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Trauma, memory, and suggestibility in children

MITCHELL L. EISEN AND GAIL S. GOODMAN
California State University, Los Angeles; and University of California, Davis

Abstract

In this review we examine factors hypothesized to affect children's memory for traumatic events. Theoretical ideas on the processing and remembering of trauma are presented and critiqued. We review research on how psychopathology may generally influence and dissociation and posttraumatic stress disorder may specifically influence children's memory and suggestibility. The special case of child maltreatment is addressed as it relates to interviewing children about traumatic life experiences. Throughout we draw on current developmental, cognitive, social, and clinical theory and research. The review covers a controversial and exciting area of psychological inquiry.

Interest in how trauma affects children's memory and suggestibility has soared in recent years, propelled by concerns about false reports of child sexual abuse. Fundamental to these concerns are questions about the accuracy and suggestibility of children's memory for highly stressful and traumatic events. However, the question of how trauma affects memory extends beyond the scope of the child-witness literature, and hinges in part on a growing controversy over how traumatic memories are encoded, retained, and retrieved. One important issue is whether traumatic memories require special explanatory mechanisms (Brown, 1995). Several theorists have proposed that traumatic memories are processed in a substantially different manner than ordinary events (Alpert, 1995; Terr, 1991; van der Kolk & Fisler, 1995; Whitfield, 1995a, 1995b), whereas others have argued that there are no special processes involved in dealing with memories of trauma and that these recollections are acquired, retained, and forgotten in the same way as other types of memories (Hembrooke & Ceci, 1995; Howe, 1997; Loftus, Garry, & Feldman, 1994; Shobe & Kihlstrom, 1997). Our article centers around this debate.

Although the study of children's memory and suggestibility for traumatic events has been largely generated by an interest in understanding the accuracy of child sexual abuse reports, our goal in this article will not be to focus singularly on children's memories of physical or sexual abuse. Rather, our aim is to examine conceptual understandings of the mechanisms involved in encoding, processing, and reporting traumatic experiences that contribute to variation in children's memory and resistance to misleading information.

It is important to note from the start that there is currently no well-established scientific basis to indicate that traumatized children are somehow more or less suggestible than nontraumatized children. In addition, published field research and clinical reports of children's memory for traumatic events are mixed in regard to how well these events are recalled and reported relative to nontraumatic events (see Fivush, 1998; and Goodman, Emery, & Haugaard, 1997, for reviews). Findings are also mixed and inconclusive in regard to the effects of stress on children's memory and

Address correspondence and reprint requests to: Gail S. Goodman, Department of Psychology, University of California, One Shields Avenue, Davis, CA 95616; E-mail: ggoodman@ucdavis.edu.

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suggestibility (e.g., Bugental, Blue, Cortez, Fleck, & Rodriguez, 1992; Eisen, Goodman, Qin, & Davis, 1998; Goodman, Hirschman, Hepps, & Rudy, 1991; Merritt, Ornstein, & Spicker, 1994; Peterson, 1998; Shrimpton, Oates, & Hayes, 1998; Vandermass, Hess, & Baker–Ward, 1993).

A few things are clear, however: Memory for traumatic events is associated with developmental and individual differences in children's encoding, storage, organization, and recall of information. Contextual and social factors related to the event and the interview can also affect children's memory of an episode and children's report of the information to others. It is likely that various combinations of developmental differences, individual differences, contextual factors, and social influences are responsible, at least in part, for variations in the way traumatic information is processed and reported in any given case.

In this review we will examine various factors hypothesized to be related to children's memory and suggestibility for traumatic events. To accomplish this task we will approach the issue of memory and suggestibility in traumatized children from a combined information processing, developmental, and clinical perspective by discussing specific emotional and cognitive influences relevant to the acquisition, organization, and retrieval of trauma-related information. In the first section we examine the issue of what makes an experience traumatic. Next, we briefly review the developmental literature on children's memory abilities. This is followed by an examination of various theories of how traumatic memories are processed and how the experience of trauma can affect children's information-processing abilities. In the next section, we combine the developmental findings on children's memory with the theories on trauma and examine a variety of possible outcomes with regard to children's memory and suggestibility concerning traumatic events. After this we discuss how various forms of psychopathology may affect children's memory and resistance to misleading information. In that section, we focus on how general psychopathology, symptoms of posttraumatic stress, and dissociative disorders have been conceived to disrupt information processing and affect a child's memory and suggestibility. Next, we consider the special case of child maltreatment and examine abuse-related factors that can influence children's memory and suggestibility. In the final section, we examine the memory interview and explore social and contextual factors that have been found to influence children's eyewitness memory reports.

It is important to state from the start that our review covers theoretical ideas in an exciting and new, but quite controversial, area of psychology. A number of the theoretical ideas we discuss are not proven and require further empirical tests. Thus at this point they may not have solid empirical evidence to support them, and we offer critique about this fact. Moreover, we admittedly speculate in places about possible implications of the theories for children's memory and suggestibility. We hope that our discussion, speculation, and critique of the literature will help stimulate others to conduct further research on trauma and children's memory.

What is Trauma?

Trauma is defined in a variety of ways, and there is little agreement on a single operational definition of this construct. However, there are some basic threads that run through most definitions of trauma outlined in the published literature on the topic. Trauma is generally thought of as an experience that (a) threatens the health and well being of an individual (Brewin, Dalgleish, & Joseph, 1996); (b) renders the individual helpless in the face of intolerable danger, anxiety, or instinctual arousal (Pynoos & Eth, 1985); (c) overwhelms an individual's coping mechanisms (van der Kolk & Fisler, 1995); (d) involves some violation of basic assumptions connected to survival (Horowitz, 1976, 1986); and (e) indicates that the world is an uncontrollable and unpredictable place (Foa, Zinbarg, & Rothbaum, 1992). Alternatively, nontraumatic stressful experiences can be perceived as threatening by some and merely challenging by others (Shalev, 1996). A num-

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ber of professionals feel that this latter distinction is important to the interpretation of laboratory research on children's memory for stressful and traumatic events. For instance, Yuille and Cutshell (1989) propose that real life traumas lead to qualitatively different memories than laboratory induced stressors. For our purposes, when we speak of trauma, we will be referring to events of sufficient magnitude to be considered overwhelming to most children, and that meet most if not all of the specifications noted above. In general, we will not focus on laboratory induced stressors such as inoculations, visits to the dentist, or genital exams. However, we do believe that well conceived laboratory studies can inform our knowledge of how trauma is processed and how traumatized children remember and report their experiences.

Children's Memory

The field's understanding of children's memory development is based primarily on memory for nontraumatic experiences. For such incidents, the memories of children as young as 3 years of age are often well organized, at least when events are understandable and have been directly experienced (Nelson, 1986). Further, young children (3–5 years of age) can give accurate reports of specific novel life events, and these event memories can endure over fairly long periods of time (see Fivush, 1993, for a review). Even 2-year-olds can remember events they experienced 6 months earlier (Fivush, Gray, & Fromhoff, 1987). However, young children often lack a well-developed knowledge base to give meaning to events (Chi, 1978), and therefore may lack a clear understanding of many experiences. Cognitive developmental limitations on the number of dimensions or units of information a child can coordinate and keep in mind may also be a constraining factor (Case, 1991; Fischer, 1980). A child may need to make sense of an event to incorporate the details of the experience into existing schemas. How the event is defined will determine how it is stored, organized, and recalled at a later date. From a Piagetian perspective, information is integrated into existing schemas, either by accommodating schemas to fit the new information or by changing the information to meet existing schemas. In the latter case, this may involve adding information to the event that never occurred, or omitting important details that do not fit one's conception of the experience (Bartlett, 1932).

Compared to older children, young children also show less conscious control over their memory (Kail, 1990) and often need assistance from adults to create a narrative of the event, which may help them to label the information that is critical and assimilate new information into existing schemas without significant distortion (Tessler & Nelson, 1994; see Fivush, 1993, 1998, for reviews). It is often proposed by trauma theorists that traumatic experiences, by definition, do not fit existing schemas. Under this view, part of what makes trauma so overwhelming is that it violates our basic schemas of how the world is supposed to be. It has been further proposed that failure to incorporate egodystonic information into existing schemata can result in fragmented and disjointed memories in adults and children (Foa, Steketee, & Rothbaum, 1989; van der Kolk, 1996). If true, piecing together of disjointed memory fragments might result in considerable distortion in the way the memory is stored and organized, leading to decreased resistance to misleading information at the point of recall.

Children's age at the time of an event

In general, children and adults are not able to verbally recall the details of an event that occurred prior to about 20–30 months of age (Pillemer & White, 1989; Schactel, 1947; Terr, 1988; Usher & Neisser, 1993). There is evidence that experiences occurring prior to this point of infantile amnesia are not encoded in a narrative form that is retrievable later in life. Rather, these early experiences are likely stored and organized in ways that lead to implicit memories. Schacter (1987) describes implicit memories as memories revealed through the facilitation of performance by previous experience on a task that does not require conscious or intentional recollection. This explains how lessons learned in infancy

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can facilitate performance later in childhood. Without such learning, we could not benefit from experience in the first 20–30 months of life. Although these early experiences can inform and influence our thinking and behavior (e.g., Bowlby, 1973), there is no evidence that this type of information is retrievable later in life in the form of a coherent verbal narrative. Therefore, traumatic memories (or nontraumatic memories) occurring prior to 20–30 months of age are likely to be stored and organized as implicit memories that can never be converted into a narrative form. Although some propose that there are exceptions to this rule, for instance, children who experienced trauma as young as 12 months of age and who reported core elements of this memory later in their childhood (Reviere, 1996), the scientific status of such clinical case reports is unclear.

By 2.5–3 years of age, if not before, children demonstrate the ability to report accurately the details of personal experiences (Fivush et al., 1987). The development of the ability to store and organize coherent event memories may be tied, in part, to the child's development of language ability. In this regard, children's ability to verbalize an experience may be correlated with their ability to organize the memory in a way that can be retrieved and reported at a later date (see Fivush, 1998). The demand for a "decontextualized" verbal report (that is, a memory report made without the support of contextual cues or prompts) is particularly difficult for young children (Bauer & Wewerka, 1997; Donaldson, 1978; Price & Goodman, 1990).

How Are Traumatic Memories Processed?

Remarkable memories

Before discussing several theoretical propositions related to whether traumatic memories are dissociated, repressed, or distorted in some way, it is important to note that traumatic and stressful events are often clearly impressed upon memory, including children's memory. These experiences are frequently organized coherently and reported accurately with relatively little distortion. For children, this has been verified through case studies (e.g., Pynoos & Eth, 1985; Terr, 1991), anecdotal reports (see Reviere, 1996, for a review), and scientific research (e.g., Goodman et al., 1991; Goodman, Quas, Batterman–Faunce, Riddleberger, & Kuhn, 1994, 1997). Cutshell and Yuille (1989) refer to these memories as "remarkable memories." Important mechanisms for the maintenance and storage of such clear detail include that the events may be often retrieved and rehearsed or thought about. By repeating the traumatic information over and over again to oneself or someone else, the central elements of the experience are relatively well maintained in memory. Christianson (1992b) refers to this as "poststimulus elaboration" and notes that the process is driven by the compelling nature of the arousing event.

Repeatedly reviewing an event or otherwise being exposed to components of it can improve children's memory for the experience through reminiscence (Brainerd & Ornstein, 1991; Howe, 1991) or the process of reinstatement (Howe, Courage, & Bryant–Brown, 1993; Rovee–Collier & Shyi, 1992). Studies of hypermnesia also show that repeated retrieval attempts can result in a net gain in the amount of information recalled (Payne, 1987).

Of more controversy is whether traumatic or stressful events involve special mechanisms at encoding. The concept of "flashbulb memories" has been used to explain how highly emotional events can be remembered with great clarity. Bohannon (1988) and other proponents of flashbulb memories propose that special mechanisms are triggered by highly emotional events that lead to an imprinting or prolongment of the details of the event in memory (see Winograd & Neisser, 1993, for a review). To the extent that such special processes may be involved, they may underlie the formation of remarkable memories. We discuss other "special mechanism" proposals (e.g., repression, dissociation) shortly in this paper.

The narrowing of attention hypothesis

The phenomenon of the remarkable memory can perhaps be understood within a larger

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model of how increasing stress leads to a narrowing of attention at the time of the trauma (Christianson, 1992a, 1992b; Easterbrook, 1959). Theoretically, this narrowing of attention results in a focus on the core details of the event at the expense of peripheral details (Christianson, 1992a, 1992b). Christianson proposes that the more focused the attention, the more enhanced and elaborate the processing of the material being attended. In stressful or traumatic situations, this enhanced and elaborate processing is likely to apply to the stressor itself. Support for this model has been found in studies of adults (Christianson & Loftus, 1987, 1990; Christianson & Nilsson, 1984) and children (Goodman, Hepps, & Reed, 1986; Peterson & Bell, 1996) where the central details of stressful and traumatic events were remembered better than peripheral elements of the experience. Additionally, there is evidence that children show greater resistance to misleading information related to the central details of stressful medical procedures (Goodman et al., 1991). However, other studies have not uncovered these trends (Eisen et al., 1998), perhaps because of the difficulties of defining central and peripheral information for children.

Theoretically, the narrowing of attention in times of elevated stress continues to the point where there is a singular intensive focus on the most central and threatening element of the trauma (Easterbrook, 1959). When a weapon is involved, this restricted attention is referred to as "weapon focus" (Loftus, Loftus, & Messo, 1987). van der Kolk (1996) argues that as intense stress turns to traumatic stress the individual becomes totally overwhelmed and cannot process any information in narrative form. Instead the memory is dissociated.

Dissociation

What happens when the unthinkable occurs? How could a child incorporate the horror of a living nightmare into their existing schemas of the world? For many clinically oriented theorists the answer is that the child dissociates (see Putnam, 1997, and van der Kolk & Fisler, 1995, for reviews). Definitions of dissociation have varied greatly. Some representative definitions include, "the lack of the normal integration of thoughts, feelings, and experiences into the stream of consciousness and memory" (Bernstein & Putnam, 1986, p. 727); "a compartmentalization of experience" (van der Kolk et al., 1996, p. 306); and the "disruption in the usually integrated functions of consciousness, memory, identity, or perception of the environment" (American Psychiatric Association, 1994, p. 477).

In describing the process of dissociation, van der Kolk and Fisler (1995) cite Janet (1919/1925) to illustrate how a person faced with overwhelming emotions is unable to create a narrative memory for the event. Instead, the memory is said to become compartmentalized and unintegrated into existing schemas. van der Kolk and colleagues (1996) propose that dissociation takes place as the traumatic experience is occurring (at the point of encoding). In explaining this phenomenon, van der Kolk et al. note that " . . . imprints of traumatic experiences are initially dissociated, and thus retrieved as sensory fragments that have little or no linguistic component" (p. 313). According to this model, the event is never actually encoded in declarative memory form. If the memory is never encoded in narrative form, the question is, how could it ever be retrieved and reported at a later date? van der Kolk et al. propose that retrieval of the dissociated memory involves a weaving of the sensory memories together with memory fragments to construct a narrative of the traumatic experience. From an information-processing perspective, dissociation as defined by van der Kolk et al. should lead to unreliable memories that are particularly vulnerable to distortion. The process of reconstructing an event from memory fragments, feelings, and intuition has been targeted by many experts as the most obvious root for false-memory creation (see Kihlstrom, 1996, and Loftus, 1997, for reviews). However, there is little sound scientific evidence for van der Kolk's interesting proposal. A number of issues relevant to his theory remain untested, for instance, the circumstances under which a dissociative process occurs, how to measure dissociation dur-

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ing an event, how to test that a narrative memory was not formed in the first place, and so forth.

The terms "dissociation" and "repression" are often used interchangeably (Scheflin & Brown, 1996). These constructs are generally employed in relation to traumatic memories that we hold onto but are at least temporarily inaccessible. However, there are important differences between the constructs of dissociation and repression that are basic to the question of how allegedly displaced memories can be accessed, retrieved, and reported in an interview at some time subsequent to the trauma.

Repression

Theoretical accounts of dissociation and repression differ fundamentally in regard to their point of action in the information-processing system. Dissociation is related to psychological processes at the point of encoding, whereas repression refers to the banishing of an event from consciousness once it has been encoded, due to its threatening content (Freud, 1915/1957; see Erdelyi & Goldberg, 1979, for a cognitive interpretation of repression). In the latter case, since the trauma was originally encoded into memory in a narrative form, the memory can be recovered at a later date.

In their review of the literature on implicit memory and emotion, Tobias, Kihlstrom, and Schacter (1992) propose that "implicit memory" be used as a substitute for the term "repressed memory." Implicit memories are, after all, memories that are out of our conscious awareness but guide our behaviors, thoughts, and feelings to some extent. Dissociated memories could also be considered implicit memories. However, unlike dissociation, repression involves memories, at least temporarily unavailable, that were originally encoded and stored in declarative memory and that also exist as implicit memories, to the extent that they still influence behavior. The apparent paradox of how a memory can exist in two forms each of which has separate and unique properties might be explained by theories of multiple memory systems (see Squire, 1995, and Tulving & Schacter, 1990, for reviews).

Multiple memory systems and the processing of trauma

Some of the earliest demonstrations of the existence of multiple memory systems came from studies of amnesiacs who showed severe impairment on conventional memory tests but who appeared fully intact when assessing other kinds of learning and memory (see Squire, 1995, for a review). Recent models of how traumatic memories are processed and stored suggest that sensory memories may be stored separately from verbal memories and accessed in different ways (LeDoux, 1992). Johnson and Multhrup (1992) proposed a "multiple-entry modular memory system" (MEM) where primitive "perceptual subsystems" of the brain handle perceptual information, while more recently developed "reflective subsystems" handle verbal material. Traumatic information would be handled at various levels within MEM. Alternatively, Foa and colleagues (Foa et al., 1989, 1992) applied Lang's theory of fear structures (Lang 1979, 1985) to explain how trauma is processed separately and simultaneously in a fear network and in existing memory structures. According to Foa (1992), the successful resolution of trauma can only occur when information in the fear network is integrated with organized memories of the event. Horowitz's (1986) theory of "stress response syndromes" explains that the need to integrate traumatic memories is driven by what he has termed "the completion tendency." The completion tendency keeps the trauma-related information in active memory until it can break though the individual's ego defenses to be ultimately integrated into existing memory structures.

Brewin, Dalgleish, and Joseph (1996) build on the work of Horowitz (1986) and propose a dual representational theory of how trauma is processed. Brewin et al. distinguish between "verbally accessible memories" and "situationally accessible memories." Verbally accessible memories are essentially narrative

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memories retrieved from a store of autobiographical experiences of the trauma. These memories can be volitionally retrieved and edited. Situationally accessible memories cannot be volitionally retrieved or edited and instead are automatically triggered by cues related to the trauma. Brewin's situationally accessible memories are not restricted to sensory fragments as are van der Kolk's dissociated memories (van der Kolk et al., 1996). Instead, these situationally accessible memories can contain verbal, sensory, and affective information. Brewin et al. focus on the importance of the completion tendency as the central force behind the drive to integrate traumatic memories into existing memory structures. They refer to this dynamic process as the "emotional processing of the trauma."

Brewin and colleagues (1996) propose three different outcomes of the emotional processing of trauma, each of which differentially influences the individual's memory for the event. Brewin et al. propose that the best case scenario for the emotional processing of a trauma is "completion integration." With completion integration, the traumatic information is successfully integrated into existing schemas resulting in little memory bias or distortion. Brewin et al. note that a number of factors can interfere with the completion tendency including inadequate cognitive development and poor social support. These circumstances can lead to a "chronic processing of the trauma." Chronic processing of the trauma as described by Brewin and his colleagues can disrupt information processing abilities and result in significant memory biases. A third possible outcome arises from an interruption of the completion tendency resulting in a "premature inhibition" of the individual's processing of the trauma. In this case, trauma-related scripts are created that are often inaccurate and/or incomplete and leave large discrepancies between the trauma information and existing schemas. This should lead to particularly poor memory for the trauma. Ironically, individuals who show premature inhibition may present as calm and unaffected by the trauma.

Theoretically, the assimilation of the traumatic event into existing schemas can result in considerable distortion in the way information is organized and reported by children (or adults). Horowitz (1986) proposes that the integration of trauma-related information into existing schemas may involve substantial editing of autobiographical memory to bring the traumatic memories into line with existing models of the world.

In summary, a number of intriguing theoretical ideas have been proposed to account for processing and memory for traumatic experiences. Unfortunately, most of these propositions: involve mechanisms that require further articulation, lack sound scientific verification, and are based on clinical observations in which detailed records of the traumatic events against which to evaluate memory were unavailable. For instance, in regard to proposed mechanisms, what does it mean to "integrate" a "fear network" into existing memory structures, and what does it mean to have "sensory memories" that are not part of a "narrative memory"? Moreover, most formulations of trauma and memory are primarily geared to adults, and do not articulate a developmental process. Interestingly, some of the proposed properties of traumatic memories are consistent with, in effect, a developmental regression of the memory system in the face of trauma. For instance, Brewin's idea of "situationally accessible memories" that cannot be volitionally retrieved without trauma cues is reminiscent of children's difficulty in accessing memories in decontextualized situations, without the presence of cues; van der Kolk's notion of sensory, nonnarrative memories harkens back to notions of sensory-motor processing (Piaget & Inhelder, 1969). In any case, in the next section, we discuss implications of theoretical notions about trauma for children's memory and suggestibility.

Trauma, Memory, and Suggestibility in Children

By combining the developmental findings on children's memory with theories of how trauma is processed, we can explore the possi-

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bility of a variety of different outcomes in children's memory and suggestibility for the details of a traumatic experience. These ideas are admittedly speculative. We offer them in the hopes of stimulating relevant developmental research.

Remarkable memories are well maintained

As noted earlier, Christianson proposed that the narrowing of attention in times of elevated stress leads to improved processing of the core information of a traumatic event at the expense of peripheral details less central to the trauma. In this case, the core information will be well attended and encoded clearly with little distortion or loss of detail. In fact, this information should be encoded with greater detail than normal due to increased attentional focus (Christianson, 1992a). This information is then rehearsed, either by repeating the memory to oneself or to others (Yuille & Tollestrup, 1992). The process of repeatedly retrieving and recounting the event creates a more elaborate and well-maintained record of the event that is easily accessible. Also, by repeatedly reviewing the event, the individual increases the likelihood of the traumatic memory being integrated with existing schemas with minimal distortion.

This is the best case scenario for reliable reporting and minimal suggestibility. The stronger and more elaborate the memory, the less susceptible it should be to distortion even if the child is presented with misleading information (Loftus, 1979), although social factors clearly affect suggestibility as well. Other factors that may strengthen memory include rehearsal and imitation. Children are less likely than adults to volitionally rehearse information, but rehearsal does occur, even in young children (Weissberg & Paris, 1986). Young children are also quite prone to imitation, including imitating traumatic events, and memories may thus be rehearsed and revealed in play, drawings, and the like (Terr, 1988).

Although, consistent with Christianson's proposal, there are reasons to expect strong memories in children of central information, there are also reasons to expect less than perfect accuracy in memory for traumatic events, and that developmental influences may be operative. The child's knowledge base, preparation for, and understanding of the traumatic experience will influence what is considered central during encoding and what will be accessible for rehearsal and retrieval processes later. As knowledge and understanding change—through cognitive developmental processes, discussions with adults and peers, and the like—further alterations in memory can be expected. Still, according to Christianson's proposal, the core information in a traumatic event might be well retained by children for many years.

Central information is encoded but not well maintained

Attending well to the core information at encoding does not insure maintenance of a clear memory for the event over time. If the core information is well attended and encoded clearly with little distortion or loss of detail but not rehearsed or reactivated, memory for the event might basically follow the same pattern of normal forgetting as one sees for peripheral detail (Yuille & Tollestrup, 1992).

There are a number of reasons why a child may not want to recall and rehearse the details of traumatic or horrific events. The child may avoid all cues related to the trauma in an effort to put the memory out of consciousness. Even if the child does not try to avoid thinking about the trauma and chooses to share the experience with others, the opportunity to rehearse these memories is often tied to the availability of a supportive adult who can help the child make sense of the otherwise unthinkable and unspeakable. As noted earlier, it has been proposed that inadequate processing of the traumatic event can lead to trauma-related scripts that are inaccurate and/or incomplete and leave large discrepancies between the trauma information and existing schemas (Brewin et al., 1996). Special processes inhibit normal forgetting. If the memory is repressed then it goes unrehearsed, at least consciously. From a traditional information-processing perspective, the unrehearsed memory should also fade with time due to the normal process of forgetting. This should

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be true at least for the narrative record of the event. However, those who propose special explanations of how traumatic memories are processed would argue that implicit memories should still remain strong until the traumatic memories (in whatever form they continue to exist) are properly integrated into existing schemas. Emphasis on the power of unintegrated traumatic memories to endure and remain active out of consciousness for indefinite periods of time is at the heart of many special process arguments. As noted earlier, Horowitz (1986) hypothesized that the completion tendency keeps these traumatic memories active until the time that they can be integrated with existing schemas. The child's failure to integrate these memories will theoretically result in the development of symptoms of posttraumatic stress and/or dissociation (see Putnam, 1997, and Pynoos, Steinberg, & Wraith, 1995, for reviews) which can further inhibit information processing and general memory abilities. If one accepts the integration notion, the child's cognitive and emotional ability to integrate traumatic information becomes an important developmental question. Presumably young children's schemas, knowledge base, and integration abilities all differ both qualitatively and quantitatively from those of adults.

Peripheral details are never encoded or too weakly encoded to endure in memory

If there is a profound narrowing of attention at the time of the trauma, this should result in some peripheral information being lost. Included would be those details that are deemed unimportant to the witness at the time of the trauma. As attention becomes increasingly focused on the central details of the unfolding trauma, the peripheral details are not attended in a manner sufficient for encoding into memory and therefore are never retained in any form or are weakly encoded and fade quickly (Christianson, 1992b). From a developmental perspective, one cannot assume that all information that seems relevant in an adult's mind must have been retained by the child or that all information that seemed irrelevant or peripheral to an adult will be so categorized by a child. However, children sometimes focus on details of traumatic events that are personally meaningful to them for reasons that would be unknown to adults. Pushing a child to report memories that are either inaccessible or never retained could conceivably lead to the creation of fantasies and false reports in children who want to satisfy an interviewer's persistent pleas for more information. A complete understanding of children's memory for traumatic events will require a solution to the problem of specifying central versus peripheral information from a child's perspective and of evaluating the personal significance of information from a child's perspective.

An internal focus of attention restricts processing of external stimuli

Alternatively, the increasing tension and terror provoked by trauma may lead to an internal focus of attention. In such instances, the person may be preoccupied with his or her safety, bodily sensations, terror, rage, or hatred and not adequately attend to the details of the event as it unfolds (Goodman & Quas, 1996; Pynoos et al., 1995; Yuille & Tollstrup, 1992). Again, in this instance, much of the event may go unattended and thus never encoded, or not retained in memory. It is unknown if, during a traumatic event, children reach this stage of processing sooner or more easily than adults.

Posttrauma elaboration results in better retention of central information but also error

Reviewing the event just after the trauma in an effort to make sense of what occurred can be viewed as the process of "posttrauma elaboration." This idea is based on Christianson's (1992a) description of poststimulus elaboration, in which the memory of an emotionally arousing event is enhanced by the repeated retrieval and rehearsal of the experience in one's memory. Is there a point in this process during which a child's memory may be most malleable? It is possible that at certain points, post trauma, the child may be particularly

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suggestible and vulnerable to the effects of the introduction of misinformation.

One could hypothesize, for instance, that a critical point would be soon after a traumatic event, before the memory is consolidated. As noted earlier, young children often need to jointly construct a narrative of the event with an adult. In the absence of a trusted and supportive adult to help the child construct a coherent narrative account of the traumatic experience, the child may create her or his own accurate or inaccurate account of what occurred in an effort to assimilate otherwise unthinkable information into existing schemas (Pynoos, Steinberg, & Aronson, 1997). This could occur soon after an event or after months or years. However, the presence of an adult to help the child construct a narrative does not guarantee accurate processing of the traumatic memory. A caring adult could attempt to help the child create alternative explanations of the event which are fundamentally inaccurate in an effort to help the child deal with otherwise unfathomable interpretations of the trauma. Alternatively, a manipulative adult may try to confuse and mislead the child to cover up improper, reckless, or malicious conduct. Or, a misguided forensic interviewer or clinician may suggest plausible explanations for what happened and jointly construct a narrative for the event with the child that is fundamentally inaccurate but meets the needs of the interviewer and/or the child. In fact, Bruck and Ceci (1997) have proposed that this form of interviewer bias is a central driving force in the creation of false memories in children in forensic and clinical interviews.

The memory is retained accurately or distorted because of the interaction between trauma and social support/attachment factors

It is generally accepted that the strength and importance of affiliate attachments (Lazarous & Folkman, 1984) play critical roles in children's vulnerability to extreme stress (Pynoos et al., 1995). Children who lack social support from a caring adult at the time of the trauma should be more vulnerable and more prone to being overwhelmed, which in turn might inhibit their ability to process trauma-related information adequately. Toth and Cicchetti's (1995) work reveals that the quality of maltreated children's attachments may moderate the effects of abuse and trauma. These investigators found that more securely attached children showed higher levels of perceived confidence. Interestingly, Vrij and Bush (1998) recently reported that children's self confidence was highly related to resistance to suggestion and that when self confidence was taken into account, age differences in suggestibility were eliminated.

The availability of a positive attachment figure should also lead to better outcomes in regard to a child's memory and suggestibility for traumatic events. Goodman et al. (1991) report that children whose parents talked supportively with them about a painful medical procedure were more accurate and showed greater resistance to misleading information about the details of the event than children whose parents did not. Also, Goodman and her colleagues found that the caretaker's attachment style was related to the child's resistance to misleading questions (see also Quas et al., in press).

The presence of a supportive adult can help the child in several distinct ways at various points in time, before, during, just after, and well after the traumatic experience. Before the trauma, parents influence children's coping styles, resilience, knowledge, and security. During the trauma, a supportive adult can help buffer the effects of the event (Bat–Zion & Levey–Shiff, 1993). Immediately following the traumatic incident, during the period of posttrauma elaboration, a supportive adult can facilitate the child making sense of the traumatic experience. Down the line, well after the trauma, a supportive adult can aid the child in coming to grips with the ramifications of the event and hopefully recover psychologically (Pynoos et al., 1995).

In sum, the availability of a supportive adult can lead to improved memory and decreased suggestibility by providing the opportunity to jointly construct a coherent and accurate narrative of the event, providing an opportunity to maintain and rehearse memory

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for the event, and buffering the adverse emotional effects of the trauma itself (before, during, just after, and down the line) to facilitate optimal processing of the information.

How Various Forms of Trauma-Related Psychopathology Can Affect a Child's Memory and Suggestibility

Pynoos et al. (1995) note that a child faced with traumatic stress may develop a wide range of psychological disorders, including, but not limited to posttraumatic stress disorder (PTSD), depression, phobias, other anxiety disorders, sleep disorders, somatization, disorders of attachment, and dissociative disorders. In this section we will focus on how general psychopathology, PTSD, and dissociative disorders can disrupt information processing and affect a child's memory and suggestibility.

General psychopathology, memory, and suggestibility

In a series of studies examining the memory and suggestibility of maltreated children, Eisen, Goodman, Qin, and Davis (1997, 1998) found that children who were judged as more psychologically disturbed demonstrated significantly poorer resistance to misleading information. Although the power of this relation was not especially strong (accounting for between 4% and 9% of the variance, respectively, across two studies), the finding was consistent across two samples that included a total of over 500 maltreated children. One hypothesis of why general psychopathology could affect children's memory would be that the children who were more disturbed were less attentive to the details of the event at encoding. Or, alternatively, they may have been less efficient at organizing and retrieving information from memory. It is also possible that the relation between the presence of general psychopathology and suggestibility has little to do with encoding or organizing the information in memory and is instead related to the child's performance in the memory interview. In this regard, the more disturbed children might be more easily confused or inattentive when presented with misleading questions and the challenges of an extended interview session. It is important to note that different forms of psychopathology might affect children's memory performance in quite distinct ways.

PTSD

Failure to integrate the trauma-related information into existing memory structures has been hypothesized as the core process involved in the development of PTSD (Foa et al., 1989, 1992; Horowitz, 1986; see Pynoos et al., 1995, and McNally, 1996, for reviews). PTSD can result in reexperiencing symptoms (intrusive and distressing memories, thoughts, mental images, dreams, and flashbacks related to the traumatic event), avoidant and numbing symptoms (social withdrawal, avoidance of trauma-related cues, thought stopping, amnesia for the trauma), and hyperarousal symptoms (irritability, hypervigilance, problems with concentration, sleep problems). There has been considerable debate about the appropriateness of applying adult diagnostic criteria of PTSD to children (see Putnam, 1996, for a review). However, there is less debate on the basic etiology of the disorder and how symptoms of PTSD can adversely influence information processing.

In their review of the literature on the effects of trauma on memory, van der Kolk and McFarlane (1996) note that PTSD can have an adverse effect on adults' processing of information in several ways. Possibly the most obvious way in which trauma interferes with information processing can be seen in reports of how persistent intrusions of trauma-related memories interfere with the individual's ability to attend to other incoming information. The overwhelming nature of the trauma-related information can lead to a powerful form of proactive interference which prohibits the individual from processing newly learned information. Also, traumatized individuals with PTSD show generalized problems with attention, distractibility, and stimulus discrimination. In children, this often presents much like Attention-Deficit Hyperactivity Disorder. This decreased attentional ability and increased

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distractibility make it more difficult for children to attend to events in their environments subsequent to the trauma. In this way, children with PTSD may not be attending to and encoding detailed information related to events in their lives in a way that will lead to reliable maintenance and reporting down the line. This is most notably a problem in children who live in chronically stressful environments and who have experienced multiple traumas over an extended period of time (e.g., in the case of child abuse or war).

van der Kolk and McFarlane (1996) note that individuals who show signs and symptoms of PTSD actively attempt to avoid specific trauma-related cues to prevent the onslaught of emotion associated with the traumatic memory. As noted earlier, this form of volitional cognitive avoidance which results in less frequent rehearsal of the episodic memory might decrease the likelihood of retaining a coherent record of the event in declarative memory over extend periods of time (i.e., several years). The combination of an active avoidance of trauma-related cues and increased distractibility at the time of the interview makes it increasingly difficult to get a reliable and complete memory report from a child in a forensic or clinical interview.

Symptoms of hyperarousal are commonly experienced by children with PTSD, and such symptoms have important implications for memory. Hyperarousal symptoms could be seen as the result of a preparatory response to a generalized expectation of danger. For some children, this increased preparatory response can lead to enhanced attention to the details of threatening situations. Therefore, some traumatized children may actually show better recall for stressful experiences by virtue of their being hypervigilent in times of increased threat (see below). They may also have a relevant knowledge base and scripts to support memory. However, there may be a point of watershed at which some children become overly stressed and no longer able to process threatening information in a meaningful manner. This point may vary dramatically from child to child due to differences in such factors as social support, coping skills, hardiness, and a diatheses to be overwhelmed by anxiety and/or experience dissociative symptoms. Theoretically, when the child reaches this point of watershed, she or he will dissociate.

Dissociative pathology

Earlier in this paper we examined various definitions of dissociation and discussed how dissociation at the point of encoding has been proposed to affect memory and suggestibility. In this section, we review further how dissociative pathology may affect information processing and influence a child's event memory and suggestibility.

Although dissociation is often seen as existing on a continuum, recent developments in the conceptualization and measurement of this construct indicate that a typological model might better fit the current data on how dissociation is displayed by the population at large (Waller, Putnam, & Carlson, 1996). This typological perspective predicts the existence of two groups: Pathological dissociators and nonpathological persons who display some level of dissociative traits ranging from mild experiences of absorption to more profound but nonpathological dissociative tendencies. It is thought that pathological dissociation is invariably related to the experience of trauma.

Pathological dissociation is believed to be associated with various forms of memory impairment. According to van der Kolk and Fisler (1995), the most common symptom of memory impairment related to dissociation is amnesia for the trauma itself. The clinical literature is filled with reports of cases of amnesia related to a wide range of traumatic experiences including natural disasters, kidnapping, torture, war experiences, and child maltreatment (see van der Kolk & Fisler, 1995, for a review). The loss of memory for traumatic experiences can be either partial or complete (Sullivan, 1995). There are also reports of adults with histories of sexual abuse who show large gaps in their autobiographical memories for both traumatic and nontraumatic events (Edwards & Fivush, 1998; Kuyken & Brewin, 1995). Unfortunately, scientific study of these types of phenomena is difficult to conduct, leaving doubts about the extent and causes of the amnesia, or whether "amnesia" is even the appropriate term to use.

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In cases of Dissociative Identity Disorder (aka, Multiple Personality Disorder) individuals allegedly have "interpersonality amnesia." This is where an individual reports no recall for extended periods of time when he or she was in another personality state. Theoretically, information from these alternate personality states is compartmentalized and therefore inaccessible. However, the status of this disorder is in dispute in scientific circles, and in the recent past it has been overdiagnosed and confused with heightened (perhaps pathological) suggestibility (Bottoms, Shaver, & Goodman, 1996).

Putnam (1997) notes that source amnesias are common in children (and adults) who suffer from dissociative disorders. A chronic sense of depersonalization and detachment seen in children with pathological dissociation gives a dreamlike quality to their autobiographical memories. It can therefore be difficult to determine if a memory report of a given event reflects such individual's actual personal experience, someone else's experience, or a dream. In addition, discontinuities in memory associated with pathological dissociation leave the individual open to plausible suggestions on how to fill the gaps in his or her autobiographical memory. This may make these individuals particularly vulnerable to the creation of pseudomemories (Putnam, 1997).

General nonpathological dissociative tendencies may also cause individuals to be less confident in their memories and more vulnerable to suggestion. Putnam (1997) has observed that dissociative individuals are less confident in their recollections and that this lack of confidence may make them more vulnerable to the effects of misinformation. Putnam's explanation is consistent with Gudjonsson and Clark's (1986) theory of interrogative suggestibility, which explains that some individuals are less confident in their memories and are therefore more suggestible. As mentioned earlier, children's lack of confidence may mediate the relation between suggestibility and age. Recently, a number of investigators have reported a positive relation between dissociation and suggestibility in both adults (Eisen & Carlson, in press; Hymen & Billings, in press; Winograd, Peluso, & Glover, in press) and children (Eisen et al., 1997), using a variety of different paradigms. Perhaps such relations are mediated by a lack of confidence in one's memory. There is also growing evidence that childhood trauma can lead to psychobiological and neuroanatomical dysfunction that may form the basis of dissociative pathology (see Bremner & Narayan, 1998, and Putnam, 1997, for reviews).

Memory for Repeated Trauma and the Special Instance of Child Maltreatment

Repeated traumas

In general, young children can have a difficult time reporting a specific instance of an episode that does not significantly deviate from what usually happens in their day to day life (Davidson & Hoe, 1993; Hudson, 1990). In addition, young children have more difficulty than older children in separating out repeated instances of similar life events and tend to confuse the details of these experiences (Farrar & Goodman, 1990). Children develop scripts for these repeated events. Children living in chronically stressful environments will likely develop generalized scripts that contain the gist of their typical abusive experiences. It is as yet unclear whether children's ability to organize and report the details of these repeated abusive experiences differs markedly from children's ability to store, maintain, and report the details of a single abusive act, although one would expect script-related confusions among similar abusive events, especially after long delays.

Although it is generally accepted that omissions and confusions will occur when multiple similar traumatic (or nontraumatic) events are being reported, the presence of omitted details and minor source confusions does not necessarily make the memory report inaccurate or invalid. Skeptics of young children's ability to accurately report the details of their life experiences point to source confusions as an important factor in understanding how memory reports are corrupted through the process of reconstruction (Brainerd & Reyna, 1991; see Ceci & Bruck, 1993, for a review). Nevertheless, the reconstructed ac-

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count of a single episode from a series of similar life experiences will usually include the core elements that are shared across the events, but omit or confuse some unique aspects of any given experience (see Fivush, 1998).

Terr (1991) originally proposed a distinction between two types of trauma: Type I and Type II. Type I traumas are single traumatic events. Terr (1991) reports that in her extensive case studies, single traumatic events are recalled quite well and in great detail. In fact, there are several case studies presented in the literature that document how children age 3 or older are quite able to retain and report details of a single traumatic experience (Jones & Krugman, 1986; Malmquist, 1986; Pynoos & Nader, 1988; see Reviere, 1996, for a review). Terr (1991) defined Type II traumas as multiple or chronic traumatic experiences. Terr reported that these events are often not recalled well at all and are frequently either partially or wholly dissociated (Terr, 1991). According to this theory, children faced with chronic abuse and trauma will dissociate as a defensive maneuver. Unfortunately, there is little empirical support for Terr's Type II distinction, and some research argues against it (Goodman et al., 1994). Still, it is an interesting hypothesis that deserves further empirical test.

It has also been proposed that children who come to rely on a dissociative defense to deal with repeated traumatic events would be likely to dissociate when confronted with more minor stressful circumstances in everyday life (Bremner, Krystal, Southwick, & Charney, 1995; Lynn & Rue, 1994; Spiegel, 1986). This could lead to a type of habitual reliance on dissociation as a defense when faced with sufficient levels of stress (Kihlstrom, 1995). However, an alternate conception of the effects of chronic abuse leads to opposite predictions in regard to a child's memory performance. It is possible that the high level of distrust found in many abused children coupled with increased hypervigilance to details in threatening situations (e.g., Rieder & Cicchetti, 1989) may lead to better memory for the event and enhanced resistance to misleading information. Pollak, Cicchetti, Klorman, and Brumaghim (1997) report that maltreated children evince more efficient cognitive organization, as reflected in event-related potentials, of stimuli associated with anger than happiness, whereas nonmaltreated children do not evince this same pattern. Pollak et al. (1997) suggest that such patterns of activation are adaptive given early exposure to aggressive treatment, and reflect internal working models and memories biased toward the processing of negative emotional information. Also, using pictures of threatening (e.g., knife, gun) and nonthreatening (e.g., spoon, phone) information, Rieder and Cicchetti found that maltreated children were more distracted by aggressive stimuli, that is, directed their attention more to the threatening stimuli, than did nonmaltreated children. These findings suggest that abused compared to nonabused children may pay greater attention to cues to traumatic events, a hypervigilance that could result in better memory. However, in Rieder and Cicchetti's study, the maltreated children also made a greater number of "fabulated recalls" (i.e., recalling objects not seen on stimulus cards or distortions of seen objects).

Unfortunately, few scientific studies have been conducted on maltreated children's autobiographical memory or on nonabused children's memory for repeated traumatic events. Extant scientific studies tend to show little or no substantial difference between maltreated and nonmaltreated children's memory and suggestibility (Eisen et al., in press; Goodman et al., 1990). However, it is possible that differences will emerge in future studies, for instance, studies that examine memory for more highly affect-related events. If Rieder and Cicchetti's (1989) results, that maltreated children produce more confabulations when faced with threatening stimuli, apply to maltreated children's autobiographical memory, this finding would be of considerable interest.

Child maltreatment and its effects on information processing

Child maltreatment is associated with a number of negative cognitive outcomes. Several studies have found that maltreated children

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tend to be intellectually delayed (Bowlby, 1973; Green, Voeller, Gaines, & Kubie, 1981) and score lower on standard IQ tests (Carrey, Butter, Persinger, Bialik, 1995; Friedrich, Einbender, & Luecke, 1983; Tarter, Hegedus, Winsten, & Alterman, 1984), even when those tests are supposed to be culturally unbiased and not tied to verbal learning (Eisen et al., in press). Poor performance on intelligence tests has been found to be related to increased suggestibility in adults (Gudjonnson, 1983) and children (Eisen et al., 1997). These intellectual delays could result from a variety of factors including lack of stimulation or intellectual support at home resulting in developmental delays; maternal prenatal drug exposure; malnourishment; and, as noted earlier, chronic stress and its influence on information processing.

In regard to children's memory for the event itself, maltreated children typically have less parental support to work through and deal with the trauma. In fact, in many cases of maltreatment the abusive parent will attempt to confuse, trick, or mislead the child to keep the child from reporting the abuse to others. In these situations, confusions and misperceptions might lead to disorganized or fragmented memories, or an accurate memory that has a false overlay. Further, many children blame themselves for the abuse and feel guilty or shameful about it, which can also contribute to memory disorganization (Fivush, 1998; Fivush & Schwarzmueller, 1995). Denial can be a particularly powerful force and adversely affect memory reports in clinical and forensic interviews. Many abused children will employ this defense as a survival mechanism necessary for living with a chronically abusive parent. Freyd (1996) proposes that betrayal by the primary caregiver in the form of sexual abuse can evoke a coping mechanism that helps block awareness of the abuse. She notes that the child needs to block out this information to maintain normal attachment processes. Freyd (1996) goes on to say that only betrayal should lead to memory loss and proposes that other types of trauma unrelated to betrayal should lead to improved memory for the traumatic experience. At present, scientific studies are sorely needed to examine the relation between betrayal, trauma, and children's memory and suggestibility.

As noted earlier, children as young as 2.5–3 years of age can report the details of personally experienced events in a coherent manner. However, young children still need a fair amount of contextual support from adults to help them structure their reports (Fivush, 1993). Younger children report less information and less accurate information, and they are less resistant to misinformation (Eisen et al., in press; Goodman et al., 1991; Ornstein, Baker–Ward, Gordon, & Merritt, 1993). To the extent they have been studied, these trends appear to exist for maltreated children as well as nonmaltreated children (Eisen et al., in press). When faced with distortion in memory reports, a central question is whether the distorted reported reflects a real change in the child's memory for the event, or a reporting error resulting from demand characteristics of the memory interview. This is an especially thorny issue in the experimental literature examining children's resistance to misleading information (see below). It is likely to be an even more thorny issue in examining the suggestibility of maltreated children, who may interpret events and interviews through negative biases in social cognition (Dodge, Bates, & Petit, 1990) and internal working models of an unsafe social world or who are especially needy of social approval.

The Memory Interview

Now that we have discussed some of the memory processes involved in encoding, storing, and retrieving trauma-related information, we examine interview factors that can influence children's memory reports. The emerging picture from mounting data on children's eyewitness memory indicates that developmental, social, and memory processes all contribute to children's performance in a memory interview. However, relatively few studies have examined interview factors as they may affect traumatized or maltreated children's memory reports. Because such children are frequently interviewed for clinical or forensic purposes, we conclude our article with a brief discussion of "the memory inter-

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view" (see also Poole & Lamb, 1998; Saywitz & Elliott, in press).

Repetition in questioning

Although repeated interviews are often regarded as a potential contaminant in children's eyewitness memory reports, research in this area does not necessarily support this contention. Interviewing children in a nonsuggestive fashion may actually improve recall through rehearsal and/or reminiscence (Brainerd & Ornstein, 1991; Dent, 1991; Howe, 1991) or the process of reinstatement (Howe et al., 1993; Rovee–Collier & Shyi, 1992; see Fivush & Schwarzmueller, 1995, and Poole & White, 1995, for reviews). Studies on hypermnesia also indicate that repeatedly retrieving material can lead to a net gain in the information recalled (Payne, 1987; Scrivner & Safer, 1988) and may be particularly useful in recalling traumatic events (Erdelyi & Goldberg, 1979).

When dealing with children, the breadth and detail of the information provided in any given interview may depend largely on the contextual cues offered by the interviewer (Fivush, 1993). In this regard, children's performance will be jointly determined by their interpretation of the questions and their ability and motivation to retrieve relevant information at that point in time. The recollection of traumatic information is often painful and difficult for children and adults. As pointed out by Quas et al. (in press), researchers have not always adequately differentiated between whether children's more limited reports of stressful versus nonstressful events are because of lack of memory or children's unwillingness to talk about emotional experiences. Perhaps especially in a single interview, one runs the risk of not gathering important information children have to offer because of such unwillingness, based in initial fearfulness, embarrassment, and/or a resistance to retrieve and rehearse emotionally charged material. In addition, there is evidence that young children do not necessarily recall all the information they are capable of reporting in a single interview (Fivush, 1993). Children often describe bits and pieces of traumatic and nontraumatic events at different times, with each piece representing a part of the puzzle. However, repeated interviewing about upsetting experiences can be emotionally taxing in itself (Goodman, Taub, Jones, England, Port, Rudy, & Prado, 1992; Tedesco & Schnell, 1987), and thus should be approached with caution when working with traumatized populations.

Whereas repeated nonsuggestive interviewing may be helpful for accurate memory, repeated multiply suggestive interviews can lead to significant distortions in memory reports for young preschool children (Bruck, Ceci, Francoeur, & Barr, 1995; Ceci, Crotteau–Huffman, Smith, & Loftus, 1994; Leichtman & Ceci, 1995; see Poole & Lindsay, in press, and Poole & White, 1995, for reviews). Although older children have been found to be more resistant to misleading information than their younger counterparts (Eisen et al., in press; Goodman et al., 1991; Ornstein et al., 1993; also see Goodman et al., 1997, for a review), the use of an overly suggestive context and misleading questions can result in significant distortion in the memory reports of some older children and even some adults. These principles appear to hold true for false memories of (nonexperienced) traumatic events, although further research is needed to determine the robustness and generality of the effects. Importantly, and somewhat ironically, although multiply suggestive, repeated interviewing may create false reports in some children, such interviewing may also be necessary to obtain embarrassing, traumatic, or implicating information from children who have actually experienced an event that they are not comfortable revealing (Bruck, Ceci, & Hembrooke, 1998; Goodman & Clarke–Stewart, 1991).

Despite the wealth of empirical data on how misleading questions lead to errors in children's memory reports, it is not entirely clear that the suggestive interviewing techniques used in these studies resulted in actual memory distortion. It has been argued that errors in the memory reports of children in these studies may actually be due to the demand characteristics of the interview and do

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not reflect an actual change in the child's memory for the event (McClosky & Zaragoza, 1985). Bruck and Ceci (1997) propose that children may show a response bias when initially administered misleading questions but that the repeated suggestive interviews eventually lead to the incorporation of misleading information into the child's memory. However, long-term follow-up data of children in several repeated interview studies indicate that the suggested memories are not reported after extended periods of time (e.g., 1 or 2 years; Huffman, Crossman, & Ceci, 1996). Bruck and Ceci (1997) propose that the originally implanted false memories fade with time. An alternative interpretation of these data would be that the child's memory was never actually changed.

Regardless of how one interprets these data, it is clear that biased reporting with or without actual memory distortion can result in disastrous consequences in the forensic context. Once the forensic interviewer documents a false report, the documentation is now a matter of written record and takes on a life of its own. Even if the child didn't really mean what he or she said or recants later on, lawyers, judges, and child welfare officials will read the report and must consider the findings in their decision making.

Special issues related to interviewing maltreated children

The forensic interview context can influence how children respond to questioning. The period following a trauma is a very stressful and confusing time. When children are involved in abuse investigations, there is often the added stressor of being removed from one's home and subjected to repeated interviews about whether their parents and loved ones may have hurt them, or touched them in a sexualized manner. Tobey and Goodman (1992) found that providing an accusatory context may lead to increased inaccuracies for some preschool children. Rapport has also been found to influence children's resistance to misleading information. A supportive context can bolster young children's resistance to suggestive misinformation about abuse, whereas intimidation can contribute to young children's suggestibility about abuse-related events (Carter, Bottoms, & Levine, 1996; Davis & Bottoms, in press; Goodman, Bottoms, Schwartz–Kenney, & Rudy, 1991).

A variety of pressures may fall on abused children that can adversely affect the accuracy of their memory reports. Sometimes children are coached to repeat scripts to the interviewer or outright lie. Often this coaching involves parents telling children how the investigators are evil and trying to tear their family apart. Alternatively, other children are instructed to keep the events secret and threatened with violence if they reveal what has happened to them. The scientific literature has barely touched on the question of how such influences affect memory reports in maltreated or otherwise traumatized children (but see Pipe & Goodman, 1991).

Conclusion

In this paper, we discussed recent theoretical notions about the relations between trauma, memory, and suggestibility and explored the implications of those notions for children's memory, especially for children who have suffered traumatic events, such as child maltreatment. As can be gleaned from our review, intriguing theoretical ideas abound, but there is an unfortunate paucity of scientific evidence to constrain theory. Moreover, a developmental perspective needs to be incorporated into theoretical notions about the effects of trauma on memory and suggestibility. As a field, we have much to learn about the relations between trauma, memory, and suggestibility in children. We hope our contribution in writing this paper will be to point out areas in which greater research is needed. We also hope we have stimulated ideas about how the diverse literatures on trauma, memory, and developmental processes can be united. This is an extremely important area of study, worthy of the field's most serious attention.

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