaboration group, participants in the Conceptual Elaboration group of Experiment 1 were more likely to respond “definitely yes” when asked if they remembered the suggestions from the video, this does not necessarily mean that they had the subjective sense of recollecting the false information (see, e.g., Roediger, Rajaram, & Geraci, 2007, for discussion). One can be highly confident in even vague memories. In Experiment 2 we sought to more directly assess whether conceptual elaboration increases false recollections, *per se*. To this end, we asked participants to indicate whether they actually *remembered* witnessing the critical items or merely *believed* they did. (Note that we chose to use *remember* vs. *believe* rather than the more standard *remember* vs. *know* procedure [e.g., Tulving, 1985] for continuity with previous repeated suggestion studies, e.g., Zaragoza & Mitchell, 1996). In summary, the goal of Experiment 2 was to assess the effects of conceptual and perceptual elaboration on false recollections of suggested items, and to do so under different grouping conditions (by episode or by scene).

Methods

Participants and Design—The experiment involved a 3 (Elaboration Type: No Elaboration, Perceptual, Conceptual) $\times$ 2 (Question Grouping: Grouped by Episode, Grouped by Scene) $\times$ 2 (Number of Postevent Exposures: 0, 3) mixed-factorial design with Elaboration Type and Question Grouping as between- subjects variables and Number of Exposures a within-subjects variable. A total of 374 students participated for course credit (*n*’s: Grouped by Scene: No elaboration = 60, Perceptual = 68, Conceptual = 68; Grouped by Episode: No elaboration = 58, Perceptual = 60, Conceptual = 60).

Materials and Procedure—The materials and procedure were identical to Experiment 1 with the following exceptions:

Grouping of Postevent Questions: For participants in the *Grouped by Episode* conditions, the grouping of the postevent elaboration questions was identical to Experiment 1 (see Table 1): participants were questioned about each of the 9 scenes from the video in chronological order three times in succession. As illustrated in Table 2, participants in the *Grouped by Scene* condition received the same questions as the corresponding participants in the Grouped by Episode condition, but they answered all three elaboration questions about the first scene, then all three questions about the second scene, and so on.

Source Test: Rather than make a confidence judgment on the source test, in Experiment 2 participants indicated, for both video and questions, whether they *Remembered* that the critical item appeared in that source, they *Believed* that the critical item appeared in that source, or the item did not appear in that source at all (a *No* response). The instructions told participants to select “remember” only if they could consciously recollect that the test item came from that source, to select “believe” if they were not able to consciously recollect the original experience but nevertheless believed that the test item was from that source, and to select “no” if they had no memory of the test item appearing in that source at all. Several examples were given for

each type of response to ensure participants could discriminate between them. The instructions also emphasized that “remember” and “believe” did not correspond to high and low confidence, and participants were given examples of situations in which one might have high confidence in a belief that something happened, despite the absence of conscious recollection (e.g., Zaragoza & Mitchell, 1996).

Results

Our primary interest was in true and false recollection, and thus we focus here on the “remember” responses (information about the other categories of responses can be obtained from the first author). Preliminary analyses revealed that, as in Experiment 1, there were small, but highly reliable, differences in item recognition of thrice-suggested items (i.e., those items “remembered” as having been either in the video, the questionnaire, or both: M 's = .94, .99 and .997 for the No Elaboration, Perceptual Elaboration, and Conceptual Elaboration conditions, respectively, $F[2, 371] = 13.99$, $MSe = .01$, $p < .0001$). However, because conditionalizing the data on item recognition yielded results that are identical to those reported below, we simply report the proportion of items attributed to each source.

The main findings of Experiment 2 were clear cut: Although conceptual elaboration led to robust increases in false remembering when the postevent questions were grouped by episode, replicating Experiment 1, conceptual elaboration did not increase false remembering above the No Elaboration level when the questions were grouped by scene. In contrast, the grouping of the postevent questions had no effect on rates of false remembering in the Perceptual Elaboration and No Elaboration conditions. We turn now to the statistical analyses that support these conclusions.

Does Conceptual Elaboration Increase False “Remembering” of Suggested Events?—The proportion of “remember in video” responses to the critical items was submitted to a 3 (Elaboration Type: Conceptual, Perceptual, No Elaboration) $\times$ 2 (Question Grouping: by Episode, by Scene) $\times$ 2 (Number of Postevent Exposures: 0, 3), mixed ANOVA. As in Experiment 1 the base rate of false “remember in video” responses to the 0-exposure items was near floor (overall $M = .02$) and did not vary by Elaboration condition, Grouping condition, nor did these factors interact, all p 's $> .10$. Moreover, repeated exposure (i.e., 3-exposures) to suggestion led to large increases in false recollection of the suggested events in all six groups, regardless of elaboration or grouping (the main effect of exposures was highly reliable, $F[1,368] = 286.17$, $MSe = .06$, $p < .0001$, as was the effect of number of exposures in each group, all six F 's > 10.00 , p 's $< .000001$). However, as predicted, the magnitude of false recollection varied as a function of both elaboration condition and grouping as evidenced by the reliable 3-way interaction ($F[2,368] = 3.82$, $MSe = .06$, $p = .02$).

Follow-up analyses conducted on the 3-exposure suggested items only (see Figure 3) confirmed that the Elaboration Type $\times$ Grouping of Questions interaction was reliable ($F[2, 368] = 4.35$, $MSe = .12$, $p = .01$). Simple effects analyses were conducted to examine the effect of Elaboration Type within the Grouped by Episode and Grouped by Scene conditions separately. The pattern of findings in the Grouped by Episode condition replicated the results of Experiment 1: The effect of Elaboration type was significant ($F[2,175] = 7.11$, $MSe = .13$, $p = .001$). Participants in the Conceptual Elaboration group falsely recollected the thrice-suggested items at a higher rate than participants in the Perceptual Elaboration group ($p = .05$), and both elaboration groups had higher false recollection rates than the No Elaboration group ($p < .001$ and $p = .07$ for comparisons with the Conceptual and Perceptual groups, respectively). In the Grouped by Scene condition the pattern was quite different. Although the main effect of Elaboration type was once again significant ($F[2,193] = 3.14$, $MSe = .10$, $p < .05$) this was because the Perceptual Elaboration group falsely recollected the suggested items at a higher

rate than both the Conceptual Elaboration and No Elaboration groups ($p = .08$ and $p = .02$ for comparisons with the Conceptual and No Elaboration groups, respectively), which did not differ from each other ($p > .10$). Hence, when the elaboration questions were grouped by individual scene, there was no evidence that conceptual elaboration increased false memory beyond the effect of exposure (in the No Elaboration group). Moreover, for the Conceptual Elaboration condition, grouping by scene led to significantly lower false recollection rates than grouping by episode ($F[1, 126] = 12.11, MSe = .13, p < .001$), but for the Perceptual Elaboration and No Elaboration conditions, the grouping conditions did not differ from each other (F 's $< 1, p$'s $> .10$).

As can be seen in Table 3, the effects of elaboration and grouping reported above were consistently observed across all of the suggested items. Specifically, when the postevent questions were grouped by episode, false recollection was greater in the Conceptual Elaboration condition than in the Perceptual Elaboration condition (paired samples t -test comparing Conceptual and Perceptual Elaboration with item as the random effect was reliable ($t[5] = 7.1, p < .01$), and false recollection in the Perceptual condition was, in turn, higher than false recollection in the No Elaboration condition ($t[5] = 2.8, p < .05$). When the questions were grouped by Scene, we once again found that false recollection of suggested item in the Perceptual Elaboration condition was significantly higher than in the No Elaboration condition ($t[5] = 4.4, p < .01$) but false recollections in the Conceptual Elaboration condition did not differ from No Elaboration ($t < 1$.)

Grouping, Elaboration, and Memory for the Actual Source of Misleading

Suggestions—We also assessed the effects of elaboration type and grouping on participants' memory of having encountered the suggested items in the postevent questions, as measured by "remember" responses to the "In Questions?" probe. As in Experiment 1, there was no evidence that the pattern of false recollection errors was related in a straightforward way to poor memory for the misleading suggestions' true source. With regard to grouping, overall, there was evidence that, participants were somewhat more likely to "remember" having encountered the thrice-suggested items in the postevent questions when the postevent questions were Grouped by Episode ($M = .93$) than when the postevent questions were Grouped by Scene ($M = .88$), this difference, though small, was statistically reliable ($F[1, 368] = 3.97, MSe = .05, p < .05$). In addition, there was a main effect of type of elaboration ($F[2, 368] = 11.54, MSe = .05, p < .0001$): participants in the Conceptual Elaboration groups ($M = .98$) were better able to accurately "remember" that the thrice-presented suggestions were in the questions than participants in both the Perceptual Elaboration ($M = .89$) and No Elaboration ($M = .84$) groups (p 's $< .01$), and the latter two groups did not differ from each other ($p > .05$). Importantly, unlike false memory for having seen the suggestions in the video, the Grouping $\times$ Elaboration interaction was not significant ($F < 1$). In short, there is no evidence that the elaboration manipulations impaired encoding of the suggestions' true source, or that the pattern of false recollection is related in any simple way to memory for the suggestions' true source.

Grouping, Elaboration, and Remembering of Actually Seen Events—As in Experiment 1, we assessed whether type of elaboration, and in this case, also the grouping of the postevent questions, affected participants' source memory for items they had actually seen in the video, by analyzing correct "remember in video" responses and correct "remember in questions" responses to the actually seen items. Because preliminary analyses once again showed that performance on the 0-postevent exposure actually seen items (i.e., actually seen items that were never mentioned in the postevent questionnaire) did not vary across the six groups, we focus on the analyses of the actually seen items that were mentioned in the questionnaire (i.e., the 3-exposure items) below.

In contrast to the false memory results, the type of elaboration carried out on actually viewed items during the postevent questions had no effect on people's ability to recollect whether they had seen them in the video, replicating Experiment 1 (M 's = .78, .82, .81 for the No Elaboration, Perceptual Elaboration, and Conceptual Elaboration conditions, respectively; $F < 1$). However, the way the postevent questions were grouped did: Reviewing all the events in sequential order three times in succession (Grouped by Episode, $M = .84$) resulted in higher rates of "remembering" than reviewing each single event three times in immediate succession (Grouped by Scene, $M = .77$; $F[1,368] = 7.73$, $MSe = .05$, $p < .01$). This reduction in memory for items that were actually seen that resulted from grouping the postevent questions by scene cannot, however, account for the pattern of false memory for the suggested items because there was no effect of elaboration, nor did the way the questions were grouped interact with elaboration condition (both p 's $> .50$) as it did for false memories. That is, whereas the grouping manipulation selectively influenced false memories in the Conceptual Elaboration condition, the grouping manipulation influenced memory for actually seen events in all three elaboration conditions equally.

As in Experiment 1, type of elaboration did, however, influence correct attributions of actually seen items to the questions ($F[2, 368] = 45.70$, $MSe = .06$, $p < .001$). Participants correctly "remembered" encountering the actually seen items in the questionnaire more often in the Conceptual Elaboration condition ($M = .95$) than in the Perceptual Elaboration condition ($M = .86$, $p < .01$), and those in the Perceptual Elaboration condition in turn did so more often than participants in the No Elaboration condition ($M = .67$, $p < .0001$). In addition, participants more often correctly "remembered" encountering the actually seen items in the questionnaire in the Grouped by Episode ($M = .86$) than in the Grouped by Scene condition ($M = .81$), $F(2, 368) = 4.17$, $MSe = .06$, $p = .04$, though the grouping of postevent questions did not interact with elaboration type ($F < 1$).

Discussion

Using a measure of recollective experience, Experiment 2 showed that when participants elaborated on both true and suggested items in relation to the same theme (i.e., the Grouped by Episode conditions), conceptual elaboration increased false recollection of suggested items, and did so more than perceptual elaboration, replicating Experiment 1. The results support the conclusion that when grouped by episode, conceptual elaboration questions resulted in a memory representation that was more likely to (falsely) give rise to the phenomenal experience of an episodic recollection than did perceptual elaboration.

The results of Experiment 2 also showed that the increase in false memory following conceptual elaboration was dependent on the grouping of the questions, whereas the increase in false memory following perceptual elaboration and no elaboration was not affected by grouping. When the conceptual elaboration questions were grouped by scene, such that the narrative structure of the video was somewhat disrupted (e.g., by having to work through the three different kinds of conceptual elaboration for a given item before getting to the next scene), conceptual elaboration had no effect on false memory development beyond that of repeated exposure, as evidenced by the finding that false recollection following conceptual elaboration of suggested events did not exceed false recollection following no elaboration.

One possible reason for these findings is that the kinds of processing required by the conceptual elaboration task were more disrupted by the need to continuously switch orienting tasks (as was required in the Grouped by Scene condition) than was perceptual processing (and processing in the No Elaboration condition). That is, it is possible that the Conceptual Elaboration tasks required substantially more cognitive resources than the Perceptual and No Elaboration tasks, and that having to toggle between the various conceptual dimensions in the Grouped by Scene condition made it more difficult for participants to fully engage in conceptual

elaboration. However, the full pattern of data argues against the hypothesis that grouping by scene selectively disrupted conceptual processing in such a general way. For example, in Experiment 2 conceptual elaboration led to *better* memory for having encountered the suggestion in the questionnaire than either perceptual elaboration or no elaboration, regardless of grouping. Moreover, grouping by scene did not disproportionately affect memory for actually seen items in the Conceptual Elaboration groups. We conclude, therefore, that the effects of grouping on false memory development documented here are not due to any unintended general effects of the grouping manipulation on participants' ability to engage in conceptual elaboration.

GENERAL DISCUSSION

The experiments reported here provide empirical evidence that repeatedly reflecting on the meaning and implications of suggested events (i.e., conceptual elaboration) increases false memory for suggested events, and also identifies conditions under which it fails to do so. When the elaboration questions were grouped by episode, conceptual elaboration of suggested events more often resulted in high confidence false memories (Experiment 1) and false memories that were accompanied by the phenomenal experience of *remembering* them (Experiment 2) than did no elaboration. Moreover, even though perceptual elaboration also led to increases in false memory, when the elaboration questions were grouped by episode, conceptual elaboration consistently led to higher rates of false memory than did perceptual elaboration. Our results also show that the false memory effects that resulted from conceptual elaboration were highly dependent on the organization of the postevent interview questions: When the elaboration questions were grouped by scene, such that participants engaged in multiple types of conceptual elaboration of a critical item before moving on to the next scene, conceptual elaboration did not increase false memory relative to no elaboration. In contrast, for the perceptual elaboration and no elaboration groups, the grouping of the postevent interview questions (whether by episode or by scene) had no effect on false recollection.

It is important to note that participants in all of the conditions (i.e., No Elaboration, Perceptual Elaboration, Conceptual Elaboration) probably engaged in some amount of spontaneous perceptual and conceptual elaboration of the suggested events, even before they answered the follow-up elaboration questions. This is because all participants encountered the suggested items in the context of complex statements that provided a coherent narrative account of the witnessed event, and they did so on three different occasions. There is considerable evidence that when comprehending meaningful connected discourse regarding concrete events, the reader constructs a "mental model" (e.g., Johnson-Laird, 1983; Zwaan & Radvansky, 1998) of the situation described in the text, a process that involves considerable reflective elaboration. Indeed, we believe that this repeated spontaneous elaboration of the suggested events accounts for the very high levels of false memory obtained in the No Elaboration group. The perceptual elaboration and conceptual elaboration manipulations reported here were designed to encourage reflective elaboration that went beyond the elaboration that normally and spontaneously occurs when people make inferences while processing meaningful discourse (e.g., Bransford & Johnson, 1973). As a consequence, the effect of the perceptual and conceptual elaboration manipulations was to boost already high levels of false memory even higher.

Why did conceptual elaboration increase false memory? Collectively, our findings show that it was not the additional meaningful elaboration, per se, that led to increases in false memory, as conceptual elaboration did not increase false memory when the questions were grouped by scene (see Figure 3). Rather, it was only when participants evaluated both actually witnessed and suggested events in relation to the same/or a similar dimension (i.e., in the Grouped by Episode conditions) that conceptual elaboration increased false memory. We propose that

evaluating both true and suggested events in relation to the same theme likely served to further link the true and suggested events *to each other* as well as to the overall representation of the story. Although participants in the Perceptual Elaboration and No Elaboration conditions were also questioned about the events of the video three times in succession (and hence likely constructed a representation of the event where the suggested items were temporally and contextually linked to the actually witnessed events), there was no need to consider all of the critical items along the given dimension in completing the questions. For example, evaluating the size of the diamond in the (suggested) ring did not require also evaluating the size of the (suggested) gun or the size of the (actual) shrub in the neighbor's yard.

We thus propose that the conceptual elaboration manipulation served to strengthen the links amongst the items by increasing the number of qualitatively different ways in which the true and suggested events were linked together. In other words, we hypothesize that conceptual elaboration increased false memory because the suggested events were strongly linked to the actual events of the video, not just temporally, but on a variety of different dimensions that were meaningful in the context of the story (e.g., consequentiality). In this regard, it is interesting to note that "embeddedness" within the context of preceding and succeeding events is one characteristic that differentiates memories of actual events from memories of imagined events (Johnson et al., 1988). Thus, it is likely that because misleading suggestions were so well integrated into a coherent representation of the witnessed event on so many different conceptual dimensions of consequence for the storyline the suggested account was mistaken for a memory of the "real" event.

Our finding that conceptual elaboration led to a greater increase in false memory than perceptual elaboration (when the elaboration questions were grouped by episode) is related to the recent finding by Garry and Wade (2005) that narrative descriptions of a false childhood event (taking a ride in a hot-air balloon) were more potent in promoting false memory for this imagined incident than a doctored photo of the fictitious incident (a fake photo depicting the subject in a hot air balloon as a child). Whereas the photo provides sensory and perceptual details that should help participants visualize the fictitious event (see also Nash et al., 2009), the narrative emphasizes the sequence of events, their relations, and how they unfold. Hence, our results, like those of Garry and Wade (2005) underscore the importance of semantic relations and narrative coherence in false memory development (Chrobak & Zaragoza, 2008; Mitchell & Zaragoza, 2001).

Of course, pinning down the precise basis for the increase in false memory following conceptual elaboration will require additional research. For example, information about participants' phenomenal experience could be gathered by asking participants about the basis for their source attributions of the suggested items using a Memory Characteristics Questionnaire (Johnson et al., 1988). In any event, the present findings clearly (1) document that repeated conceptual elaboration of suggested events can lead to pronounced increases in false memory development, and (2) show that conceptual elaboration is empirically dissociable from perceptual elaboration, insofar as the increase in false recollection following conceptual elaboration was dependent on the structure of the postevent interview but false recollection following perceptual elaboration was not.

Conclusions

Much of the scientific literature on eyewitness suggestibility and false autobiographical memory has emphasized the role of perceptual elaboration in false memory development. Although conceptual elaboration processes undoubtedly play a role in other varieties of memory distortion errors (e.g., schematic intrusions, e.g., Brewer & Treyens, 1981; semantic associates effects, e.g., Roediger & McDermott, 1995), relatively little attention has been paid to the role that conceptual elaboration might play in promoting the development of false

eyewitness memories for misleading postevent suggestions. Yet, in many real-world situations where suggestive forensic or therapeutic questioning might be of concern, reflecting on past events often involves reflecting on and reevaluating the past from a different perspective. Those events that later turn out to be highly consequential (such as those that are relevant to forensic investigations) may evoke repeated reflection on the meaning and implications of the events that were observed, and not just perceptual/contextual aspects. To the extent that memories have been distorted by postevent suggestions, this kind of repeated meaningful reflection and re-evaluation might serve to preserve and reinforce the inaccuracies in memory caused by postevent suggestion. As noted by the English philosopher David Hartley (1834), “All men are sometimes at a loss to know whether clusters of ideas that strike the fancy strongly and succeed each other readily and immediately be recollections or mere reveries.” (p. 275). The results presented here suggest that conceptual elaboration may be one vehicle by which suggested events become embedded in “clusters of ideas that strike the fancy strongly and succeed each other readily and immediately”, thereby leading us to confuse suggested events for veridical recollections.

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Figure 1.

Mean proportion of suggested items misattributed to the video (collapsed across *maybe yes*, *probably yes*, and *definitely yes* responses) as a function of postevent exposure (0 vs. 3) and elaboration condition (No Elaboration, Perceptual, or Conceptual). Note that the pattern is identical for the *definitely yes* errors. Error bars represent the standard error of the mean.

Figure 2.

Mean proportion of items seen in the video that were correctly attributed to the video (collapsed across *maybe yes*, *probably yes*, and *definitely yes*) as a function of postevent exposure (0 vs. 3) and elaboration condition (No Elaboration, Perceptual, or Conceptual). The pattern is the same for *definitely yes* responses. Error bars represent the standard error of the mean.

Figure 3.

Mean proportion of suggested items in the 3 postevent exposure condition that were incorrectly *remembered* as being in the video, as a function of elaboration condition (No Elaboration, Perceptual, or Conceptual) and grouping condition (By Episode or By Scene). Error bars represent the standard error of the mean.

Table 1

Sample questions in Experiment 1 for the misleading suggestion “the thief stole a ring” as a function of elaboration group (perceptual, conceptual, or no elaboration). For each question subset (a, b, or c), the suggestion was embedded in the description of the third scene.

1.c 2.c 3.c After looking through several drawers on top of the dresser, the thief took a <i>ring</i> and some money.	PERCEPTUAL (<i>Description</i>): NO ELAB (<i>Grammaticality</i>): think the thief was have? (large or small) and” from this sentence is it still grammatically correct?	CONCEPTUAL (<i>Motivation/Reaction</i>): What size diamond did the ring Do you If you remove the words “a ring disappointed that he did not find other jewelry besides the ring? (yes, no)
9.c		

Note. The suggestion is italicized here for the readers' convenience; they were not highlighted for participants.

Table 2

Sample questions for the misleading suggestion “the thief stole a ring” in the Grouped by Scene condition of Experiment 2 as a function of elaboration group (perceptual, conceptual, or no elaboration). Note that questions in the Grouped by Episode condition were exactly as in Experiment 1 (see Table 1).

1.	a.	
	b.	
	c.	
2.	a.	
	b.	
	c.	
3. After finding a <i>ring</i> and some money in the dresser, the thief continued to look for more items		
PERCEPTUAL		CONCEPTUAL
NO ELABORATION		
a. Did he find the ring in the left, word in this sentence rhymes middle, or right compartment? “sing”?	a. How incriminating would a jury find it that the thief was found with a stolen ring in his possession? (very, somewhat, not at all)	a. What with
b. What color was the velvet box Unscramble the following to form a word in central to the plot? (yes, no)	b. Was the fact that the thief stole a ring containing the ring? (blue or black) this sentence: ginr	b.
c. What size diamond did the ring you remove the words “a ring have? (large or small) from this sentence is it still grammatically correct?	c. Do you think the thief was disappointed that he did not find other jewelry besides the ring? (yes, no)	c. If and”
4.	a.	
	b.	
	c.	
.		
.		
9.	a.	
	b.	
	c.	

Note. The suggestion is italicized here for the readers’ convenience; they were not highlighted for participants.

Table 3

Mean proportion of “remember in video” responses for each thrice exposed suggested item as a function of grouping (by episode or by scene) and elaboration condition (no elaboration, perceptual, or conceptual)

Scene	Grouped By Episode				Grouped by	
	Suggestion	No Elab	Perceptual	Conceptual	No Elab	Perceptual
Conceptual	Ring	.52	.13	.47	.60	.21
	Dog	.21	.28	.37	.43	.21
	Curb	.26	.13	.27	.40	.18
Perceptual	Blinds	.09	.24	.30	.40	.18
	Cigarette	.24	.24	.37	.57	.24
	Gun	.18	.31	.30	.43	.24
Mean		.25	.22	.35	.47	.21
						.35