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False Memories of Childhood Experiences

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SUMMARY

We conducted two experiments to investigate if college students would create false memories of childhood experiences in response to misleading information and repeated interviews. In both experiments we contacted parents to obtain information about events that happened to the students during childhood. In a series of interviews we asked the students to recall the parent-reported events and one experimenter-created false event. In the second experiment we varied the age at which we claimed the false event occurred. In both experiments we found that some individuals created false memories in these circumstances and in the second experiment we found no effect of age of attempted incorporation. In the second experiment we also found that those who discussed related background knowledge during the early interviews were more likely to create a false recall. Generalizations to therapy contexts are discussed.

Can adults create false memories of childhood experiences in response to misleading information and the demands of an interview? Psychologists who work with people recovering from childhood abuse and trauma have contended that most memories recovered during therapy are accurate (Bass and Davis, 1988; Fredrickson, 1992; Olio, 1994). Memory psychologists, in contrast, have expressed concern that many recovered memories may be false memories (Kihlstrom, 1993; Lindsay and Read, 1994; Loftus, 1993). Thus investigation of factors that contribute to our understanding of the recovery of childhood memories is important. If adults can create false childhood memories, then therapists will need to exercise caution in their interviews with clients, and the courts may need to view memories recovered through therapy as having been contaminated by potentially biasing influences. Research on false memories may also provide information concerning the processes involved in memory creation—whether memory creation involves integration, source confusion, or some combination of both.

The focus on memories of childhood experiences is an old concern in the psychoanalytic tradition (Erdelyi, 1990; Freud, 1957, 1974). Freud viewed childhood memories as an important source of information about an individual and he emphasized the interpretation of childhood memories. Freud was also interested in childhood, or

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infantile, amnesia—the observation that most adults recall little from the first few years of life. He interpreted childhood amnesia as evidence for repression, and he suggested that the recovery of repressed memories was important in therapy. Freud argued that both conscious and recovered memories are constructions based on actual childhood experiences, childhood fantasies, and adult memories and fantasies.

In addition to the Freudian approach, other approaches also emphasize memories of childhood. Narrative approaches to autobiographical memory, for example, suggest that childhood memories supply important illustrations of an individual's character (see Bruner, 1986, 1987; Cohler, 1994; Spence, 1982). Narrative theorists (Bruner, 1987; Gergen and Gergen, 1983) have suggested that not only the content but also the form of an autobiographical narrative provides information about how individuals view themselves. While the narrative tradition has primarily emphasized the stories that people choose to tell about their lives, other recent writers (e.g. Bass and Davis, 1988; Fredrickson, 1992) have been concerned with the recovery of repressed childhood memories, particularly of abuse and other forms of trauma. Like Freud, such writers consider the recovery of memories during therapy important to the healing process: 'For many survivors, remembering is the first step in healing' (Bass and Davis, 1988: p. 70). In contrast to Freud, Bass and Davis (1988) and Fredrickson (1992) have assumed that memories are accurate, or have at least been more willing to believe that the memories are accurate.

Memory researchers (e.g. Kihlstrom, 1993; Lindsay and Read, 1994; Loftus, 1993) have recently expressed concern that repressed memories recovered during the course of therapy may be false memories—creations based on the demands of the interview context. Loftus (1993) offered evidence concerning the influences of misleading information and situational demands on memory as reason to doubt the veracity of memories recovered through therapy. Eyewitness memory researchers, for example, have found that postevent information can lead to errors in subsequent reports of an event (Loftus, 1979, 1992). In a typical experiment, individuals view an event, are later provided incorrect information about the event, and are finally asked to remember the event. Individuals provided incorrect information are likely to incorporate that information into succeeding reports of the original event—this is generally referred to as the misinformation effect. Arguments exist regarding the underlying mechanism of the misinformation effect. Authors emphasize that the misleading postevent information becomes integrated with the original memory, thereby replacing the correct information; or that the individual recalls the postevent information without memory for the source of the knowledge and thus erroneously attributes the information to the original event (Belli, 1989; Belli and Loftus, in press; Lindsay, 1990; Loftus, 1992; Loftus, Donders, Hoffman, and Schooler, 1989; Loftus and Hoffman, 1989; McCloskey and Zaragoza, 1985; Zaragoza and Lane, 1994). None the less, that the phenomenon occurs is not in question. Thus, the misinformation effect can be applied to memories of childhood. Information an individual has learned after childhood events, during later childhood or during adulthood, can become incorporated into that individual's memory and lead to inaccurate recall or false memories (Belli and Loftus, in press; Lindsay and Read, 1994; Loftus, 1993).

In addition to the influence of postevent misinformation, the influence of social demands may also contribute to erroneous recall. Early researchers in social psychology demonstrated that social pressures can affect an individual's perception and judgement. For example, Asch (1956) found that individuals will sometimes conform

to majority opinion on simple perceptual judgements despite errors in that majority opinion—an example of the majority effect. In a recent application of the majority effect to memory, Betz, Skowronski, and Ostrom (1993) found that memory is also sometimes influenced by erroneous majority views. In other research, it has been found that the source of information in the typical misinformation effect paradigm can influence the incorporation of misleading information (Ceci, Ross and Toglia, 1987; Chambers and Zaragoza, 1993; Dodd and Bradshaw, 1980; Greene, Flynn, and Loftus, 1982).

Although the laboratory findings regarding misinformation and social influence are robust and replicable, such research may not be directly applicable to the accuracy of childhood memories recovered during therapy (Berliner and Williams, 1994; Olio, 1994; Pezdek, 1994). Laboratory research often changes elements of events (by altering or adding features) while the whole event is generally remembered accurately. Olio (1994) noted that changing or adding features is not the same as causing someone to believe that an entire event occurred. In the typical eyewitness memory paradigm, for example, the difference would be between convincing someone that a car in a viewed videotape passed a yield rather than stop sign and convincing someone that they watched a videotape of a car passing a sign when they actually viewed a different videotape. Additionally, the events in laboratory investigations tend not to be particularly self-relevant. For instance, subjects in the typical eyewitness memory experiment watch a video or slides about unknown individuals. Yuille and his colleagues (Yuille, 1993; Yuille and Cutshall, 1986; Yuille and Tollestrup, 1992) have argued that more self-involved memories (those that happen to a person as opposed to those that a person encounters through material such as videotapes) may be less susceptible to the misinformation effect.

In response to such concerns, some researchers have attempted to extend false memory research by causing subjects to create memories of full events. Ceci and colleagues (Ceci, Huffman, Smith, and Loftus, 1994, Ceci, Loftus, Leightman, and Bruck, 1993) have shown that misleading information combined with social pressure caused some preschoolers to claim that a false event occurred. For example, once a week for several weeks, Ceci *et al.* 1994) asked preschoolers to think about some real and false events. In this fashion, misinformation (the false events) was repeatedly presented to the subjects. In addition, the information was presented by a powerful source (the experimenter working in conjunction with the parent) in a supportive environment. By the end of the experiment, over one-third of the children incorrectly remembered false events that they had previously correctly denied.

Loftus and Coan (in press) reported similar anecdotal evidence in adults asked about childhood events. They had older siblings remind younger brothers and sisters about some childhood experiences. One of the experiences about which the subjects were asked was an event that had never occurred (getting lost on a particular occasion in a specified location). Loftus and Coan found that repeatedly asking about the event over several sessions led some individuals to remember the false event. The individuals who created false memories provided the information they had originally been given and then often elaborated upon the base description.

The two studies we report in this paper are extensions of research investigating whether people will make incorporations of false, self-involved events. We investigated whether college students would create a false recall of a childhood experience in response to the demands of multiple interviews. In the first study we mailed a

questionnaire to the parents of students in an introductory psychology class that asked parents to describe events that happened to their child. When questionnaires were returned, we invited the students to participate in two autobiographical memory interviews based on the information provided by their parents. We presented the study as an investigation of how well and how accurately people could remember childhood events. Included in the series of events was one event that did not happen to the student (either an overnight hospitalization for an ear infection at age five or a birthday party with pizza and a clown at age five). At the end of the first interview, the students were encouraged to continue thinking about the events and to attempt to remember more by the second interview. We predicted that in the second interview some students would provide a false recall based on the information from the first interview.

The second study served as a replication and extension of the first. In the second study, we used less probable false events, included a third interview, increased the supportive interviewer demands, and varied the age at which we claimed the false event occurred. We varied the age based on the general pattern observed in studies of childhood amnesia (Sheingold and Tenney, 1982; Usher and Neisser, 1993). Specifically, few individuals can recall events from age two, most can recall events from age six, and most can recall numerous events and a relatively complex personal narrative from age ten. We were interested in evaluating the extent to which self-knowledge at a particular age influences the ability to add a new memory at that age. If individuals will incorporate a new memory most easily with little competition from general knowledge, then we should observe more false memories at earlier ages. If, instead, individuals require a solid base of self-knowledge upon which to construct a false memory, then we should see more incorporations at later ages.

EXPERIMENT 1

Method

Subjects

One hundred and thirty one introductory psychology students from Western Washington University provided consent for distribution of a questionnaire to their parents. Eighty-three questionnaires were returned by parents (63 per cent response rate). Twenty-five subjects participated in pilot investigations. Of the remaining 58 possible subjects, we recruited 22 to participate in this experiment based on our ability to contact and schedule students during the last four weeks of the academic session. Two were dropped for failure to complete the second interview, leaving 20 subjects (5 males, 15 females). Subjects participated on a volunteer basis after they had completed the introductory psychology class.

Materials

The questionnaires sent to parents included questions about specific childhood (ages two to ten) events in six event categories. The categories included were: (1) getting lost; (2) going to the hospital: (3) an eventful birthday; (4) loss of a pet; (5) a family vacation; and (6) interaction with a prominent or famous person. For each event described, parents were asked to indicate the age of their child when the event occurred, and to describe activities, places, and individuals involved in the event.

In addition, we constructed two event descriptions for use as the false events. Both

events represented instances of the event categories, with one event being positive and one negative in emotional valence. Within the eventful birthday category, the positive event was the individual's birthday party at age five during which pizza were served and a clown visited. Within the going to the hospital category, the negative event was presented as an overnight visit to the hospital at age five due to a high fever and a possible ear infection. In response to the birthday and hospital event categories on the parent questionnaire, no parents recorded similar events (clown at a birthday party, overnight hospitalization for fever and ear infection) at any age.

Procedure

All subjects participated in two interviews in which they were asked to remember and describe a series of childhood events. On the basis of parent responses, subjects were asked to recall two to five true events. In addition, each subject was asked to recall one of the two false events (determined randomly). The order of events was the same in both interviews and the false event was always the third event the subjects were asked to recall. For each subject, one interviewer conducted both sessions. Three interviewers, two male and one female, conducted the sessions. All sessions were tape-recorded.

At the beginning of the first interview, subjects were informed that in both interviews they would be asked to recall and describe a set of childhood experiences based on information obtained from their parents. We told the subjects that the goal of the research was to investigate how much they could recall by the end of the second session and that we would compare their recalls to the information provided by their parents. Subjects were also informed that the sessions would be tape recorded and were asked to wear a lapel microphone. For each event, subjects were first cued with an event title (family vacation) and an age (at age five). If the subjects were unable to recall the event, or if what they described did not appear to agree with information provided by parents (they appeared to be describing a different vacation), brief additional cues were provided: location, one or two activities, and other people involved. If subjects were still unable to recall the event, the interviewer moved to the next event. The interviewers were encouraging in terms of non-verbal communication, but did not provide any additional verbal cues or demands. The false event was presented in the same way as the other events. At the end of the first interview, we encouraged subjects to continue thinking about the events, to try to remember more before the next interview, and to not discuss the events with their parents.

The second interview occurred one to seven days after the first. After the subjects finished describing the events they were asked several questions about each event and the experience of remembering the event. The questions included whether they had thought or talked about the event in the last five years, whether the family had photographs of the event, if a mental image accompanied their memory of the event and, if so, the image perspective, and the strength and valence of any experienced emotion. Also the subjects were asked if they had discussed the events with their parents between interviews and had a subject done so we would have dropped that subject's data. After answering these questions, subjects were informed that one event was an event we were relatively sure had not happened to them. As part of the debriefing, we asked subjects to guess which event they thought was the false event. We told all subjects, particularly those who incorporated aspects of the false events, that such incorporation was a normal memory process and that in this situation we expected people to accept the false events.

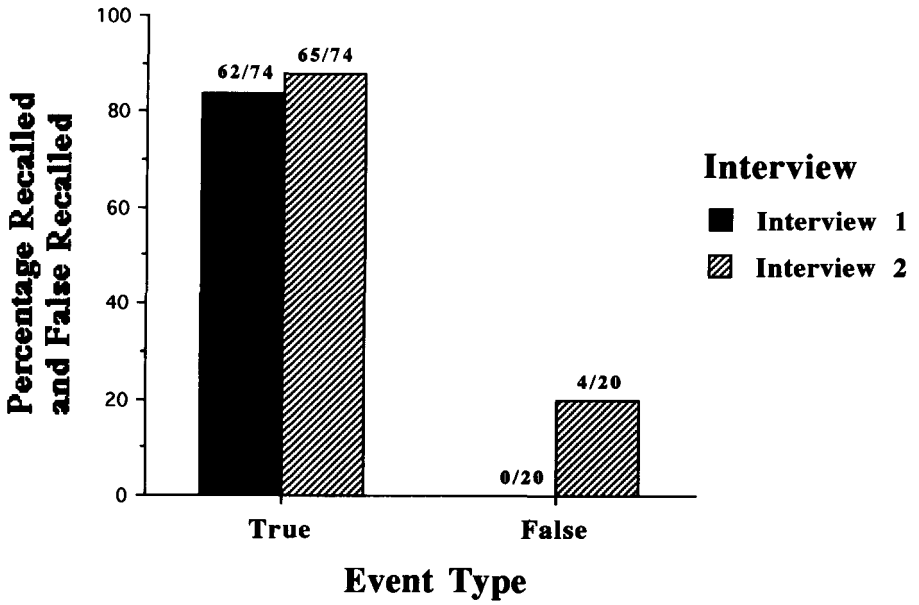

Figure 1. Percentage of true events recalled and false events falsely recalled in both interviews.

Results and Discussion

Based on the information provided by the parents, the 20 subjects were asked to recall 74 true events (an average of 3.7 true events per subject). In the first interview, the subjects recalled and described 62 of the 74 true events (83.8 per cent). In the second interview, in addition to continuing to recall the events remembered at time one, subjects provided memories for three of the 12 events (25 per cent) that had not been remembered during the first interview. The subjects had either recalled the event or had reconstructed a memory based on the first interview. Figure 1 shows the recall rate for the true events and the false recall rate for the false events.

Each subject was also asked about one of the two false events. During the first interview no subjects incorporated any of the false information into an event description, although some subjects talked about related information (a similar event or general knowledge). During the second interview four of the 20 subjects (20 per cent) incorporated false information in an event description (see Figure 1). Two subjects incorporated false information for the birthday event and two for the hospital event. When asked to identify the false event during debriefing, subjects who did not incorporate false information correctly identified the false event while three of the four subjects who incorporated false information did not correctly identify the false event.

Table 1 provides an example from a subject questioned about the false eventful birthday. This example illustrates the manner in which subjects incorporated the information. The four individuals who incorporated false information talked about related information during the first interview. This appeared to be an attempt by these individuals to connect the false information to true information. In the case presented in Table 1, the subject described what was probably a real birthday party during the first interview and seemed to accept the false information regarding a clown as

reasonable, 'Oh, maybe a visit from a clown, some animal or something came out and visited us'. The subject then added the false information to this event description during the second interview (leading to the unlikely combination, at least at that time, of pizza and McDonalds).

Thus we demonstrated that individuals will create false recalls of childhood experiences in response to misleading information and the social demands present in repeated interviews. The subjects who incorporated the misleading information appeared to be integrating it with either specific event knowledge or general self-knowledge. Thus the creation of false recalls of childhood experiences resembles the process whereby eyewitness memories are distorted by postevent information (Loftus, 1979, 1993). In the traditional misleading eyewitness memory experiment, the subject views the original event, is presented with misleading postevent information, and incorrectly recalls the misleading postevent information when trying to recall the original event. The subjects in our study had relevant episodic and semantic knowledge of their childhood—the original event. We then exposed them to the false event as described by the interviewer during the first interview—the misleading postevent information. Those who created a false recall incorporated the misleading postevent information into their later recall. In order for a false recall to occur, the subjects apparently had to access some original information when presented with misleading information. It is possible that the wholesale adoption of an event when an individual has no related knowledge or when the individual does not access related information may be rare.

It is likely that the experimental demands of the two interviews also played an important role in the creation of false recalls. As noted, no subjects incorporated false event information during the first interview. At the end of the first interview, all subjects were told that during the second interview they were expected to remember more events and more about the events they did recall. Several aspects of the experi-

Table 1. Example of incorporation of false information regarding an eventful birthday

Interview 1

I: We have event number 3, an eventful birthday party at age 5.
S: Oh.
I: Anything you can remember?
S: Well, I remember from pictures a girl there that I might have known, her name was Molly. That's about it, that's all I remember.
I: Anything else?
S: Oh, oh, maybe we went to McDonald's. We went to McDonaldland and I remember we sat around in the McDonald's, the chairs were like little toadstools around a big animal and I remember, I don't know if Ronald McDonald came out. We all had these little cupcakes.
I: We've got here pizza, ice cream, and a visit from a clown.
S: Oh, maybe a visit from a clown, some animal or something came out and visited us.
I: Can you remember anything more specific. Just anything else.
S: No.

Interview 2

I: Event number 3, an eventful birthday at the age of 5.
S: We were in McDonald's, McDonaldland and a clown came in and we all had little cupcakes and we sat on toadstools and I'd say there were about 13–14 people sitting around this table and we had pizza.
I: OK, anything else you can think of?
S: No.
I: OK.

ment probably contributed to the power of this social situation. First, subjects were in an experimental context in which the demand characteristics included eventual recall of the false event and subjects tend to conform to explicit experimental demands (Orne, 1962). Second, the subjects faced a unanimous majority of two (parent and experimenter) claiming that the false event did occur (Asch, 1956). Finally, memories for childhood experiences, when compared with more recent experiences, can be viewed as ambiguous stimuli because they are not present and because the memories themselves are often more vague (Johnson, Foley, Suengas, and Raye, 1988). Asch (1956) suggested that the more ambiguous the stimulus, the more likely a subject would be to conform to the social demands. Thus, in this case where the memories that remain from childhood are relatively ambiguous, subjects may be more inclined to accede to the provided description.

EXPERIMENT 2

In our second study, we conducted a replication and extension of Experiment 1. The replication was not exact because we wanted to ensure the generality of false recalls of childhood events and obtain more convincing evidence that subjects will make substantial incorporation into their recollections of childhood. Thus, in the second experiment, we changed the events that we attempted to insert. The three new false events differed from those of the first experiment in two respects. First, although the events were relatively negative in emotional tone, they could be viewed as humorous in retrospect. This change enabled the subjects to supply their own emotional interpretations. Second, we attempted to construct events that were less likely to have occurred. The first event was attending the wedding reception of a friend of the family and accidentally spilling a punch bowl. The second event was having to evacuate a grocery store when the overhead sprinkler systems erroneously activated. The third event was being left in the car in a parking lot and managing to release the parking brake resulting in the car rolling into something. (We uncovered no true instances of the wedding event, although many subjects attended weddings. Given that we did not ask about unusual experiences while grocery shopping, we cannot be sure that a sprinkler event did not occur. With respect to the car event, in the information provided by parents, there were two accidents caused by children releasing parking brakes and we did not use this event with those subjects.)

In the other extension in Experiment 2, we attempted an initial investigation of the role relevant background knowledge plays in the incorporation of false childhood events. We approached the role of background knowledge by noting that people are able to remember varying numbers of childhood events based on their age when the events occurred. In particular, there appears to be an age before which few people remember anything—this phenomenon is referred to as childhood, or infantile, amnesia (Fivush and Hamond, 1990; Howe and Courage, 1993; Sheingold and Tenney, 1982; Usher and Neisser, 1993). We selected three ages (2, 6, and 10) at which to attempt false event insertion based on the amount of specific event and general self-knowledge people have available. If, as we noted in Experiment 1, the creation of false recalls is dependent on relevant self-knowledge, then this process should occur more readily at older ages.

Method

Subjects

Two hundred and fifty six introductory psychology students from Western Washington University gave permission for us to distribute a questionnaire regarding childhood experiences to their parents. One hundred and forty three questionnaires were returned (55.9 per cent). Selection of subjects was limited to questionnaires that described at least three events (only seven subjects were not contacted for this reason). In addition, we recruited subjects based on the order in which the questionnaires were returned, and we did not contact 49 possible subjects because their parent questionnaires were returned too late. Of the remaining 87 subjects, 29 could not be reached or scheduled. Thus 58 subjects participated in the study, seven of whom did not complete all three interviews in a timely fashion, leaving 51 who completed data collection (17 males, 34 females). Subjects received course credit for their participation.

Materials

The questionnaire mailed to parents was very similar to the one used in Experiment 1. Parents were asked to describe childhood events (ages two to ten) within ten event categories. In addition to the six event classes from Experiment 1 (getting lost, going to the hospital, an eventful birthday, loss of a pet, a family vacation, and interaction with a prominent or famous person), we added four more event classes (winning a context, car events, weddings, and mischief with a friend).

We constructed three events to be used as the false events. The first was that the individual had attended a wedding of a friend of the family. At the reception the individual was running around with other kids, bumped into the table with the punch bowl, and spilled punch on the parents of the bride. The second was that the individual had been shopping with a parent in a grocery store when the fire extinguisher sprinkler system activated. The store was evacuated although there was no fire. The third was that a parent had left the individual in the car while going into a store for a moment. The individual managed to release the parking brake and the car rolled into something.

Procedure

All subjects participated in three interviews spaced one day apart (we scheduled subjects for Monday–Wednesday–Friday or Tuesday–Thursday–Saturday interviews). In all interviews we asked the subjects to remember and describe three to five childhood events based on parent responses to the questionnaire and one of the three false events. The false event (wedding, store, or car) and the age of insertion (2, 6, 10) were determined randomly. The order of events was the same in all interviews and the false event was always placed in the fourth position. The same interviewer conducted all three interviews for any given subject (there were three male and two female interviewers). All sessions were tape-recorded.

The sessions were similar to those in Experiment 1. The two most important differences concerned the amount of information used to cue events and the amount of emphasis on increased recall over the three sessions. During the first interview in Experiment 1, the subjects were first cued with an event title and an age. They were provided more details only if they failed to recall the event or if what they recalled did not match with parent information (or false information). During the first interview in this experiment, we provided all cue information (age, event, location, actions, and others involved) as part of the first cue in order to limit the number of times subjects

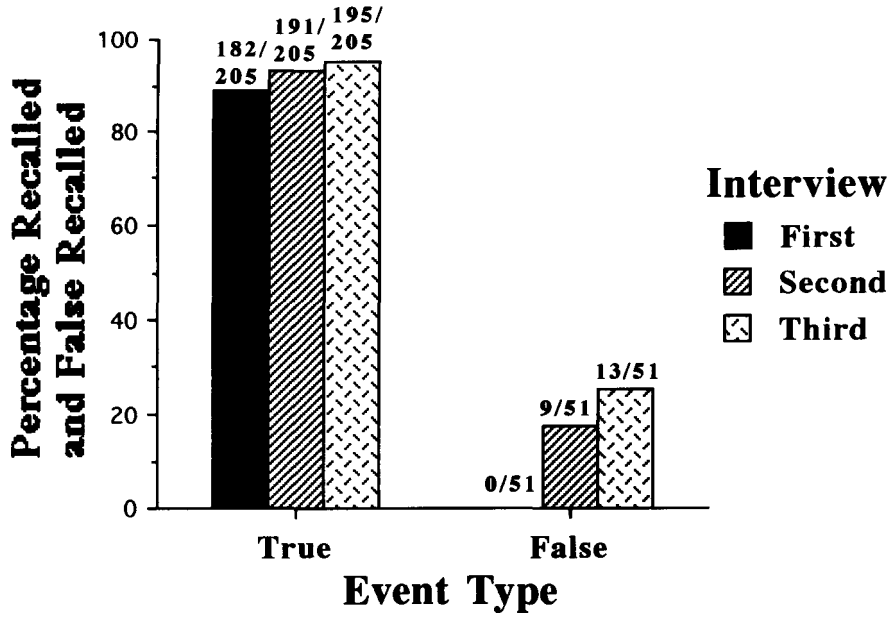

Figure 2. Percentage of true events recalled and false events falsely recalled in all three interviews.

recalled a similar but different event. During interviews two and three, we first provided the event title and age, and, if subjects failed to recall the event, we provided the additional details.

We also increased the experimental demands for increased recall. More complete recall, along with accuracy, was given as one goal of the research during the introduction. The subjects were reminded of this expectation whenever they failed to recall an event during the first or second interviews. They were also reminded of this goal at the end of the first and second interviews and asked to continue thinking about events between interviews. In addition, the third interview served to intensify the experimental demands.

Results and Discussion

Based on the information supplied by parents the 51 subjects were asked to recall 205 true events (4.02 events per subject). As Figure 2 shows, the percentage of true events for which subjects provided some recall increased from 88.8 per cent to 95.1 per cent form the first to the third interview. Of the 23 true events not recalled during interview one, 13 were recalled during interview three (a recovery rate of 56.5 per cent). Whether subjects recovered these memories in response to repeated questioning and appropriate cues (a form of hypermnesia; see Erdelyi, 1990) or whether they created the memories in response to experimental demands is unclear. In addition, some events may have not been recalled due to a parent making an error rather than a subject forgetting the event.

As the information from parents provided us with true events at a variety of ages, we also used the true events to obtain an index of the age of offset of childhood amnesia—that is the age after which the students were able to remember specific events

Table 2. Example of a clear false recall in experiment 2

First Interview

I: The next one is attending a wedding. At age six you attended a wedding reception and while you were running around with some other kids you bumped into a table and turned the punch bowl over on a parent of the bride.
S: I have no clue. I have never heard that one before. Age 6?
I: Uh-huh.
S: No clue.
I: Can you think of any details?
S: Six years old, we would have been in Spokane, um, not at all.
I: OK.

Second Interview

I: The next one was when you were six years old and you were attending a wedding.
S: The wedding was my best friend in Spokane, T____. Her brother, older brother was getting married, and it was over here in P____, Washington, cause that's where her family was from and it was in the summer or the spring because it was really hot outside and it was right on the water. It was an outdoor wedding and I think we were running around and knocked something over like the punch bowl or something and um made a big mess and of course got yelled at for it. But uh.
I: Do you remember anything else?
S: No.
I: OK.

(Howe and Courage, 1993; Sheingold and Tenney, 1982; Usher and Neisser, 1993). Consistent with Usher and Neisser (1993), we found that the age of childhood amnesia offset for college students appears to be between the second and third birthday. For

Table 3. Example of a less clear false recall in experiment 2

Third Interview: Discussion of a wedding, followed by a turn to the reception.

I: How about the playing with the other kids and you were running around at the reception?
S: I don't know why I can't remember it.
I: What can you remember about that?
S: I want to say like I was the oldest of the kids running around and you said I knocked the punch bowl into somebody's parents, the bride's, groom's or something.
I: Well according to this it looks like you guys were running around and you ...
S: I tripped.
I: Bumped or yeh, somehow you bumped into the table, I don't know what or how hard or you bumped into the table and it tipped the punch bowl and it spilled on the bride's parents. That's pretty much all I have.
S: Wonder what they were doing sitting next to the punch bowl, um, I get a picture from somebody else's view so I, just thinking about it, um, I don't think it's a real memory.
I: Of you falling into the punch bowl?
S: Yeh, um the table and the parents just standing there, um, I don't know if I'm fabricating that or if it actually happened.
I: What do you remember about that, like what other details are you seeing?
S: Big red punch bowl, lots of ice, big plastic bowl, but it was like surrounded by nothing, it was like sitting on the end of a table uh, you know, with like cups and the thing, the scoop, but that's it, you know it's like the end of a long table. Tripped over my laces or something, I don't know, I'm not sure.
I: Do you remember the people that it spilled on at all, do you remember any details?
S: Not really, not at all, yeh, you stumped me on this one.
I: OK.

events reported by parents to have occurred at age two, subjects provided some description for 53.8 per cent (7/13) during the first interview and 61.5 per cent (8/13) during the third interview. For events reported to have occurred at age three, subjects provided some description for 81.5 per cent (22/27) during the first interview and 96.3 per cent (26/27) during the third. For events age four to ten, subjects provided recalls for 92.3 per cent (153/165) during the first interview and 97.6 per cent (161/165) during the third. Although the subjects recalled information for some of the earliest events, it is unclear if this is true episodic memory. The subjects could be reporting information they have incorporated from family discussions over the course of their lifetime (Usher and Neisser, 1993, also addressed this concern). All recalls, particularly those in the third interview, may have also been influenced by the information and social demands present in the interview context.

We also asked each subject about one of the three false events at one of the three ages. Figure 2 also shows that no subjects provided false recalls during the first interview and that 13 (25.5 per cent) did by the third interview. We included as false recalls those event descriptions that incorporated some of the false information or those that provided elaborations consistent with the false information. Two raters agreed that all 13 did include incorporations or elaborations. Of the 13, however, not all were equally clear examples of false recalls. Six were very clear: generally these subjects incorporated most of the false information and often they elaborated on the event. Five were less clear false recalls: these subjects incorporated less of the critical information or did not incorporate any of the false information but rather elaborated in a fashion that only would have been possible given the false information. Two subjects recalled the false event, attributed the false recall to an image, and expressed doubts as to whether image was actually a memory of the event. (Several additional subjects said they could see and believe the event, but unless they described the event, we did not include such statements as indicative of false recall. None the less, such statements could be seen as instances of false recognition.) Table 2 provides an example of a clear false recall and Table 3 provides an example of a less clear false recall.

We found no difference in the rate of false recalls based on the attempted age of insertion—subjects were equally willing to incorporate the false events at ages two, six, and ten. With respect to the role background knowledge plays in false recall creation, two possibilities are implied: (1) the creation of false recalls is not dependent on accessing relevant background knowledge (as subjects have little at age two yet did create false recalls; or (2) the limited amount of information people have is enough to allow the creation of false recalls. The second option seems reasonable given that subjects in our sample did report recall of some events from the second year of life.

To further investigate the role of background knowledge in the creation of false memories we looked at whether or not subjects explicitly accessed background knowledge during interviews one and two, and the rate of false recalls by interview three. We counted specific events (such as a wedding actually attended if asked about the punch bowl), general self and family information consistent with the event (where they lived and who could have got married then), and general self and family information inconsistent with the event (never attended weddings) as instances of accessing relevant background knowledge. Subjects who described relevant background knowledge during interviews one or two were more likely to create false recalls by interview three (χ^2 (1, n = 51) = 4.792, p = .029). Eleven of the 30 subjects who talked about relevant background knowledge eventually provided false recalls, while only two of the 21 who

did not eventually provided false recalls. Thus, we conclude that accessing some form of relevant background knowledge plays an important role in the creation of false recalls, although such accessing may not be necessary.

GENERAL DISCUSSION

In two studies we found instances in which people will create false recalls of childhood experiences. In Experiment 1, we provided subjects with descriptions of events that purportedly occurred during childhood and, in the second interview, 20 per cent of the subjects not only agreed that the event occurred but also provided a recall of the event that included some of the false information. Experiment 2 was an extension of the first experiment that used different false events. In this case, with less likely events, one additional interview, and some increased conformity demands, we found that 25 per cent created a false recall. In Experiment 2, we also varied the attempted age of insertion to investigate the role of background knowledge in the creation of false recalls. We had expected that if subjects needed relatively clear, age-appropriate knowledge as the basis for false recall construction that age two would result in fewer false recalls than ages six and ten. This was not the case, as subjects were equally likely to create false recalls at all the cued ages.

None the less we found evidence that the process of false recall creation most probably depends on accessing some relevant background information. In the second experiment we observed that subjects who discussed relevant personal knowledge (either specific events or generic knowledge) during the first two interviews were more likely to create false recalls in the final interview. Thus a form of schematic reconstruction may account for the creation of false recalls. Individuals call up schematic knowledge closely related to the false event when they first encounter the false event. Then they think about the new information in conjunction with the schema, and most probably, store the new information with the schema. When asked to recall the false event at a later time, they recall the false information and the underlying scheme. The underlying schema supports the false event by completing the event--adding actual background information and providing generic scenes. This process appears very similar to the schema-like interpretations of the misinformation effect (those that rely on the new information being combined with the old information, e.g. Loftus, 1979).

The creation of false recalls may also be explained as dependent on a form of source confusion—the false event is accepted as being a personal memory rather than as something recorded by the parent on a questionnaire and presented by the experimenter. Perhaps the schematic knowledge lends its credibility to the false recall enabling an individual to identify the false recall as a personal memory. The more similar the false event is to true events (or to some personal knowledge) the more likely an individual will accept the event. For example, when using recognition of events from an individual's diary and distracter items, Barclay and DeCooke (1988) reported that individuals were more likely to falsely identify distracters as personal memories when the distracters were true events with modification than when the distracters were completed new.

In addition to the informational aspects of our experiments, the social aspects also probably contributed to the creation of false recalls. In the explicit demand characteristics, we stated that we expected subjects to recall more events, and recall events in

more detail, with successive interviews. Further, the subjects faced a unanimous majority of authority figures (parent and experimenter) claiming that the event occurred. Asch (1956) demonstrated that subjects are likely to conform in the face of a unanimous majority. Recent work on the social psychology of the memory experiment has shown that people are more likely to accept misinformation from an authoritative source (Dodd and Bradshaw, 1980; Greene *et al.*, 1982) and from a majority (Betz *et al.*, 1993).

We suspect that incorporating information about remembered events in response to the social context is a general phenomenon. People often engage in memory discussions with friends and family. In the course of these discussions individuals may often present differing views, memories, and reactions. If one goal of such discussions is to arrive at an agreed upon version of the past (Edwards and Middleton, 1986a,b; Edwards, Potter, and Middleton, 1992; Hyman 1994), then people may often come to accept information from others. This may be particularly true for childhood events—parents may often repeat stories and children may eventually have difficulty determining whether they remember the event or simply know about it based on their parents' stories. Thus, some of the true events that subjects described in the two experiments may have been derived from family stories rather than episodic memory.

Although we found evidence that false recalls of childhood events can be created in response to misinformation and the demands of an interview, the application of these findings to a therapy situation is still difficult. When a therapist and a client discuss a client's childhood, is the client likely to recover repressed memories or create false recalls based on interview demands? When compared to our experiments, several aspects of the therapy situation may make it less likely that the recollections that come to light during therapy will be false recalls while other aspects may make the creation of false recalls more likely. With respect to aspects that may make false recalls less likely, first there is the nature of the event. We implanted single events that, while emotional, are relatively innocuous. In contrast, clients in therapy are often reported to recover a series of traumatic memories (often of various kinds of abuse) and it may be the case that more negative events are harder to create. Ceci and his colleagues (Ceci *et al.*, 1993) found that children were less likely to incorporate emotional events (either negative or positive) than neutral events. Second, there may be a stigma attached to negative traumatic events, such as abuse, that would keep most individuals from accepting such events as personal memories. Fredrickson (1992) noted that clients often have this reaction to returning memories and claimed that she encourages them to accept the abuse as real. Third, in our research, we told subjects the events happened (we attributed the claim to the parents). At most a therapist can claim that it is likely some trauma happened, or that in similar cases people have been abused. Many books (e.g. Bass and Davis, 1988; Fredrickson, 1992) list adult symptoms that are indicative of repressed abuse memories and strongly suggest that such memories exist, but this is not the same as a claim by parents that the event occurred. We did find, in spite of our demands, that a few subjects occasionally questioned their parents' reports. Some subjects suggested that their parents were mistaken, had the age wrong, or had children confused.

Two important aspects of therapy situations may make the creation of false recalls more likely in therapy. First, the social demands of therapy have several powerful features. The therapist plays and may accentuate the authority role—authority and expertise influence the acceptance of misinformation (Chambers and Zaragoza, 1993;

Dodd and Bradshaw, 1980; Greene *et al.*, 1982). The demands to remember could be more intense in a therapy situation if the therapist presents remembering as crucial for healing. The therapy context is almost certainly longer-lasting than our experiments—therapy includes many sessions over several weeks or months while our experiments included only two or three sessions in one week. Second, the client in therapy is likely to be more motivated than the typical psychology student participating in an experiment. Admittedly, subjects enjoyed our experiments and tried to help the interviewers. Such motivation, however, may be weak compared to the client who is searching for answers to serious personal problems and has heard that the answer may lie in hidden childhood memories.

The match between background knowledge and the false event, a factor we consider crucial for the creation of false recalls, can be seen as either hindering or aiding the creation of false recalls. Certainly it can be argued that few non-abused individuals have relevant personal knowledge directly related to events such as child abuse. Many adults, none the less, have memories and knowledge that may provide a basis for the construction of a false recall. For example, many adults were physically punished as children, most were kissed and held (perhaps when they did not want to be), all were bathed, and all were seen in the nude by adults. Thus the personal history of any individual may contain the necessary building blocks for false recall of abuse. In addition, if the construction of false recalls does not depend on related personal knowledge but can be accomplished with generic knowledge, then most adults have heard stories about abuse that could then serve as building blocks. This points out our concern with the importance of understanding the role of background knowledge in the construction of false recalls. A final point here is that the interviewer can enable this connection between false events and past knowledge through direct suggestion. The interviewer can emphasize related knowledge by suggesting that the individual remember available memories and visit sites from childhood experiences. The interviewer can also dismiss an individual's reasons for doubting a memory or suggest tentative acceptance of images as accurate recalls (Fredrickson, 1992). Anything that aids individuals in making such connections may inadvertently aid in the creation of false recalls.

Thus people may create false recalls of childhood experiences over the course of therapy. This leads to a difficult dilemma for therapists who see the recovery of repressed memories as critical to success in therapy. Searching for such memories by repeated questioning, by providing cues that might later be incorporated, by facilitating the match between self-knowledge and possible events, or by discouraging doubt may result in the creation of a false recall. Child abuse is a very serious and all too frequent problem. Recovering from child abuse is a long and difficult process. Unfortunately, given the malleability of human memory, it is possible that while acting with the best of intentions to help someone recover memories of traumatic events, a therapist may aid in the creation of false memories.

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