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Is knowing believing? The role of event plausibility and background knowledge in planting false beliefs about the personal past

KATHY PEZDEK

Claremont Graduate University, Claremont, California

IRIS BLANDON-GITLIN

California State University, Fullerton, California

SHIRLEY LAM

Claremont Graduate University, Claremont, California

RHIANNON ELLIS HART

Hampshire College, Amherst, Massachusetts

and

JONATHAN W. SCHOOLER

University of British Columbia, Vancouver, British Columbia, Canada

False memories are more likely to be planted for plausible than for implausible events, but does just knowing about an implausible event make individuals more likely to think that the event happened to them? Two experiments assessed the independent contributions of plausibility and background knowledge to planting false beliefs. In Experiment 1, subjects rated 20 childhood events as to the likelihood of each event having happened to them. The list included the implausible target event "received an enema," a critical target event of Pezdek, Finger, and Hodge (1997). Two weeks later, subjects were presented with (1) information regarding the high prevalence rate of enemas; (2) background information on how to administer an enema; (3) neither type of information; or (4) both. Immediately or 2 weeks later, they rated the 20 childhood events again. Only plausibility significantly increased occurrence ratings. In Experiment 2, the target event was changed from "barium enema administered in a hospital" to "home enema for constipation"; significant effects of both plausibility and background knowledge resulted. The results suggest that providing background knowledge can increase beliefs about personal events, but that its impact is limited by the extent of the individual's familiarity with the context of the suggested target event.

Since 1994, there has been a veritable flood of research in cognitive psychology on planting false memories. Pezdek and Lam (2007) conducted a PsycINFO search of empirical publications in cognitive psychology and, using the subject heading "false memory," they found 198 related articles that had been published since 1994. One interpretation of how false events become planted in memory is that offered by Pezdek, Finger, and Hodge (1997). According to this interpretation, if a suggested false event is judged to be true, details of the generic script for the event, as well as details from related episodes of the event,

can be "transported" in memory and used to construct a memory for the false event. How does this interpretation apply to planting memories for implausible events—that is, events that are not likely to be considered true?

Pezdek et al. (1997), Pezdek and Hodge (1999), and Pezdek, Gabbay, and Blandon-Gitlin (2006) reported that false memories are significantly less likely to be suggestively planted for implausible events. The operational definition of an implausible event in this line of research is one that is perceived as having a low probability of occurrence for individuals in the cohort tested. Pezdek et al. (1997, Experiment 2) had 20 associates read descriptions of one true event and two false events to a younger sibling or other close relative. The more plausible false event described the subject being lost in a mall while shopping; the less plausible false event described the subject receiving an enema for constipation. One week later, three individuals remembered the plausible false event; none remembered the implausible false event. This finding was replicated with children by Pezdek and Hodge. Similarly, Mazzoni,

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Loftus, and Kirsch (2001), Mazzoni, Loftus, Seitz, and Lynn (1999), and Wade, Garry, Read, and Lindsay (2002) reported that manipulations that increased event plausibility increased the probability of suggestively planting the false memory for the event. One interpretation of these findings is that if people determine that a suggested event is implausible, they simply do not allocate as much time and cognitive effort to the process of searching for relevant information in memory.

There is an alternative interpretation of the effect of plausibility on the planting of false memories. Most implausible events are also events for which individuals have limited knowledge; that is, plausibility is usually confounded with degree of background knowledge. For example, in the study by Pezdek et al. (1997, Experiment 2), receiving an enema in childhood was considered to be an implausible event because it probably never happened to the individuals in the cohort tested (high school students in 1996), who were also unlikely to know much about how an enema is administered.¹

Hart and Schooler (2006) recently assessed the independent contributions of plausibility and degree of background information to individuals' beliefs about the occurrence of childhood events. In their study at Time 1, and 2 weeks later at Time 2, subjects were presented the list of childhood events known as the Life Events Inventory (LEI) and were asked to rate the likelihood that each event had occurred to them prior to the age of 10. The list included the implausible target event "received an enema." Just prior to completing the LEI at Time 2, subjects were presented passages providing (1) detailed procedural information about how a barium enema is administered in the hospital; (2) information about the high prevalence rate of barium enemas; (3) neither passage; or (4) both. In each of two experiments, only the main effect of plausibility was significant; plausibility but not degree of background information affected the change in LEI scores. In a relevant study, Mazzoni et al. (2001) reported that describing to people a typical experience of an unlikely event (e.g., possession by the devil) increased their rating of the likelihood that they had experienced the event. However, the manipulation that increased individuals' background knowledge also included information that enhanced the plausibility of the event, so no conclusions about the independent roles of plausibility and background information can be drawn from this study.

We considered two factors that might mediate the potential contributions of plausibility and background information to planting beliefs about having personally experienced the painful and invasive procedure of receiving a childhood enema: the duration between suggestion and test, and the familiarity of the context in which the procedure was suggested. As will be seen, we observed that, whereas the effect of plausibility was reliable but unaffected by these variables, acquiring more knowledge about the suggested procedure only increased individuals' beliefs about having received a childhood enema, if the event was alleged to have occurred in a familiar context.

This study also tests the claim that just knowing about an event can make individuals more likely to think that the event occurred to them (e.g., Loftus, 1993), a hypothesis that has received little empirical scrutiny. In two experiments, we sought to identify whether merely knowing leads to believing, and the conditions under which this is likely to occur. This study is important because people often acquire background knowledge about traumatic events—from conversations, for example, as well as from the popular press and other media. If the mere acquisition of such information can inspire people to believe that such events occurred to them, a basis may exist for eventually developing false memories for these traumatic events.

EXPERIMENT 1

In Experiment 1, we tested whether merely providing subjects with knowledge about a barium enema procedure was sufficient to increase their belief that they might have experienced the procedure; and we further examined whether increasing the delay between the receipt of information and querying about the past might increase individuals' susceptibility to an effect of knowledge. One aspect of the study by Hart and Schooler (2006) that may have constrained the extent to which background information affected the change in occurrence ratings for the target event was the duration between reading the passages and completing the LEI at Time 2; the passages were read at Time 2 just prior to completing the LEI. With no delay between reading the passages and completing the LEI at Time 2, the source error necessary to confuse the content of the background information passage with information actually in autobiographical memory would be less likely to occur. Experiment 1 includes a test delay condition to assess whether providing background information affects occurrence ratings when the delay between Time 1 and Time 2 is increased to 4 weeks and the passages are presented 2 weeks prior to Time 2.

Method

Subjects and Design. Subjects volunteered to participate in 12 psychology classes at public colleges in the Los Angeles metropolitan area. There were 296 subjects who completed the experiment and did not violate the exclusion criteria specified in the results section (mean age = 22.26 years, $SD = 5.42$; 98 males, 198 females). This was a 2 (background information provided or not) \times 2 (plausibility information provided or not) \times 2 (test immediately after the passages or delayed until 2 weeks later) between-subjects design, with approximately equal numbers of subjects in each of the eight conditions.

Materials and Procedure. Subjects participated in three phases of the experiment. In the first phase, subjects completed the 20-item LEI similar to that used by Pezdek and Eddy (2001) and Hart and Schooler (2006). One item in the LEI was the target event "received an enema." Subjects first rated each event on a scale from 1 (*definitely did not happen to me prior to age 10*) to 8 (*definitely did happen to me prior to age 10*). This task was not timed. Subjects were instructed not to discuss any portion of the study with their classmates, friends, or families until the study was completed.

Two weeks later, subjects returned for the intervention phase. Each subject was given a packet to complete on a self-paced sched-

ule. The packet contained a one-page passage on each of four critical topics: (1) how frequently barium enemas are administered; (2) the prevalence of chicken pox; (3) detailed procedural information about how a barium enema is administered in the hospital; and (4) detailed procedural information about how to treat a child having a seizure. Every subject received information about either the prevalence of barium enemas or the prevalence of chicken pox and either how a barium enema is administered or how to treat a child having a seizure. The order of presentation of the passages was counterbalanced across subjects. The four central conditions in this study—defined by the 2 (background information provided or not) \times 2 (plausibility information provided or not) between-subjects design—were administered by the pair of passages presented in the intervening phase. After reading each passage, subjects turned over the sheet and answered four comprehension questions. If they could not answer any questions, they were instructed to reread the passage and attempt the questions again.

The passage about the prevalence of enemas reported that administering a barium enema to a child was a highly plausible event for individuals in the cohort tested. Within this passage it was reported that "The American Academy of Pediatrics states that approximately 85% of all children in the United States had this procedure performed on them in the 1980s and 1990s. Parents were encouraged to have their children receive an enema by the time the children reached the age of 5." The passage presenting procedural information about how a barium enema is administered described the process from how the solution was mixed to evacuation of the bowels.

The test phase followed in which subjects completed the LEI a second time, again providing occurrence ratings for each of the 20 events. Subjects in the immediate test condition completed the test phase shortly after reading the passages. Those in the delay test condition did so 2 weeks later.

Results and Discussion

There were three exclusion criteria. Subjects were excluded from the analyses if (1) they responded 8 (*definitely did happen*) to the LEI events "won a million dollars" or "played for the LA Lakers";² (2) their responses to all LEI

questions were identical (e.g., all rated 1 or all rated 8); or (3) they were a univariate outlier (i.e., transformed mean LEI occurrence ratings were $z > 3.26$). Based on these criteria, 37 subjects were excluded.

We first determined that the mean occurrence ratings (range = 1–8) at Time 1 were not significantly different among the four conditions (overall $M = 1.66$, $SD = 1.72$) [$F(3,292) = 0.74$]. This low mean rate of occurrence at Time 1 also confirms that the target event "received a barium enema" was highly implausible; it was generally judged not to have happened to subjects in childhood.

The data were then scored as the mean change in occurrence ratings from Time 1 to Time 2 for the target event as a function of manipulating plausibility, background information, and test delay. A 2 (background information provided or not) \times 2 (plausibility information provided or not) \times 2 (test immediately after the passages or delayed 2 weeks later) ANOVA performed on these data revealed only a significant main effect of plausibility [$F(1,288) = 10.45$, $MS_e = 2.77$, $p < .001$, $\eta^2 = .04$]. No other effects approached significance. These data are presented in Figure 1 combined across the two delay conditions, because delay did not have a significant effect on occurrence ratings.³

These findings replicate those of Hart and Schooler (2006). Subjects' occurrence ratings were significantly affected by information that increased the plausibility of the target event, but not by simply providing background information about this event. Further, increasing the delay between presenting background information and completing the LEI a second time did not increase individuals' susceptibility to the effect of knowledge. The effect on subjects' beliefs about this past event was the same, whether the second LEI was completed immediately after reading the passages or 2 weeks later.

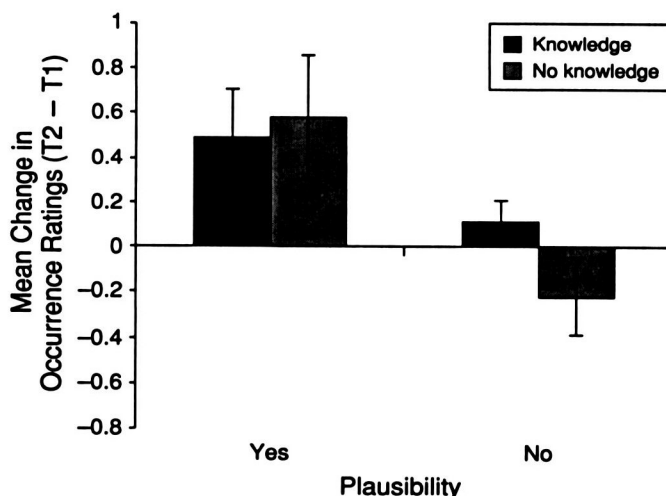


Figure 1. Mean change in occurrence ratings (with standard errors) combined across delay conditions for the target event in Experiment 1 as a function of the conditions defined by the 2 (background information presented or not) \times 2 (plausibility information provided or not) design (range in occurrence ratings = 1–8).

EXPERIMENT 2

One aspect of Experiment 1 (as well as the two experiments by Hart & Schooler, 2006) that may have constrained the extent to which background information affected the change in occurrence ratings was the fact that the enema described was a barium enema administered in a hospital. Subjects of Experiment 1 could have inferred that because they knew they had not been in the hospital as children, the event must not have occurred to them; that is, the context for the event was unfamiliar. In fact, the use of the target event "received an enema" originated in the study by Pezdek et al. (1997), where the enema described was a home enema administered for constipation. In Experiment 2, we examined whether providing background information about an implausible procedure enhanced people's belief that they had personally experienced it if the suggested procedure occurred in a more familiar context: an enema administered at home for constipation. Here, the term *context* refers both to the physical context—the enema is administered at home rather than at the hospital—and to the situational context—treating constipation is a relatively common occurrence.

Method

Subjects and Design. Subjects volunteered to participate in five psychology classes at public colleges in the Los Angeles metropolitan area. There were 125 subjects who completed the experiment and did not violate the exclusion criteria (mean age = 24.35 years, $SD = 8.06$; 68 males, 56 females, and 1 unspecified). This was a 2 (background information provided or not) \times 2 (plausibility information provided or not) between-subjects design with approximately equal numbers of subjects in each of the four conditions.

Materials and Procedure. The procedure was the same as that of Experiment 1, except that all subjects in Experiment 2 completed the second LEI 2 weeks after reading the passages. The target event used in Experiment 2 was "received an enema for constipation." The packet presented during the intervening phase contained the same four passages used in Experiment 1, except that the enema passages described an enema administered at home for constipation. The passage about the prevalence of enemas indicated that giving a child an enema at home for constipation was a highly plausible event for individuals in the cohort tested. In addition, as in Experiment 1, within this passage it was reported that "The American Academy of Pediatrics states that approximately 85% of all children in the United States had this procedure performed on them in the 1980s and 1990s. Parents were encouraged to have their children receive an enema by the time the children reached the age of five." The passage presenting procedural information about how to administer a home enema incorporated information presented in the directions included with a purchased enema kit, along with information from Spock (1946).

Results and Discussion

No subjects met the exclusion criteria specified in Experiment 1. We first determined that the mean occurrence ratings (range = 1–8) at Time 1 were not significantly different among the four conditions (overall $M = 1.86$, $SD = 2.05$) [$F(3,121) = 0.65$]. This low mean rate of occurrence at Time 1 also confirms that the target event, "received an enema for constipation," was an implausible event that was generally judged not to have happened to the subjects in childhood.

The data were then scored in terms of the mean change in occurrence ratings from Time 1 to Time 2 for the target event as a function of the four conditions defined by manipulations of plausibility and degree of background information. These data are presented in Figure 2. A 2 (background information) \times 2 (plausibility information) ANOVA performed on these data revealed a significant main effect of plausibility [$F(1,121) = 5.06$, $MS_e = 3.30$, $p < .05$, $\eta^2 = .04$] and a significant main effect of background information [$F(1,121) = 4.53$, $MS_e = 3.30$, $p < .05$, $\eta^2 = .04$]. Both reading the passage describing an enema as plausible and reading the passage presenting background information about administering an enema resulted in subjects' being less likely to indicate that the target event "definitely did not happen" to them in childhood. The interaction was not significant ($F = 0.02$).⁴

To further examine the effects of plausibility and background information, the next analysis assessed how frequently the change in occurrence ratings for the target event from Time 1 to Time 2 increased, decreased, or stayed the same. These data are presented in Figure 3. For the large majority of the subjects (70% across all four conditions), occurrence ratings for the target event did not change from Time 1 to Time 2, although 4 weeks had passed. In what condition were subjects more likely to increase their occurrence ratings for the target event from Time 1 to Time 2? As can be seen in the four bars on the right side of Figure 3, occurrence ratings for the target event were more than twice as likely to increase from Time 1 to Time 2 in the condition in which subjects received both the plausibility information and the background information [$p(\text{having received both passages given that occurrence ratings increased}) = .45$] than in any of the other three conditions ($ps = .14, .23, \text{ and } .18$). Together, these results, along with the nonsignificant interaction of plausibility and background information, suggest that the effects of plausibility and background information are each significant and affect occurrence ratings independently.

It is interesting to note that in the condition in which neither the plausibility nor the background information passages were presented, the mean occurrence ratings actually decreased from Time 1 to Time 2 ($M = -0.42$). This finding is consistent with the results of Experiment 1 ($M = -0.22$). In Experiment 2, whereas only 4 of the 33 subjects in this condition increased their occurrence ratings from Time 1 to Time 2, 7 subjects decreased their occurrence ratings. Also, the magnitude of the mean change in occurrence ratings for subjects in this condition who increased from Time 1 to Time 2 was less ($M = 1.25$) than that for those who decreased ($M = -2.71$). Thus, although most subjects in the condition that received neither the plausibility nor the background information passages (67%) gave the same low rating to the target event at Time 1 and again at Time 2, those who did change were likely to rate this implausible target event as unlikely to have happened to them in childhood. In other words, in the absence of any intervention, thinking about the occurrence of a highly implausible childhood event led subjects to become more certain that it had not happened to them. Against this

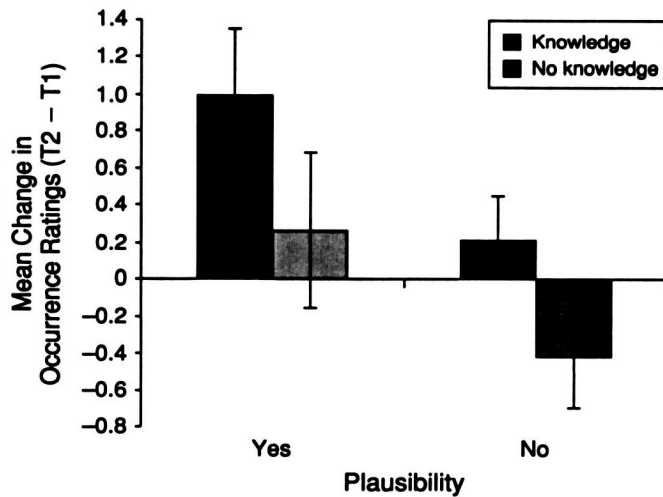


Figure 2. Mean change in occurrence ratings (with standard errors) for the target event in Experiment 2 as a function of the conditions defined by the 2 (background information presented or not) \times 2 (plausibility information provided or not) design (range in occurrence ratings = 1–8).

control condition, the effects of increasing plausibility and background information increased occurrence ratings.

GENERAL DISCUSSION

These results confirm previous findings that providing subjects with information that increases the plausibility of an implausible event enhances the perception that the event was personally experienced. In both experiments, after reading a passage describing an enema as plausible, subjects were less likely to indicate that the target event “definitely did not happen” to them in childhood. Moreover, in contrast to some studies that have confounded plausibility and background knowledge (Mazzoni et al., 2001), these findings, along with those of Scoboria, Mazzoni, Kirsch, and Relyea (2004) and Hart and Schooler (2006), indicate that event plausibility is distinct from event knowledge. Indeed, in Experiment 1, plausibility influenced belief in the occurrence of an event, even when knowledge had no effect.

We propose that there are specific stages in the process of judging whether a proposed childhood event occurred to an individual (Pezdek et al., 1997). First, people evaluate the plausibility of the suggested event. Second, if the suggested event is initially judged to be plausible, they then attempt to retrieve relevant information about the event from memory and construct an image from this information. Third, they make a source misattribution error and confuse the constructed image with a real event. According to this model, manipulations of plausibility would be expected to affect the first stage of this process, thus: “If most people have experienced this event, it is likely that I have too, and may have a memory for it.” Manipulations of background information would primarily affect the second stage of this process; if there is more information about the suggested event in memory, people are

more likely to construct credible images and subsequently to believe that they must have experienced the event. This general model accounts for how plausibility and background information independently affected the change in LEI scores in this study from Time 1 to Time 2.

By examining the impact of delay, this study replicated and extended Hart and Schooler’s (2006) finding that, in some situations, increasing the perceived plausibility of a personally invasive procedure can enhance subjects’ belief that they personally experienced that procedure. Importantly, the present study also demonstrated, for the first time in the empirical literature, a condition under which introducing additional background knowledge can affect people’s beliefs about their own personal histories; specifically, in Experiment 2, after receiving background information about a home enema, subjects were less likely to indicate that this event “definitely did not happen” to them in childhood. This finding thus introduces enhanced background knowledge as a new source, in addition to imagery, plausibility, and suggestion, for establishing the foundations of false memories.

Differences Between the Effects of Knowledge in Experiments 1 and 2

The unique effects of background knowledge observed in this study also raise the question of why knowledge influenced people’s beliefs about the past in Experiment 2 but not in Experiment 1. One uninteresting interpretation is that the failure to observe an effect of knowledge in Experiment 1 was simply a Type II error, due to an insufficiently powerful design. In this regard it is notable that the same absence of an effect of knowledge was observed in two separate conditions of Experiment 1 (i.e., both with and without a delay between information presentation and questioning), as well as in two similar experiments conducted by Hart and Schooler (2006). We can thus be rea-

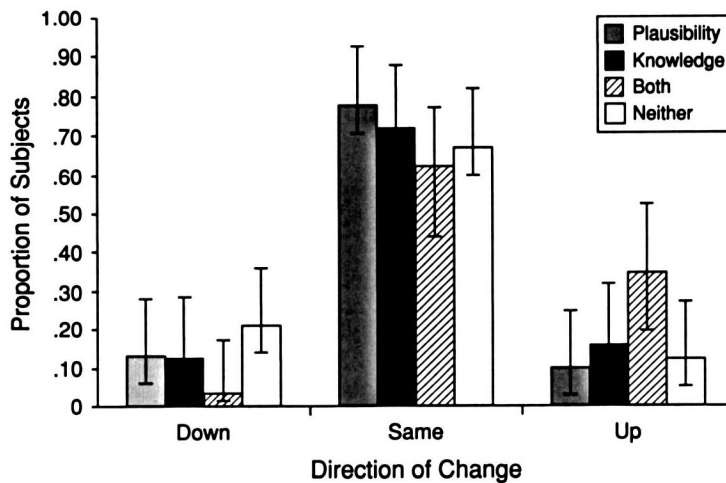


Figure 3. Proportion of subjects in each of the four conditions in Experiment 2 for whom the occurrence ratings from Time 1 to Time 2 for the target event decreased, stayed the same, or increased (with 95% confidence interval indicated).

sonably confident that the difference between the effects of knowledge observed in Experiments 1 and 2 are not simply due to insufficient power in the first experiment.

There are several differences between the procedures used in Experiments 1 and 2 that could be responsible for the different effects of knowledge on autobiographical memory beliefs. One difference between the two experiments involves the physical context in which the enema procedure was depicted. In Experiment 1, the enema procedure occurred in a hospital, whereas in Experiment 2, the procedure was described as having taken place at home. It seems plausible that the subjects of Experiment 1 could have inferred that because they knew they were not in the hospital as children, the target event administered in a hospital must not have occurred to them. Such an account would be in keeping with the "lack of knowledge inference" reported by Gentner and Collins (1981). According to the "lack of knowledge inference," a person who is trying to verify an assertion as true or false uses metaknowledge to reason that he or she would certainly have more knowledge of the asserted event if the event were real. Providing background information about an event is unlikely to cause individuals to believe that the event had happened to them, if there are reality constraints that lead them to reject the event outright. One potential reality constraint in this study is location cue, that is: "I know that I was never in the hospital as a child, so that must not have happened to me." Although plausible, one argument against this account is that it is not obvious why the constraint of knowing that one had never been in a hospital would be sufficient to prevent background knowledge from inflating subjects' estimations of having received the procedure, but not similarly neutralize the effects of plausibility.

A second potentially important difference between the knowledge manipulations in Experiments 1 and 2 involves the perceived base rates of barium procedures compared with home enemas for constipation. Knowledge might be

especially likely to embellish beliefs about events that are considered relatively more plausible. If so, knowledge could have a greater effect on beliefs about experiences with a home enema relative to the hospital enema, because the former is considered more likely. While this account is certainly plausible, it seems to predict that the plausibility manipulation and the knowledge manipulation should interact. However, the results of Experiment 2 suggest that plausibility and background information independently contributed to increasing individuals' likelihood ratings that an event had occurred to them in childhood; increased knowledge had the same effect on occurrence ratings, regardless of whether or not plausibility was manipulated.⁵ Thus, while differences in perceived base rates may account for the discrepancy between the effects of knowledge in Experiments 1 and 2, the data at present do not support this possibility.

A third potential source of the differential effectiveness of the knowledge manipulation in Experiments 1 and 2 is the differences in the overall familiarity of the context of the procedure. Because constipation is a relatively common symptom, a description of receiving a treatment for it is likely to overlap with existing information in memory; this information in turn could provide a scaffolding upon which a false belief about a personal enema experience might be constructed. On a related point, because constipation is something that most people are familiar with, it is likely to be easier for subjects to recall a past experience of having been constipated, and the ease of memory retrieval is known to influence memory attributions (Winkelman, Schwarz, & Belli, 1998).

Regardless of the precise reasons for the differences between the effects of knowledge in Experiments 1 and 2, the observation that increased knowledge can—at least sometimes—enhance an individual's belief in having personally experienced an event is broadly consistent with support theory (Tversky & Koehler, 1994), according to

which the probability of a possible event (e.g., "What is the likelihood of catching a sexually transmitted disease?") is greater if the event is unpacked (e.g., "HIV, chlamydia, and syphilis are sexually transmitted diseases"). Providing individuals with more knowledge about an event would certainly constitute one form of unpacking. Thus, support theory predicts that for any event of a fixed-objective probability, greater knowledge of the event should make it seem subjectively more likely.

Importantly, support theory has not previously been applied to people's estimations of the probabilities of personal autobiographical experiences. Indeed, in the case of prior autobiographical events, there are also reasons to expect that under some conditions, greater knowledge could reduce perceived probability. Specifically, Ghetti and Alexander (2004) reported that salient autobiographical events that never actually occurred are easier to dismiss than less salient events, because subjects can metacognitively reason "If that had happened to me, I would certainly remember it." It thus follows that if providing knowledge of an event increases its salience to the point where it seems too memorable to have been forgotten, it would decrease perceptions that the experience actually occurred. Such a process may have been operative in Experiment 1, where description of barium enema procedures may have made it seem so salient that subjects concluded that they would have remembered it had it happened, thereby countervailing the unpacking effect that support theory would have otherwise predicted. Indeed, in keeping with this prediction, Hart and Schooler (2006) found that subjects who were given additional information about the barium enema procedure actually decreased the degree to which they reported remembering the event.

In sum, although it is not possible from this study to definitively conclude why Experiment 2 was uniquely effective in demonstrating the effects of knowledge, it seems likely that providing additional knowledge has multiple effects, some of which enhance the perception that an experience actually occurred, and some of which may do the opposite. A definitive identification of these factors awaits further research, but it seems likely that the absence of an effect of knowledge in Experiment 1 stemmed at least in part from the alien nature of the suggested procedure,⁶ whereas the presence of an effect of knowledge in Experiment 2 was due (again, at least in part) to the subjects' greater familiarity with the context of the procedure.

Caveats

One potential criticism of this study is that its conclusions are limited to two target events, a barium enema administered in a hospital and a home enema for constipation. Although it would have been ideal to include more target items, the use of only two target events is justified on several bases. First, it would be methodologically difficult to maintain credibility with the subjects while suggestively introducing multiple false events. In light of this, there are a number of important false-memory studies that were conducted using only one false target item (i.e., "were lost in a mall," used by Loftus & Pickrell, 1995; "put Slime in the

teacher's desk," used by Lindsay, Hagen, Read, Wade, & Garry, 2004; "took a hot air balloon ride," used by Wade et al., 2002). Second, because the false memory research is frequently generalized to cases of child sexual abuse, it is desirable in this line of research to use target events that approximate intrusive physical penetration. Besides receiving an enema, it is not clear what other target events satisfy this criterion and could ethically be suggested to subjects.

Although there were significant patterns of results in this study, these results are typical of those of other studies using LEI scores in that the changes in LEI ratings were actually modest. First, across all conditions in both experiments, the majority of the subjects provided exactly the same occurrence rating for the implausible target event at Time 1 and 2 or 4 weeks later, at Time 2. Second, even in the conditions under which the greatest change in occurrence ratings was observed—in Experiment 2, when subjects were presented both the passage increasing the plausibility and the passage providing background information—the mean change from Time 1 to Time 2 was only 1.00 units on the scale from 1 to 8. Significantly higher rates of false memories, not just beliefs, have resulted from using other procedures (e.g., Lindsay et al., 2004). However, in the present study and in numerous other studies using LEI ratings, beliefs about the occurrence of childhood events are reported to be fairly stable, not highly malleable. Because the belief that an event has occurred is hypothesized to be a prerequisite to constructing a false memory for the event (Scoboria et al., 2004), changing beliefs provides the foundation upon which false memories can be raised. Thus, it would be expected that the rates of planting false memories for implausible childhood events would be quite low under similar conditions in the real world.

Relevance to Memories of Childhood Sexual Abuse

False-memory research is frequently generalized to real world cases involving memory for childhood sexual abuse (Loftus, 1993), and childhood sexual abuse is a relatively implausible event for most children. The present findings may further inform this issue in several respects. First, the fact that plausibility enhanced people's belief that they personally experienced as disturbing and invasive a procedure as receiving a barium enema in the hospital lends further credence to the possibility that providing plausibility information could subsequently contribute to the planting of false memories of sexual abuse. However, the observation that providing background information only influenced people's beliefs about an event that was more consonant with personal experiences suggests that gaining knowledge about abuse may be more likely to produce false memories if one possesses relevant experiences to which that knowledge might apply. For example, gaining knowledge about sexual abuse might be more likely to influence the memories of individuals who recall dysfunctional relationships to which additional sexual details could be added. Of course, in this study, people were only provided relatively modest amounts of information over a minimal amount of time, so we can only speculate about the effects of more

enduring and extensive knowledge. Nonetheless, these results do suggest that, whereas providing individuals with background information about an event can make them more likely to think that the event occurred to them, this is less likely to occur for suggested events that are inconsistent with personal beliefs and memories.

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NOTES

1. In a pilot study, Pezdek et al. (1997) had 98 subjects complete a questionnaire to assess how frequently they remembered experiencing two target events and the extent of their background knowledge about these two events. These events were (1) being lost in a shopping mall as a child and (2) receiving an enema for constipation as a child. Whereas 68 subjects remembered being lost as a child at least once ($M = 1.26$ times), only 11 subjects remembered receiving an enema ($M = 0.20$ times); these means were significantly different [$t(97) = 6.30, p < .001$]. In addition, the mean number of idea units generated regarding what it would be like to be lost in a mall ($M = 6.26, SD = 3.46$) was significantly greater than the comparable figure for receiving an enema ($M = 3.19, SD = 3.24$) [$t(97) = 8.61, p < .001$].

2. Some of the LEI items that are highly unlikely to have occurred served as control items on the basis of which to exclude people who might lie or not take the test seriously.

3. A 2 (background information provided or not) \times 2 (plausibility information provided or not) \times 2 (test immediately after the passages or delayed two weeks later) ANCOVA was also conducted on these data. In this analysis, the dependent variable was the Time 2 LEI scores; the Time 1 LEI scores served as the covariate. The results of the ANCOVA were consistent with the ANOVA results; only the main effect of plausibility was significant [$F(1,287) = 13.20, MS_e = 2.49, p < .001$].

4. A 2 (background information) \times 2 (plausibility information) ANCOVA was also conducted on these data. In this analysis, the dependent variable was the Time 2 LEI scores; the Time 1 LEI scores served as the covariate. The results of the ANCOVA were consistent with the ANOVA results; both the main effect of plausibility [$F(1,120) = 5.22, MS_e = 2.78, p < .05$] and the main effect of providing background information [$F(1,120) = 4.03, MS_e = 2.78, p < .05$] were significant.

5. However, we should be cautious about drawing strong conclusions about this specific relationship from the results of Experiment 2. In Experiment 2 but not in Experiment 1, the LEI change score in the condition that received the plausibility passage but not the background information passage was low (i.e., mean LEI change score = .26) relative to the condition that received the plausibility passage and the background information passage (i.e., mean LEI change score = 1.00). Further research is necessary to test the consistency of this finding.

6. It should be noted that it is certainly possible to imagine bizarre events; in fact, imagining specific bizarre laboratory tasks has been reported to lead subjects to erroneously remember having performed these tasks (Thomas, Bulevich, & Loftus, 2003; Thomas & Loftus, 2002). However, in this other research, the tasks labeled "bizarre" were all trivial and doable (e.g., sit on dice, stab Silly Putty with a pencil, wrap an eraser in a napkin) and subjects actually did perform some of the "bizarre" tasks in those experiments. This is not true for either of the target events used in the present study.

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