

**ADULT RECOLLECTIONS OF CHILDHOOD ABUSE:
COGNITIVE AND DEVELOPMENTAL PERSPECTIVES**

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Increasingly during the 1980s, the specter of two equally awful phenomena arose. Genuine sexual victimization became more and more visible and many victims were not believed when they came forward. A separate but also painful problem is the realization that innocent people have been accused of these crimes, with attendant devastation for themselves and their families.

An understanding of these two types of life-shattering phenomena requires a consideration of the operation of memory. Of special importance are issues such as the extent to which delayed reports of traumatic experiences are taken (by the self and others) to be accurate and believable reflections of reality and the degree to which memory is malleable and can come to be distorted over time. In this regard, experiences involving victimization can be arrayed along a continuum. At one extreme, there is the type of case in which a victim has sustained, enduring memory for a traumatic experience that is independently corroborated. At the other extreme, there is the situation in which an individual has no memory at all for having been victimized and there is no corroboration, as well. In between these two extremes are a variety of cases in which different types of partial memory are reported, with or without corroboration.

As memory researchers, we have grave concerns about those cases in which an individual has no memory for a traumatic experience (that may or may not have taken place), enters therapy, and emerges sometime later with an elaborate memory. Indeed, as scientists, we are very interested in situations that resemble the highly publicized Ramona case in which memories come to be exhumed during the course of therapy. In this case, a

young woman claimed that she had been molested between the ages of 5 and 16 by her father -- including numerous times with the family dog -- and that she buried this in the unconscious until it was dredged up in the course of treatment.

To those of us who are engaged in scientific memory research, such claims as were seen in the Ramona case embody a rather bizarre web of assumptions about the workings of the human memory system. For example, memory is assumed to go underground, not be accessible to consciousness for decades, but can nonetheless be expressed in sets of symptoms (e.g., aversion to mayonnaise), and then subsequently be recovered. The very symptoms that brought someone to therapy in the first place are thought to be caused by the unexpressed memories. Indeed, the symptoms are taken to be overt manifestations of sleeping memories, and the task of some therapeutic orientations is to hunt for the missing memory.

We are also very concerned about situations in which an individual has partial memories of an earlier traumatic experience. Under these conditions a partial memory can become elaborated over the course of time, with the potential for considerable distortion. Indeed, even when the partial memory is accurate and contains a component of truth, a serious risk of distortion exists. Moreover, as memory researchers, we are very concerned about therapists who have misconceptions about the ways in which memory works and who engage in practices on the basis of those misconceptions that can be dangerous. To fully appreciate the basis of these concerns, we need to consider the intertwined issues of remembering and suggestibility.

To accomplish this goal, in this report we summarize the salient features of research on human memory, focusing on the contributions of the literatures in cognitive and developmental psychology. We first provide a broad overview of memory and its

development by making use of a conceptual framework for thinking about the flow of information within the memory system. We then focus in greater depth on three topics that are initially addressed in our overview: (a) A developmental perspective, and its relevance for considering questions of adults attempting to remember things from the distant past; (b) Suggestibility, memory distortions, and the extent to which misleading information may degrade memory performance; and (c) Distinguishing between reality and fantasy, and monitoring the sources of information. The report concludes with a treatment of the importance of determining boundary conditions for some of the effects that are discussed.

A Framework for Examining Memory

Our ability to remember events involves the execution of a complex set of processes on information to which we are exposed. These cognitive activities are often discussed by cognitive and developmental psychologists in terms of the flow of information within the memory system. A consensus view in the field would hold that at a minimum, memory involves the encoding of information into some type of storage system from which it may be subsequently retrieved and reported. Discussions of memory thus turn on questions of the encoding, storage, and retrieval of information. More specifically, the key issues revolve around (a) the encoding processes that lead to the establishment of a trace or representation in storage; (b) the factors that influence the fate of these representations over time; and (c) the variables that affect the subsequent retrieval of the information represented in memory.

Consistent with this emphasis on encoding, storage, and retrieval, Loftus and Davies (1984) suggested that remembering was determined by such factors as the organization and quality of the initial representation of the event to be recalled, the

individual's prior knowledge of that event, the delay interval between storage and subsequent retrieval, the type of cue or prompt used to elicit recall, and the events that take place in the interval prior to recall testing. In a similar fashion, Ornstein and his colleagues (Ornstein, Larus, & Clubb 1991; see also Ornstein, in press) have discussed remembering in terms of the following four general themes about memory performance: (a) Not everything gets into memory; (b) What gets into memory may vary in strength; (c) The status of information in memory changes; and (d) Retrieval is not perfect (i.e., not all that endures gets retrieved).

This basic perspective permits us to characterize the contributions of a set of variables to different aspects of the flow of information. Thus, for example, an individual's prior knowledge can affect the encoding and storage of information, as well as its status during a delay interval, and its production and possible distortion at recall. Moreover, stress experienced during an event can possibly influence encoding and thus subsequent recall, whereas stress experienced during an interview can affect the retrievability of information. Finally, many strategies have effects that can be localized as well; for example, rehearsal may serve to maintain or increase the strength of traces while self-generated cueing may increase the likelihood of retrieval.

The four themes indicated above will be used to illustrate briefly the major influences on remembering (see also Ornstein, et al., 1991; Ornstein, in press):

Theme 1: Not Everything Gets into Memory

It is important to emphasize at the outset that not all "problems" of remembering are due to failures to retrieve stored information. Indeed, some experiences may not be remembered

because they were not entered into memory in the first place. The human cognitive system is quite limited and some incoming information must be selected for attention and further processing, whereas other information is essentially excluded. The literature indicates that this selectivity in attention occurs at the outset and that not everything that is experienced ends up in permanent memory (e.g., Broadbent, 1958; Hale & Hagen, 1973; Kahneman, 1973; Nickerson & Adams, 1979).

A number of factors influence the encoding of information in memory, perhaps the most important of which is having the necessary prior knowledge to understand and interpret what is being experienced. A great deal of research suggests that what an individual already knows, and the expectations that are created by this knowledge, can severely influence how he or she monitors the world, how events are interpreted, and hence, how incoming information is coded and placed in memory (Bjorklund, 1985; Chi & Ceci, 1987; Chi, 1978; Ornstein & Naus, 1985). Indeed, studies that examine the development of expertise in particular domains (e.g., chess, soccer) have repeatedly demonstrated that the highly organized and accessible knowledge of experts permits them to encode and remember domain-related information more effectively than novices (Chi, Glaser, & Farr, 1988; Schneider & Korkel, in press; Spilich, Vesonder, Chiesi, & Voss, 1979). Moreover, research on memory for text and narrative (Stein & Trabasso, 1982) indicates that the construction of a stable representation depends upon comprehension of the to-be-remembered materials. In terms of the theme of the APA Working Group, this raises intriguing questions, to which we return later, about the young children's understanding and encoding of various sexual events.

Theme 2: What Gets into Memory May Vary in Strength

Assuming that information about an experience is encoded and

entered into long-term memory, several factors may influence the strength and organization of the resulting trace in memory. Moreover, strong traces may be readily retrieved, even in response to minimal cues and prompts, whereas weak traces may be more difficult to recover and may require greater levels of "support." The research literature suggests several basic factors that have the potential to affect the strength of traces in memory: the amount of exposure to a particular event (both in terms of the length of exposure and the number of repetitions), the age of the individual, and the salience of the event (with highly salient experiences surviving longer than less salient ones).

Clearly, variations in the extent of exposure to an event sequence are most often associated with differences in the strength of the resulting trace in memory (Crowder, 1976). Thus, given a single "presentation" of a particular event to which an individual is paying attention, the longer the exposure to relevant features, the stronger the trace for those features. Similarly, increases in the number of repetitions of an event are associated with increases in trace strength. Moreover, with increases in age through young adulthood, there are corresponding changes in a variety of fundamental information processing skills (e.g., speed of encoding and retrieval), in the flexible use of a repertoire of strategies, and in accrued knowledge about the world (Kail, 1989; Schneider & Pressley, 1989). These basic developmental changes are associated with age-related differences in the efficiency of information acquisition. Other things being equal, older children and adults will learn more from comparable exposure to stimulus materials than will younger individuals (see, e.g., Brainerd, Kingma, & Howe, 1985). Thus, for any given constant exposure, there will most likely be age-related differences in the strength of the resulting trace in memory. For example, Pillemer, Picariello, and Pruett (1994) found that children who were 4 1/2 years old at the time of a fire alarm

could recall more about this event seven years later than could children who were only 3 1/2 years old. The superior retention of the children who were older was attributed to their greater original understanding of the causal nature of the event (e.g., that overheated popcorn set off a fire alarm; that urgency was required in vacating the building; that such things occur indoors and not on playgrounds, etc.).

Theme 3: The Status of Information in Memory Changes

Given that information about an event has been stored, the status of the memory trace can be altered during the course of the interval between the experience and a report of it (see Brainerd & Ornstein, 1991; Ornstein, Gordon, & Baker-Ward, 1992). The passage of time, as well as a variety of intervening experiences, can influence strongly the strength and organization of stored information. In this regard, it is quite possible that professional interactions with therapists may alter clients' reports of the events being discussed (see Lindsay & Read, 1994). Moreover, the impact of these encounters and discussions will likely increase as a function of increase in the delay interval, as the memory trace undergoes decay.

A number of factors have been shown to contribute to the changing nature of the representation in memory. Without reinstating events or experiences (e.g., through rehearsal, prompts, or visualizations), the strength of a memory trace decreases over time, and this trace decay combines with interference in the delay interval to make access to stored information and successful retrieval more difficult. Moreover, the initial memory traces of young children, typically weaker in comparison with those of older individuals (as discussed above) may undergo more rapid decay (see, e.g., Brainerd, Kingma, & Howe, 1985). Thus, even in the absence of potentially interfering experiences, the passage of time may be associated

with increasing difficulty in recall, especially for younger children. In addition, it is well known that pre-existing knowledge can influence the status of information already in memory (Bartlett, 1932; Chi & Ceci, 1987; Cofer, Chmielewski, & Brockway, 1976; Ross, 1989), just as it can affect the encoding of information, as discussed above. Indeed, especially over time, memory for events can be changed and interpreted more consistently in the light of existing knowledge. For example, Bartlett (1932) found that memory became more reconstructive (as opposed to reproductive) over time, leading him to argue that recall did not involve the activation of some fixed memory trace, but rather the schema-based reconstruction of an event.

In addition to the potential influences of time and prior knowledge, it must also be realized that many things that are experienced after an event can profoundly influence children's memory for that event. Thus, what happens in the delay interval(s) can have an important impact on the integrity of a memory trace. Moreover, some intervening experiences can act to strengthen memory, whereas others can interfere with performance. On the positive side, partial repetitions of an initial experience may function to reduce forgetting by the process of "reinstatement" (Campbell & Jaynes, 1966). Indeed, Campbell and Jaynes (1966) proposed reinstatement as a mechanism whereby learned behaviors that might normally be forgotten can be maintained in memory. Extrapolation from the basic learning literature suggests that opportunities to discuss a particular event may serve to maintain it in memory, although there is always the chance that aspects of the interaction may lead to some distortions in the account. This latter possibility leads to a consideration of the fact that not all intervening events serve to facilitate memory, and many, if not most, experiences can have a negative impact on retention.

The classic literature on retroactive interference in human

memory (see, e.g., Melton & Irwin, 1940; Postman & Underwood, 1973) indicates that subsequent experiences interfere with the recovery of information about earlier events. Moreover, there is currently a rich body of work on the mnemonic consequences of inconsistent postevent information and the suggestibility of memory. Many studies lead to the conclusion that exposure to inconsistent information can have a negative effect on reports of previously experienced events (e.g., Bowers & Berkerian, 1984; Christiaansen, Sweeney, & Ochalek, 1983; Loftus, 1979; Loftus & Palmer, 1974). Nonetheless, there are alternative views concerning the mechanisms that underlie these misinformation effects. Memory-based positions include the views that misleading information either (a) leads to a distortion in the memory representation for the original event (e.g., Loftus, 1979; Loftus & Loftus, 1980; Loftus, Miller, & Burns, 1978) or (b) serves to make the memory for the original information inaccessible (e.g., Berkerian & Bowers, 1983; Christiaansen & Ochalek, 1983) or (c) creates confusion between the original and misleading information concerning which was actually the initial event (e.g., Lindsay & Johnson, 1987). In contrast to these three positions, McCloskey and Zaragoza (e.g., 1985a, 1985b; Zaragoza, McCloskey, & Jamis, 1987) reject all claims that misleading information affects memory of the initial event, even though they do not question reports of suggestibility. At present, however, there is a growing consensus (see, e.g., Loftus & Hoffman, 1989; Tversky & Tuchin, 1989) that suggestibility effects may stem from both memory impairment and from the acceptance of misinformation.

Theme 4: Retrieval is Not Perfect

The final step in remembering involves the retrieval of information in storage. Not everything in memory can be retrieved all of the time. Putting aside the issue of whether the basic memory representations have been altered or not, it

still is the case that the contents of the memory system are not always retrievable. A variety of cognitive and social factors can have an impact on the subject's ability to gain access to previously-acquired information or even to attempt to do so. Moreover, under some conditions, information is "retrieved" that had not been entered into memory in the first place (see, e.g., Pynoos & Nader [1989]; Pettit, Fegan, & Howie [1990]).

The conditions of the underlying memory trace are obviously relevant to any discussion of the retrievability of stored information. Thus, for example, memory traces that have undergone considerable decay may be more difficult to access than traces that are stronger. Nonetheless, with appropriate conditions of contextual support, it may be possible for weaker traces to be retrieved (e.g., Folds, Footo, Guttentag, & Ornstein, 1990). Regardless of the status of the underlying memory trace, a general principle of the psychology of memory is that remembering is facilitated to the extent to which the conditions prevailing at the time of recall resemble those in place when the information was acquired (see, e.g., Godden & Baddeley, 1975). Also, the presentation of retrieval cues that serve to re-establish the encoding context likewise facilitates recall markedly (e.g., Tulving & Thomson, 1973). Note, however, that repeated testing (without additional input) may lead to spontaneous improvements in recall over repeated assessments (see, e.g., Brainerd, Kingma, & Howe, 1985; Howe & Brainerd, 1989).

It must also be recognized that what a subject "remembers" and reports may not always be retrieved from memory storage. Indeed, particularly after long delays when the details of events may have faded, the gaps may be filled in by constructive processes at retrieval. Thus, recall may be determined by the recovery of some stored information in combination with the logical construction of what might have taken place. Indeed,

recall at a delay may be more profitably viewed as a mixture of reproduction and reconstruction, with the latter process often being unconscious. It must also be recognized that under some conditions social forces (e.g., fear of embarrassment) may operate to lead an individual to elect not to report publicly what has been retrieved from memory.

Implications

The foregoing discussion has serious implications for the evaluation of any adult client's reports about events that are alleged to have taken place in childhood. Without even considering situations in which there may be lying or deliberate failure to disclose, the lack of a report of a sexual abuse history may arise for any of a number of reasons. For example, there may have been no abuse to report, or abuse did take place but it was never stored in memory (i.e., Theme 1), or information about an abuse was entered in memory but it was forgotten over time (Theme 3). Concerning the presence of a report that arises for the first time in therapy, again alternative interpretations are possible. It could be a genuine memory retrieval, but it could also be the product of suggestive influence, or the current retrieval context that is leading to an erroneous reconstruction of the past in the light of current knowledge and expectancies (i.e., Themes 3 & 4). All of these alternatives must be seriously considered, rather than the uncritical acceptance of any claim. Indeed, in the absence of external corroborative evidence, there is no principled means of distinguishing among these various alternatives.

A Developmental Perspective

A developmental orientation is implicit in any discussion of the flow of information within the memory system. As suggested, age-related differences in prior knowledge, in the strength and

organization of underlying representations, in the time course of forgetting, and in fundamental information processing skills all have important implications for what can be remembered. Such a developmental perspective, moreover, is essential for any serious discussion of adults' abilities to remember (or to recover memories) of events that may have been experienced when they were young children. In any treatment of this issue it is necessary to ask how the events in question were understood and encoded at the time, to inquire as to the extent to which they may have been discussed over the very long "delay interval," and to come to grips with retrieval problems that may arise from the dramatic cognitive changes that have taken place over the years. It is also necessary to acknowledge the pervasive problem of infantile amnesia, namely, the failure of adults to be able to gain access to memories from the first few years of life (Howe & Courage, 1993; Usher & Neiser, 1993).

Understanding and Encoding

At the most fundamental level, one cannot retrieve a memory of an event unless it was adequately encoded and stored in memory in the first place. As suggested above, prior knowledge about the events being experienced is essential for successful encoding and memory storage, and an implication of the literature is that a child who does not understand what is happening to him or her will have little basis for subsequently remembering what was experienced. For example, when the targets of abuse are young enough to have almost no knowledge of sexuality, they will be unable to interpret what has happened, and their memory may not be very accurate. Although children as young as 2- and 3-years-of-age will clearly understand that "something is wrong" if they experience physical pain associated with anal or vaginal penetration, when they experience "milder" forms of abuse (e.g., frequent "accidental" touching of private parts) they may not even be aware that they are being abused. For such a child, the

distinction between genital fondling and normal hygiene is blurred. Consequently, their memories may be quite different from children who are old enough to have learned that certain behaviors are viewed as inappropriate by society; for these latter children, the knowledge of abuse may increase its memorability (e.g., by providing an effective code for its initial storage and subsequent retrieval). In cases in which abuse is less apparent to the child, knowledge gained at a later date through sex education or conversations with friends may lead to an insight long after the event. In these situations, however, it must be recognized that the insight will result in a reinterpretation of what was originally placed in memory.

Developmental Changes and Cognitive Reorganization

Even when experiences are understood and encoded in memory, what is remembered later depends upon many factors. Age-related changes in the strength and organization of the underlying representations, as well as developmental differences in the time-course of forgetting and the level of support required for recall are all critical determinants of what can be remembered. The influence of these factors, moreover, is exacerbated as the "delay interval" is extended from days to months to years, which is obviously the case in discussions of adults' abilities to remember early experiences. Further, the dramatic cognitive reorganization that takes place with development from infancy and early childhood to the adult years is so complete that it becomes difficult to approach the task of remembering from the same cognitive perspective that was operative when the events to be remembered were originally experienced. Yet, a general developmental-cognitive principle states that the cognitive status of the individual at Time 1 sets the conditions of recovery at Time 2. A similar cognitive mechanism must be available at Time 2 in order to make contact with the trace as it was originally encoded at Time 1. It thus is unlikely that an

event that was encoded using an infant's or young child's perceptual-motor schemes can be retrieved using adult inferential schemes that were not available to the infant at the time of encoding.

Admittedly, there have been periodic suggestions that original perceptual-motor memory traces can later be retrieved and recoded using a more developmentally advanced interpretive framework than was available at the time of the original experience (Perris, Myers, & Clifton, 1990; Sugar, 1992), but such recoding seems to be a rare exception in the literature rather than the rule. One possible demonstration of this type of retrieval and recoding can be seen in Perris, et al.'s (1990) study of young children's memory for a series of animal pictures. Linguistic encoding of these pictures can be ruled out, given that the subjects were only 8 months of age when they initially saw these pictures. However, when memory was assessed ten months later, one of the children used a word to describe one of the previously-seen animals, and thus seemed to have engaged in verbal recoding. Nonetheless, for a number of reasons, not the least of which is the overwhelming absence of this phenomenon in the literature, it would seem imprudent to attach too much importance to the behavior of a single child.

A case study reported by Sugar (1992) raises the same possibility of retrieval and later recoding, even over very extended delay intervals. Sugar (1992) claimed that an adult client was able to retrieve the memory of a red liquid blotch that she had presumably observed on her floor when she had been 18 months old and that she could also interpret this blotch as the source of anxiety. (Later, this client's mother informed her that the red blotch was probably a miscarriage that she had at that time.) If this report were true, it would indicate that as an adult, the client gained access to a perceptual encoding many decades later and reinterpreted its meaning using adult

interpretative schemes that were unavailable to her at the time of the original experience. Such reports, though quite interesting, lack the type of validation that is needed before one can confidently accept them as evidence.

In general, based on an assessment of the total corpus of the developmental literature, there is scant evidence for the claim that an adult can gain access to the contents of children's perceptual encodings and can then recode them using more mature interpretive schemes, though such recodings may occur under special circumstances. Differences in the organization of adult and 2-year-old minds make it difficult for the former to gain access to the cognitive products of the latter. The same mental schemes used by an immature cognitive system to encode an event are needed to later retrieve the original encoding if the event. To repeat, it is hard to imagine how an event that requires semantic interpretation can be recalled in adulthood if the event was not semantically interpreted at the time of encoding. Thus, there is reason to be skeptical of claims that adults can retrieve memories of early events that are laden with current adult meaning. Indeed, under these conditions, it is highly likely that adults' reports of early experiences reflect the unconscious activation of current understanding and knowledge. To borrow from Ross's (1989) treatment of this difficult issue of adults attempting to remember earlier experiences, consider the following:

Herein lies a difficulty in any autobiographical sketch which purports to deal with one's mental development. It is a story of oneself in the past, read in the light of one's present self. There is much supplementary inference -- often erroneous inference -- wherein "must have been" masquerades as "was so."

-- Lloyd Morgan (1930. p. 237)

and

It is all too common for caterpillars to become butterflies and then to maintain that in their youth they had been little butterflies. Maturation makes liars of us all.

-- Valiant (1977, p. 197)

Infantile Amnesia

The developmental analysis presented here relates directly to the well-documented phenomenon of infantile or childhood amnesia, that is, the general "poverty" of adult recollections of the first several years of life. Freud identified the phenomenon in some of his earliest writings: "What I have in mind is the peculiar amnesia which, ...hides the earliest beginnings of the childhood up to their sixth or eighth year." (1905/1953, p. 174). Subsequent investigators would say that Freud's suggestion about the sixth year misses the mark. Indeed, most studies of childhood amnesia suggest that the earliest recollections of adults are not generally of experiences taking place before the age of about three or four (Kihlstrom & Harackiewicz, 1982; Pillemer & White, 1989). For example, Winograd & Killinger (1983) report that few of their subjects who were younger than three at the time of the Kennedy assassination were able to recall any information about where they were when they heard the news. In contrast, Usher and Neisser (1993) found that some events, such as the birth of a sibling and a planned hospitalization, might be remembered later if they occurred at age two. However, it must be kept in mind that the bits and pieces of such memories that were obtained by Usher and Neisser (1993) may not be indicative of genuine episodic memory. An alternative hypothesis is that these apparent memories are the result of educated guesses, general knowledge of what must have been, or external information acquired after the age of two

(Loftus, 1993b).

Although our understanding of infantile amnesia is far from complete, a number of the developmental factors discussed above are at the core of current accounts of the phenomenon. Thus, for example, the nature of the initial encoding of an experience and the "fate" of the representation over time are of fundamental relevance for accounts of later retrieval and remembering. Certainly, the dramatic changes in mental organization that occur with development -- contributing to difficulties with the subsequent retrievability of earlier encodings -- must be considered in discussions of the problems faced by adults when trying to remember the distant past. Other accounts of infantile amnesia revolve around the limited nature of young children's linguistic and cognitive skills (see, e.g., Fivush, Haden & Adam, 1995; Nelson, 1993) and the absence of a well-defined sense of self (Howe & Courage, 1993). Doubtless, all of these factors contribute to the difficulties faced by adults when trying to recollect early experiences. Moreover, the pervasive nature of infantile amnesia contributes to the skepticism felt by many students of memory when confronted with claims of events taking place in the early years of life.

Suggestibility and Distortions of Memory

A central feature of the framework introduced above is that memory representations are not static, but rather are subject to considerable change over time. Details may be lost and information in storage may be modified so as to increase its consistency vis a vis underlying knowledge. Moreover, for a variety of reasons, exposure to post-event information, either prior to retrieval or at the time of questioning, has the potential to result in changes in the contents of memory, or at least in subjects' reports of what is remembered. At the extreme, it is possible for an individual to "remember" events

that might not have been experienced, but might have been read about or discussed with others (including therapists). Even the generation of more interpretive detail than was previously reported about an experienced event can be viewed, at least in part, as stemming from post-event interviewing experiences. Thus, many factors can lead to a distortion of one's memory for the past. In this section, we provide an overview of research on suggestibility that documents some of the ways in which these distortions can arise.

The Influence of Post-Event Misleading Information

Although there has been considerable interest in suggestibility for more than 100 years (Binet, 1900; Small, 1986; Stern, 1910), sustained research on memory distortions began in the 1970s (Loftus & Palmer, 1974; Loftus, 1979). The recent work begins with a simple question: What happens when people experience an event, say a crime or accident, and are later exposed to inconsistent or misleading information about that event? At one level, the answer to this question is clear: the new information can influence recollections of the original event. Indeed, after the receipt of new information that is misleading in some way, people often make errors when they report what they saw. As discussed above in the treatment of the framework for examining memory, the new, post-event information can sometimes become incorporated into the recollection, can sometimes interfere with the retrieval of the original memory trace, can sometimes create source-monitoring confusion, and can sometimes influence subjects' reports via social as opposed to mnemonic mechanisms. Moreover, the impact of new information about an event can be quite insidious because witnesses are often not able to detect its influence. Understanding the mechanisms by which revised data about a witnessed event come to be accepted is a central goal of current research.

A great deal of research illustrating that memory can become skewed when people assimilate new data makes use of a simple variation on the traditional retroactive interference paradigm. Participants first witness a complex event, such as a simulated violent crime or an automobile accident. Subsequently, half of the subjects receive new misleading information about the event, whereas the others do not get any misinformation. Finally, all participants attempt to recall the original event. Consider, for example, a study in which participants saw a simulated traffic accident and then received one of two types of written information about the accident. Some subjects were misled about what they had seen (e.g., a stop sign was referred to as a yield sign), whereas the others did not receive misleading information. Later, when asked whether they originally saw a stop or a yield sign, those participants who had been given the incorrect information (yield sign) tended to choose it on the recognition test (Loftus, 1979).

By now, this basic finding has been replicated in a wide range of experiments involving a broad variety of materials (see Loftus, 1982), with the result being that the memory performance of subjects who were exposed to misleading post-event information was routinely inferior to that of individuals who had not been presented with such information. Indeed, people have recalled nonexistent broken glass and tape recorders, a clean-shaven man as having a mustache, straight hair as curly, stop signs as yield signs, hammers as screwdrivers, and even something as large and conspicuous as a barn in a bucolic scene that contained no buildings at all. In short, misleading post-event information can alter a person's recollection in a powerful, even predictable, manner. In some experiments, moreover, the deficits in recollection following receipt of misinformation have been dramatic, with performance differences as large as 30 or 40% being observed.

The decrement in report accuracy arising after receipt of misinformation is often referred to as the "Misinformation Effect" (Loftus & Hoffman, 1989). Four questions about the misinformation effect have occupied the attention of researchers: (a) When are people particularly susceptible to the damaging influence of misleading information, and conversely when are people particularly resistant? This is the issue of "contextual variables" associated with memory distortion. (b) What groups of individuals are particularly prone to having their recollections be modified, and conversely what groups are resistant? This is the issue of "individual difference" variables (e.g., IQ, personality) associated with memory distortion. (c) Does misinformation actually impair a person's ability to remember event details? Put another way, what happens to the original event memory after exposure to misinformation? This is the issue of the fate of actual memory traces. (d) Do people who claim to have seen misinformation items genuinely believe they have seen those items? This is the issue of "cognitive vs. social mechanisms" in reporting errors and relates to the question of "false beliefs" vs. deliberate confabulations.

Developmental Changes in Suggestibility

Recent research suggests that young children may be disproportionately vulnerable to suggestive influences (see Ceci & Bruck, 1993, for a review). For example, studies of the misinformation effect with children of different ages (e.g., Ceci, Ross, & Toglia, 1987; see also Ceci & Bruck, 1993) indicate that preschoolers are usually more susceptible to the influences of misleading post-event information than are older children and adults. Moreover, in an extension of this paradigm to a pediatric examination setting in which an inoculation was administered, Bruck, Ceci, Francoeur, and Barr (1995) found that 5-year-olds' reports could be influenced by the provision of misleading post-event suggestions. Feedback that was pain-

affirming (i.e., that the shot hurt), pain-denying (i.e., that the shot did not hurt), or neutral did not affect the children's reports after one week of the amount of pain experienced or the degree to which they had cried. However, pain-affirming and pain-neutral feedback, as well as other misleading information about certain actions of the physician and an assistant that were given approximately a year after the check-up, did have a substantial effect on the children's reports. Most importantly, in this study misleading information influenced children's delayed accounts about salient actions that involved their bodies under stressful circumstances. After a one year delay and four suggestive interviews, 32% of the children who been erroneously told that the doctor was a woman reported that he was indeed a woman.

Research with other paradigms documents further the vulnerability of young children to suggestion. Recent work shows that merely repeating erroneous suggestions over time can have a massive influence on what children report. In a series of studies Ceci and his colleagues (Ceci, 1993; Ceci, Huffman, Smith, & Loftus, 1994) questioned parents about events that had and had not happened to their children within the previous 12 months. The children were then interviewed individually and asked to make judgments about (individually-determined) real and fictitious events. For each child, the events were read aloud along with instructions to "think real hard about each one of them ... try to remember if it really happened." The participants were asked for these judgments on seven to 10 separate occasions, with the final assessment taking place 10 weeks after the first session. The findings indicated that the preschool subjects almost always recalled the true events correctly but that they were inaccurate between 25 and 44% of the time in their judgments of the false events. Moreover, in their final narratives, the children frequently described the false events with vivid detail, so much so that professionals (e.g.,

clinical and developmental psychologists) could not differentiate accurately between descriptions of the experienced and false events.

In a follow-up study, Ceci, Loftus, Leichtman, and Bruck (1994) interviewed children repeatedly but also told them that they actually had experienced the fictitious events. They found that under these conditions there was a significant increase in the children's reports that false events had actually been experienced previously. Thus, even when subjects correctly refused to accept an erroneous suggestion as an actual memory the first time it was presented, they often came to accept it as real the more often they were asked to imagine it. Not all erroneous suggestions, however, are likely to be equally potent in this regard. Specifically, positive events such as going on a hot air balloon ride were nearly twice as likely to result in false reports as negative events such as falling off a tricycle and getting stitches in the leg. However, even negative events were associated with significant levels of false reporting. The idea that certain types of events are more prone to report distortion than others has been extended by Ornstein and his colleagues. When 3-, 5-, and 7-year-olds were interviewed by Baker-Ward, Gordon, Ornstein, Larus, and Clubb (1993) about a visit to the doctor and questioned about activities not included in their check-ups, plausible suggestions (e.g., "Did the doctor give you a shot?" when no inoculation had been administered) were more believable than silly ones (e.g., "Did the nurse lick your knee?").

Can traumatic memories be changed?

In contrast to this account of the malleability of memory, there are some who argue that traumatic events leave some sort of indelible fixation in mind. For example, Terr (1988, p. 103) indicates that "traumatic events create lasting visual images ...

burned-in visual impressions", and Kantor (1980, p. 163) states that such "...memory imprints are indelible, they do not erase -- a therapy that tries to alter them will be uneconomical." These assertions, however, fail to recognize evidence that memories of even life's most traumatic experiences can be quite malleable. For example, Harsch and Neisser (1989; see also Neisser & Harsch, 1992) examined adults' recollections of how they heard the news of the 1986 explosion of the space shuttle Challenger. The subjects were questioned on the morning after the explosion, and again nearly three years later. Most individuals described their memories as "vivid," but none of them was entirely correct and over a third were "wildly inaccurate." One subject, for example, was on the telephone having a business discussion when her best friend interrupted the call with the news. Later she would remember that she heard the news in class, and at first thought it was a joke. She later walked into a TV lounge and saw the news, and then reacted to the disaster. Warren and Swartwood (1992) research on children's recollections of the Challenger disaster documents similar distortions in memory.

Another study demonstrates the malleability of memory for a serious life and death situation (Abhold, 1992). The subjects were individuals who had attended an important high-school football game at which a player on the field went into cardiac arrest. Paramedics tried to resuscitate the player, and apparently failed. The audience reactions ranged from complete silence, to sobbing, to screaming. (Ultimately, fortunately, the player was revived at the hospital). Six years later, many of these individuals were interviewed and errors of recollection were found to be common. Moreover, when exposed to misleading information about this life and death event, many individuals absorbed the misinformation into their recollections. For example, after receiving a false suggestion over a quarter of the subjects were persuaded that they had seen blood on the player's jersey.

But what if the traumatic event was personally experienced rather than simply observed? It is clear that even personally experienced events that were traumatic can be altered in memory. An example is seen in a study of concentration camp survivors who, by definition, had witnessed and experienced many horrible events: One person was beaten so badly he was unable to walk for several days. When interviewed 40 years later, he only remembered receiving an occasional kick (Wagenaar & Groeneweg, 1990). These and other studies show that even very traumatic memories can be modified in memory. Elements can be added or to the memory representation or deleted from it, thus raising serious questions about the claim that these types of traumatic experiences elements are impervious to change.

Is it possible to "inject" a complete memory for something that never happened?

A growing literature now suggests that it is relatively easy to create pseudomemories, at least in some individuals. Recent studies, for example, suggest that the use of hypnosis can lead to the establishment of pseudomemories for events that never happened. In one study, Laurence and Perry (1983) instructed subjects to "relive" a recent night while a suggestion was implanted that they had heard some loud noises and had awakened. Nearly half the participants accepted the suggestion and stated after hypnosis that the suggested event had actually taken place. In another investigation, Spanos, Menary, Gabora, Dubreuil, and Dewhirsts (1991) gave hypnotic regression suggestions to subjects and convinced them to develop past life identities. Under these conditions, some of the participants "remembered" that they had been abused as children, guided by the assumption that childhood abuse was quite common in that past life.

In another study involving hypnosis, Laurence and Perry (1983) found that a sizeable percentage of the participants

accepted an hypnotic suggestion concerning noises that had presumably been heard one night. However, it turns out that hypnosis is not necessary for the establishment of false or pseudomemories. Indeed, in an important follow-up study, Weekes, Lynn, Green, and Brentar (1992) found that simply inducing subjects to imagine and describe the loud noises resulted in later "memories" for noises that had never occurred. In addition, more complex false memories have recently been created without the use of hypnotic procedures. For example, Loftus and Coan (see Loftus & Ketcham, 1994, Chapter 7) suggested to five individuals that they had been lost for an extended time when they were about the age of five. With the help of some prodding from a trusted family member (a mother, an older brother, an aunt), these individuals (ages 8 to 42) became convinced that they had been lost. For example, 14 year old Chris received the suggestion from his older brother that he had been lost in the University City shopping mall in Spokane, Washington. After some time, Chris was supposedly rescued by an elderly man and reunited with his mother and brother. Ultimately, Chris would expand upon the initial suggestive seeds and come to "remember" his scared feelings, conversations with his mother, and the description of the man who had supposedly rescued him.

More recently, Loftus and Pickrell (1995) tried to convince 24 individuals (ages 18 to 53) that they had been lost for an extended period of time, that they had been crying or scared, and that they had been eventually rescued by an elderly person and reunited with their families. The subjects thought that they were participating in a study of the "the kinds of things you may be able to remember from your childhood." They were given a brief description of four events (three true and one false "lost" event) that supposedly occurred while the subject and family members were together. These research participants were then asked to write about these events in detail and were interviewed about the events on two subsequent occasions, after delays of one

and two weeks. The results indicated that of the 24 subjects, 75% said that they couldn't remember the false event. The remaining participants, however, developed a complete or partial false memory for the suggested experience. These false memories were described in fewer words and were rated as less clear than the true memories. Nonetheless, despite these differences between the true and false memories, it was still the case that sometimes the false memories were described in quite a bit of detail and were embraced with a fair degree of confidence.

A question arises as to whether it would be possible to implant a false memory of something that is far less common in human experience than being lost. In a recent study, Hyman and his colleagues (1995), asked parents of college students to supply personal events that occurred to their child before the age of 10. These students were then asked to remember some "real" events and also to remember something that never took place, e.g., an overnight hospitalization for a high fever with a possible ear infection. Hyman, et al. found that no subjects "recalled" the false events during the first interview, but in a second interview that took place some one to seven days later, 20% of the participants "remembered" something about these experiences. In another study, Hyman and his colleagues created false memories of having gone to a family wedding and accidentally knocking over the punchbowl and spilling punch on the parents of the bride. Repeated interviews resulted in more detailed descriptions of both actual and false memories, with up to a quarter of the subjects assenting to the false memories. These empirical demonstrations support the feasibility, with sufficient suggestion, of inducing entire false memories, including those of relatively uncommon experiences.

Source Monitoring

As the above discussions of memory and suggestibility imply,

accurate remembering involves the ability to make distinctions among various types of information in memory. For example, when attempting to remember a particular instance of a frequently-occurring activity (e.g., a visit to the doctor for a routine check-up), it is essential to differentiate between memory for the specified instance on the one hand, and generic knowledge of the class of activities, on the other hand. It is also necessary to distinguish between the "target" or to-be-remembered information and other information to which one has been exposed, and the treatment of suggestibility illustrates how difficult this differentiation process can be. Indeed, one interpretation of the basic misinformation effect is that it reflects a failure to monitor accurately the sources of available information. Support for the source monitoring interpretation comes from the work of Johnson, Hashtroudi, & Lindsay, (1993) who have shown that it is possible for subjects to be confused about which of two (or more) competing memory representations corresponds to a target experience. Other demonstrations of suggestibility clearly reflect a failure to distinguish accurately between reality and imagination or fantasy. In this section, we review these interrelated topics.

Distinguishing Between Reality and Fantasy

Suppose that a child is asked to perform certain actions (e.g., touch her ear), but merely to imagine carrying out other actions (e.g., touch her nose). Later, she is asked to decide which actions had been actually performed and which had been only imagined. As implied above, this task requires the ability to monitor the multiple origins or sources of memory. Sometimes, as in this example, it is essential to discriminate between an external source (doing something) and an internal source (thinking about or imagining doing something); at other times, it is necessary to distinguish between two internal sources (e.g., memories resulting from what one said versus what one thought) or

between two external sources (e.g., memories of what was said or done by one person versus what was said or done by another). Source monitoring makes use of "typical" differences between different sources of memories. For example, compared to imagined events, observations of actual events typically tend to be more vivid and have less information about cognitive operations (e.g., inferences). In addition, real events tend to be retrieved more easily (see Johnson, Hashtroudi, & Lindsay, 1993; Lindsay & Read, 1994).

The ability to distinguish among various sources of memory is quite important, not only in laboratory tests but also in everyday life. Source monitoring contributes to the ability to exert control over our beliefs, and, as suggested above, failure to attribute the correct source to a memory can result in a false belief:

"....if you remember that the source of a "fact" was a supermarket tabloid such as the National Enquirer and not Consumer Reports, you have information that is important for evaluating the veridicality of the purported fact. Perhaps most important, the subjective experience of autobiographical recollection -- the feeling of remembering a specific experience in one's own life -- depends on source attributions made on the basis of certain phenomenal qualities of remembered experience." (Johnson, Hashtroudi, & Lindsay, 1993, p. 3)

An important, though still relatively unexplored cognitive variable, is the extent to which suggestibility results from an incapacity to distinguish between the various sources of memory (imagined versus perceived, internal versus external). Freud's view that the claims of childhood sexual abuse by many of his female adult patients were false and merely reflected their inability as children to distinguish reality from fantasy has

never received persuasive empirical support. Moreover, many have argued that it is invalid, a reflection of a prior era's refusal to accept the reality of intrafamilial sexual abuse (e.g., Mason, 1984). Freud believed that it was possible, at least in principle, to retrieve his patients' original memories, by removal of symbolic-fantasy transformations that "blockaded" them from consciousness (Freud, 1933). Piaget (1926), however, was less optimistic that memories of early experiences could be separated from fantasies, commenting that "The child's mind is full of these 'ludistic' (fantasy play) tendencies up to the age of seven or eight, which means before that age it is very difficult for him to distinguish the truth" (p. 34).

Outside of the classical work on animism by Piagetians, the topic of reality monitoring did not receive empirical scrutiny until the 1970s, when a number of studies converged on the view that young children were, in fact, able to reliably distinguish reality and fantasy (Flavell, Flavell, & Green, 1987; Morrison & Gardner, 1978; Taylor & Howell, 1973). Morrison and Gardner (1978) reported the results of a "triad sorting task" in which 5- to 12-year-olds were instructed to put two fantasy figures (e.g., dragon and elf) together and to exclude one that is real (e.g., frog). They found that even 5-year-olds were quite aware of this distinction, although accuracy did increase with age, as did explicit fantasy-based explanations (i.e., stating that "they are both fake"). Similarly, the 5-year-old children were quite adept at sorting pictures into piles of real and pretend figures, although they made more errors than the 12-year-olds.

Harris, Brown, Marriott, Whittall, and Harmer's (1991) findings modified these conclusions in important ways. As in the above studies, preschool children showed a firm grasp of the distinction between fantasy and reality, with most correctly stating that imagined ghosts, monsters, and witches were not real. However, when the children were told to imagine a pretend

character that was sitting in a box, over a period of time, many of them began to act as though the pretend character was real. For example, half of the children in one study were told that the pretend character was a rabbit and half were told that it was a monster. After this instruction, all the children agreed that it was a pretend character and that the box was empty. The experimenter then said she had to leave the room for a few minutes, but a third of the children who had been told that there was a pretend monster in the box would simply not let her leave the room! None of the other children acted this way. Upon the experimenter's return, almost half of the children in both age groups said they wondered if perhaps there was an imaginary creature in the box. Further questioning uncovered some magical and unrealistic thinking. Although almost all of the children admitted to pretense before the experimenter's departure, 25% of the children now thought that pretend creatures could become real. These data are illuminating by showing the fragile distinctions of children's fantasy-reality boundaries, as measured in earlier studies. When situations and questioning become more intense, children appear to easily give up distinctions between what is real and what is only imagined. In this study, despite the fact that the children were repeatedly assured that the creatures were imagined, it seems that a procedure that was only mildly suggestive succeeded in breaking down their shaky differentiations within a short period of time.

Distinguishing Between Perception and Imagination

Consistent with the young child's fragile ability to distinguish between concrete fantasy and reality figures, there is some evidence that they have difficulty differentiating between what they experienced through perception and what they only imagined they experienced. Marcia Johnson and her colleagues have been at the forefront of this area of research for a decade (see Johnson, 1991 for review; Foley & Johnson,

1985; Lindsay, Johnson, & Kwon, 1991; Suengas & Johnson, 1988). In the most embellished model, called MEM, for "Multiple-Entry Modular Memory" system, recollection is based on the interplay of two subsystems, one that is the repository of perceptual processing and the other that contains the contents of reflective processing. The perceptual system records and stores the contents of perceptual processes such as seeing and hearing, while the reflective system records psychologically generated information such as imagining, thinking, and speculating. Without going into the theoretical nuances of the various MEM subsystems, suffice it to say that developmental differences about reality-fantasy monitoring could reflect the earlier functional capability of the perceptual subsystems, and the later development of the reflective systems. At issue is whether these subsystems are developmentally invariant or whether they unfold over a prolonged period of development (Lindsay, Johnson, & Kwon, 1991).

If subjects of various ages are asked to judge whether they had actually said a word, or had imagined saying it, 6-year-olds have more difficulty discriminating between these two possible sources of their memories than do 9-year-olds and adults (e.g., Foley, Johnson, & Raye, 1983). The reason offered for younger children's greater difficulty in distinguishing between memories of their actual behaviors and their self-generated fantasies is that the cues involved in differentiating between actual versus imagined events are not well developed before late childhood. However, children do not experience difficulty when asked to judge whether they said (or did) something versus whether it was said (or done) by someone else, prompting Foley and her colleagues to conclude that young children can differentiate among multiple sources of their memories, except in the situation in which the two sources are both self-generated (Foley, Santini, & Sopasakis, in press). Thus, compared with older children and adults, preschoolers are more error-prone at distinguishing

between real versus imagined acts or words when they both concern themselves, but they are no worse than adults when it comes to judging whether an act (or words) was performed (or spoken) by themselves versus someone else.

Recently, however, Foley, Johnson, and Raye's (1983) interpretation has been called into question, and a more general source monitoring framework has been invoked to account for preschool children's source confusions. According to this more recent account, young children find it especially difficult to separate sources of information that are perceptually and semantically similar. In one study (Lindsay, Johnson, & Kwon, 1991, Experiment 3), for example, 7- and 10-year-olds and adults were shown a videotape of a set of actions and instructed to either perform these actions themselves (e.g., "Please touch your nose.") or to watch others perform them (e.g., "Please watch the girl touch her nose."), or to imagine themselves carrying the actions (e.g., "Please imagine touching your nose.") or to imagine another individual performing them (e.g., "Please imagine that the girl is touching her nose."). Following this procedure, the subjects were given a surprise memory test to determine whether they remembered which acts they performed, imagined, or watched. Compared to adults, children found it more difficult to distinguish between imagined and actual actions if the same actor was involved in both kinds of actions (e.g., watching versus imagining the girl touch her nose). In contrast, young children performed as well as adults when the sources of information were relatively discriminable (self versus girl). Thus, whereas all age groups can reliably distinguish between the actions of two perceptually or semantically distinct actors, a developmental trend can be seen in the discrimination between actual and imagined sources of memories that are perceptually or semantically similar.

Suggestibility and Source Monitoring

Source monitoring studies suggest that children can be susceptible to a wide range of confusions, some of which involve confusing actual events with suggested events when these are both perceptually and semantically similar (e.g., performed by same-sex, same-age individuals, or similarly-dressed individuals). Further, it is fairly well established that asking children and adults to mentally rehearse details or emotions from fictitious events can lead to later source amnesia; subjects of all ages appear to confuse rehearsed false events with real events (Ceci, et al., 1994a, 1994b; Suengas & Johnson, 1988). For example, Suengas and Johnson (1988) found that adults who were asked to imagine various details of fictitious events (e.g., having tea and cookies with someone in a certain room) rated their confidence that these were actual memories more similarly to real events that had not been repeatedly rehearsed. Rehearsing fictitious events' perceptual details made them appear as real as non-rehearsed actual events.

As discussed above in the section on suggestibility, in a developmental extension of this phenomenon, Ceci, et al. (1994b) found that repeatedly asking preschoolers to visualize non-events made them more likely to later insist that they actually experienced those events. For example, children were asked repeatedly whether they had ever gotten their hand caught in a mousetrap and had to go to the hospital to get it removed. The first several times that this was, the subjects usually accurately stated that this never happened to them. However, after having been asked about this non-event weekly for 10-12 weeks, 20-40% of preschoolers claimed that they did recall it happening to them. In a related study where children were told about, rather than asked about, nonexperienced events such as falling off a bicycle and having to get stitches in the leg, between 40% and 60% of preschoolers stated that they did remember it happening (Ceci, et al., 1994b). Thus, like adults, children are susceptible to source amnesia in that they can lose the

spatio-temporal information needed to "tag" the sources of their memories. This results, moreover, in a propensity to confuse imagined and real imagined experiences because the information about an event that is contained in the memory representation has lost its context, or "time and place." As a consequence, memories may appear to be familiar, but lacking the basis for this familiarity, they can be confused with other concepts.

Implications

The reader might ask why it is important that we assay this literature? There are several reasons. In some of the cases of "repressed memory," the clients themselves are young children (Ceci & Bruck, 1995). Moreover, in the therapeutic context with adults, an aim is to recall childhood experiences, and if these experiences have been contaminated in ways documented here, then the memory reports themselves are also contaminated. Further, the same mechanisms described in these studies could be played out in adult therapy, as, for example, with repeated visually guided imagery inductions (see Lindsay & Read, 1994).

Although this brief review does not include many cognitive variables that could conceivably lead to developmental differences in suggestibility (e.g., age-related changes in inferential skills, abstract reasoning abilities, perspective-taking, and metacognitive skills), it does describe those that have received the most attention of researchers in the field of suggestibility. Taken together, this research indicates that there are non-trivial sources of suggestion that can lead children and adults to mistakenly believe that they experienced events that they either merely imagined or had suggested to them by an interviewer. Although such forms of suggestibility may be more common when the memory is a peripheral or non-salient one, it is also the case they can be found even for highly salient, central events such as injuries, genital exams, and inoculations.

Summary, Boundary Conditions, and Caveats

A century of systematic investigation has led to a substantial body of empirical and theoretical knowledge about memory and its development. Scientists have amassed considerable data on the processes that are associated with both beneficial and baleful mnemonic consequences. In recent years, moreover, there has been an awareness of the contextual nature of these processes, and we now appreciate that they work more or less effectively as a function of aspects of the prevalent conditions at the time of encoding, storage, retrieval, and reporting. Thus, for example, impressions of children's memory performance may vary substantially as a function of the characteristics of the event that is being remembered and the conditions of assessment (e.g., Ornstein, Baker-Ward, & Naus, 1988; Ornstein, et al., 1991). Although this view of context specificity is completely consistent with the framework for analyzing the flow of information within the memory system outlined above, we nonetheless recognize the need to identify factors that may be responsible for variability in remembering and suggestibility. In this final section, we discuss the operation of some of these factors and, based on our analysis of the literature, express concerns about various types of "memory work" in psychotherapy.

Generalizability and Boundary Conditions

How generalizable is the integrative account of memory and suggestibility that we have presented? What are the boundary conditions that are suggested by the research on which our overview has been based? We recognize that to some readers, the applicability of the research findings reviewed in this report are limited to the rarefied atmosphere of the experimental laboratory. For example, it is alleged that this body of work has little relevance in the real world of trauma and abuse memories in which the rememberer is a victim/participant in an

aversive event that may involve loss of control, personal embarrassment, and caregiver betrayal. In this regard, numerous writers have expressed the view that the latter types of events result in memories that are impervious to the types of alteration studied by memory researchers. Thus, to choose one example:

Traumatic memory seems to bear little resemblance to the tepid, anemic, and rather desiccated experimental laboratory paradigms of the memory researchers, and might be expected to leave a much deeper imprint. (Wylie, 1993, p. 43).

Our response to arguments such as this is to indicate clearly that the basic principles of memory are indeed very relevant for accounts of children and adults' recall of stressful and traumatic experiences. Of course, the contextual view of remembering presented here would lead us to expect that memory and suggestibility might vary from event to event, but this variation should be driven by factors known to influence information processing, such as the subject's attentional deployment and prior knowledge that we have discussed.

Let us consider children's memory for stressful experiences. Admittedly, it is easy to locate in the literature studies claiming that even young children are quite resistant to suggestion about such traumatic, abuse-related events (e.g., Goodman & Clarke-Stewart, 1991; Saywitz, Goodman, Nicholas, & Moan, 1991), with some researchers claiming that age differences in suggestibility are evident principally with nonparticipating children (i.e., bystanders as opposed to children who were the recipients of some action), and mostly on non-sexual questions (Rudy & Goodman, 1991). To be sure, it may be the case that personal, salient events are harder to alter than neutral, sanitized ones, and there is some evidence that the stronger the trace strength, the more difficult it is to interfere with the memory (Pezdek & Roe, 1994). Based on this research we would

posit that events that are traumatic may be harder to alter than neutral ones. However, it would be misleading to imply that this means that traumatic events are impervious to alteration, because there is a large literature that demonstrates that this is not the case (some of which has been reviewed here: e.g., Bruck, et al., 1995; Wagenaar & Groenweg, 1990; Wright, 1994). Indeed, a careful reading of the scientific literature suggests that all types of memories are susceptible to alteration as a result of suggestive techniques such as imagery inductions, leading questions, source confusions, and stereotype inductions. Moreover, there are reliable age differences in suggestibility, even for events that are stressful, painful, and potentially sexual, including ones in which the child is a participant.

Suggestibility: Mechanisms and Individual Differences

As indicated earlier, researchers have argued over the most accurate depiction of suggestibility, specifically, whether false postevent suggestions from an interviewer actually alter a subject's memory (e.g., trace overwrite, inculcation of competing sources, creation of retrieval competition) or whether such suggestions merely alter a subject's willingness to report what they remember (see Loftus, 1985; McCloskey & Zaragoza, 1985a, 1985b). Based on the available evidence, it appears that at least some of the decrement in accuracy that is observed in the aftermath of suggestive questioning is the result of genuine cognitive mechanisms, such as memory trace alteration and source confusions, whereas some of it is due to social (non-cognitive) reasons, (e.g., deferring to an interviewer because of the presumption that his or her memory for the experience might be more accurate). So, suggestibility is a multi-pronged concept that includes both cognitive and social mechanisms (see Ceci & Bruck, 1993).

Despite the tremendous progress made on the nature and

developmental course of suggestibility, we know far less about the characteristics that lead one person to be more susceptible to erroneous suggestions than another. Variables that have received attention in the literature include verbal IQ, personality, parenting style, and theory of mind. Although these factors may ultimately prove important in accounting for individual differences in the vulnerability to false suggestions, at present they have not been associated with large differences in performance.

Conclusions and Concerns

Suggestibility effects can and have been found for all types of events, including ones that involve a person's body, that are sexual and painful, and entail loss of control. Perhaps it is somewhat harder to alter a report about event when it is salient, persistent, painful, sexual, and well-understood, and we certainly need additional research to document the extent to which this is the case. Moreover, as indicated above, we still are a long way from predicting which individuals are most prone to the deleterious influence of suggestive techniques. Further, the existing evidence leads us to conclude that at least part of the false reporting that has been described in the scientific literature is the result of cognitive mechanisms, but part of it also reflects the operation of social factors. Finally, the available evidence makes clear that individuals who have been exposed to repeated suggestive techniques over long periods of time sometime provide highly detailed and coherent narratives that happen to be false. When this occurs, it is quite difficult for professionals to detect the falsehood in the absence of external corroboration.

For all of these reasons, we have grave concerns about the "memory work" methods for retrieving abuse memories that are advocated by some clinicians. These include guided imagery,

sexualized dream interpretation, body work, hypnotic regression, and more. One source for such recommended tactics is a popular book on repressed memories by Fredrickson (1992). This book has been referred to as "a textbook for memory invention" and a "lethal" one at that (Pendergrast, 1995). The book encourages women to believe that they were abused as infants by several perpetrators. "How old do you think you were when you were first abused? Write down the very first number that pops into your head, no matter how improbable it seems to you...Does it seem too young to be true? I assure you it is not." (pp. 59-66). The "imagistic" work advocated by Frederickson is especially problematic. Under the guidance of a therapist, the patient is supposed to close her eyes, relax, breath deeply, and try to picture some kind of abuse. "If nothing surfaces, wait and then give your best guess in answer to the questions ... If you feel resistance or skepticism, try to go past it." Afterward, the therapist is supposed to follow up with questions that can fill in any blanks (pp. 109-112). The prescriptions go on to tell readers that this is an exercise in imagination, in picturing what might have happened. Ultimately, sadly, such imaginations can turn into a tragic reality, providing a real world analogue for the kinds of pseudomemories created in the experimental research that we have reviewed.

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