

CHILDREN AS VICTIMS,
WITNESSES,
AND OFFENDERS
Psychological Science and the Law

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Chapter 4

Children's Memory
in Forensic Contexts
*Suggestibility, False Memory,
and Individual Differences*

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When children come in contact with the legal system as victims or eyewitnesses, one of the challenges they face is the expectation to provide accurate and complete accounts of events. This is especially important in sexual abuse cases in which children's testimony is often the only evidence against the alleged perpetrator. Much of the psychological research prompted by the preschool abuse cases of the 1980s (see Wood, Nathan, Nezworski, & Uhl, Chapter 5, this volume) revealed that children, in particular young children, are especially susceptible to misleading suggestions and memory distortion, which can significantly affect the accuracy of their accounts. More recent research, however, has shown that under many conditions children can be reliable witnesses and provide accounts of events that are accurate and useful to investigators. In this chapter, the current literature on children's memory abilities is reviewed, with a focus on research examining forensically relevant factors that increase or reduce children's suggestibility and memory distortion. We also review recent evidence on individual differences found to be useful in predicting children's witness abilities. We believe that children's experiences in the legal system and the usefulness of their accounts can be greatly enhanced if forensic investigators have an understanding of how social-cognitive factors affect children's memories of autobiographical events.

It is important to make a few points before we begin. First, following Quas, Qin, Schaaf, and Goodman's (1997) and Pezdek and Lam's (2007) conceptual distinction, we use the term "suggestibility" to refer to children's susceptibility to suggestions about nonexistent details of witnessed events and the term "false memory" to refer to children's development of memories of entirely new suggested events that never occurred. Second, although for ease we separated the review into factors that reduce or increase children's accuracy, it is important to keep in mind that these factors interact and rarely occur in isolation. For example, age is a factor that is associated with other variables such as knowledge base, source memory, and language ability, which together may affect children's memory and susceptibility to suggestions. Although we review studies that uniquely assessed each of these factors, it is likely that in forensic settings many of these factors interact, and predicting accuracy or suggestibility of individual children may be difficult. Third, because it is beyond the scope of this chapter to review all factors that affect suggestibility and false memories, we present only studies that investigated children's memory using real-world events and procedures that are relevant to issues in the forensic arena.

In a typical suggestibility study, children first experience an event (e.g., a magic show in the lab) and, after a short or long delay, are given suggestions that target events occurred (e.g., the magician gave them a sticker). Accuracy and suggestibility are assessed by analyzing children's responses to free-recall questions/prompts (e.g., "What happened on the day you saw the show?") and to focused nonleading (e.g., "Which trick did you like best?") and misleading/suggestive (e.g., "The magician touched you on your arm, didn't he?") questions. Correct responses to questions determine children's accuracy. Suggestibility is determined by whether children recall suggested details or assent to the occurrence of the target details. In the typical false memory study, children are first asked about true events (e.g., "What happened when you fell off a bicycle?") that parents reported to have occurred, followed by questions about a target false event (e.g., "What happened when you got your hand caught in a mousetrap?"). If children assent to a target suggested false event or actually report details of the false event beyond that conveyed by the interviewer, it is concluded that children have developed a false memory for the event. We next review some of the many factors identified in such studies as influencing children's suggestibility and tendency to develop false memories.

FACTORS THAT INCREASE CHILDREN'S SUGGESTIBILITY AND FALSE MEMORIES

Excellent reviews of many factors that increase children's suggestibility and memory distortion have been reported elsewhere (e.g., Bruck & Ceci, 1999).

Here, we focus on the recent literature on key factors that can increase children's susceptibility to misleading information during forensic investigations: type of interviewing techniques, the experience of stress or negative emotions during recall, and increased delay between event and investigative interviews.

Interviewing Techniques: Question Type and Props

The types of questions and techniques used in forensic interviews to elicit information from children can be suggestive and increase the likelihood of influencing their accounts. Generally, questions can be classified into open-ended questions (e.g., "What happened on the day you went to his house?") that prompt free recall in children and focused questions that require short (e.g., "On that day, were you on the sofa or bed?") or yes-no (e.g., "Did you go to his house?") responses. Typically, children provide more accurate information with open-ended questions than with focused questions (see Lamb, Orbach, Hershkowitz, Esplin, & Horowitz, 2007). Despite this, the use of focused questions appears to be the norm in forensic interviews around the globe (Lamb et al., 1996; Lamb, Sternberg, & Esplin, 2000; Lamb et al., 2003; see Powell, Fisher, & Wright, 2005, for a review). Furthermore, in sexual abuse investigations, props such as anatomically detailed dolls or their analogue, human figure drawings (two-dimensional drawings of humans with or without clothes), are sometimes used to direct children's attention to specific abuse-related details. The use of focused questions and props in forensic settings may be partly due to the finding that children, particularly young children, sometimes do not provide critical information in free recall.

In theory, open-ended questions allow children to search their memory unconstrained, which can lead to the retrieval of all relevant information. Focused questions, on the other hand, typically trigger the search of single pieces of information that limit the amount retrieved from memory. Moreover, information elicited from open-ended questions tends to be more accurate than information elicited from focused question. This is probably because open-ended questions require the child to extract information from memory, whereas focused questions require the child to recognize from options imposed by the interviewers, which may or may not be correct. In their 2007 field study, Lamb, Orbach, Hershkowitz, Horowitz, and Abbott analyzed interviews of sexual abuse victims and their perpetrators to determine the accuracy of information derived from open-ended versus focused questions. Information provided by the victim and confirmed by the alleged perpetrator was the index of accuracy. Indeed, the findings revealed that details prompted by open-ended questions were more likely to be confirmed by the perpetrator than those from focused questions. Moreover, central details (e.g., references to sexual actions or sexual body parts) were more

likely reported by the victim and confirmed by the perpetrator in response to open-ended than focused questions.

However, laboratory studies, in which the accuracy of event details is known with greater certainty than in field studies, have shown that children sometimes omit important information during open-ended questioning. Hutcheson, Baxter, Telfer, and Warden (1995) had two groups of children (5- to 6-year-old and 8- to 9-year-olds) witnessed a staged event at their school. They were later interviewed by professional child interviewers, who used free recall and focused questions. Over 70% of children across age groups who omitted details in response to free-recall questions reported some details when prompted with focused questions. This suggests that children possessed the information in memory but needed specific cues to help them retrieve it.

Retrieval cues in the form of props seem to be important in helping children report critical details of events. Goodman, Quas, Batterman-Faunce, Riddlesberger, and Kuhn (1997) assessed children's memory for a voiding cystourethrogram (VCUG), an invasive medical procedure that involves genital touch and can be painful and embarrassing to children. A few days after undergoing the VCUG, children ages 3-10 were interviewed with open-ended questions (e.g., "I need to know everything that happened when you got the test"), followed by similar queries but accompanied with gender-appropriate anatomically detailed dolls and toy doctor kits for children to demonstrate what occurred during the procedure (e.g., "I want you to show and tell me what happened when you got the medical test"). Following the prop demonstration, focused nonmisleading questions (e.g., "Did the nurse touch you down there?") and misleading questions (e.g., "Didn't they take your socks off after they put the tube in you?") were introduced. Children of all ages reported more information and were more likely to report the critical touch with the props than with open-ended questions. This indicates that children are less likely to report important and potentially embarrassing details unless they are directly prompted. It is vital to note, however, that, although preschoolers in the Goodman et al. (1997) study showed an increase in overall recall when the props were used, this was accompanied by a similar increase in errors. Thus, although props can be helpful in interviewing preschoolers, the risk of inaccuracy can be high. Similar results have been found with human figure drawings, which are often recommended and used by therapists and forensic interviewers (Aldridge et al., 2004).

In sum, the main concern with focused questions and props is that although their use usually elicits an increase in critical information (but see Lamb et al., 2007), there is a risk of triggering children's suggestibility by introducing potentially incorrect information. This is because in forensic settings investigators usually do not know the "ground truth" of alleged acts,

and thus using techniques that introduce events believed to have occurred, but that might be false, can potentially contaminate children's accounts.

Effects of Stress and Emotion

Laboratory and naturalistic studies have shown that stressful or highly emotional events are often remembered better than nonstressful events (see Greenhoot & Bunnell, Chapter 3, this volume). The reasons for this phenomenon may have to do in part with an increased release of stress hormones (e.g., cortisol) during emotional experiences, which assist in memory consolidation (see Cahill & McGaugh, 1998). It can be predicted that with enhanced processing a stronger memory trace forms, which consequently is less malleable and more resistant to forgetting. However, in a review of research on children's and adults' memories of traumatic experiences (e.g., medical procedures, natural disasters, violent events, sexual abuse), Pezdek and Taylor (2002) concluded that cognitive principles that apply to memories for nontraumatic events also apply to memories for traumatic events, and although memory for traumatic experiences are generally correct, they appear to be no more accurate than other memories. They based their conclusion on the finding that, similar to memories of nontraumatic experiences, memories of traumatic events (1) are not impervious to forgetting, (2) show an age-related pattern whereby accuracy and amount of details increases with age, (3) are likely to be accurately remembered in gist but not veridical form, and (4) are susceptible to distortion. It seems clear that traumatic memories are subject to the same laws that govern memory for everyday experiences.

Are children accurate and resistant to suggestion when reporting traumatic experiences in legal settings? The answer to this question is, not always. Especially under the conditions that arise in legal contexts, children may not be accurate at reporting and rejecting misleading information about traumatic events. Quas and Lench (2007) found that arousal at encoding and retrieval of a fear-inducing event differentially affected accuracy in children's reports. Children's arousal (as indexed by heart rate) was recorded once while watching a fearful film and again a week later during an interview by either a supportive (warm and friendly demeanor) or unsupportive (cold and detached demeanor) interviewer. Children who exhibited increased arousal at encoding a week earlier made fewer errors in responses to focused misleading questioning than children who had been in a lower state of arousal during encoding. This suggests that memory was enhanced by a strong emotional reaction to the events in the film. This pattern changed, however, when arousal at retrieval was considered. In the unsupportive interview condition, children who exhibited increased arousal made more errors in response to focused questioning than children who

exhibited lower arousal. The association between arousal and memory was not significant in the supportive interview condition. These results suggest that even if a traumatic event is strongly encoded, the accuracy of its retrieval may be compromised when the social context during recall is not optimal.

Quas and Lench's (2007) results directly support findings on the effects of legal involvement and stress on the completeness of children's responses. Being part of certain legal proceedings can be stressful to children; Goodman et al. (1998) reported that pretrial anxiety was higher for children expecting to testify in open court compared with closed-circuit television. In a comprehensive naturalistic study, Goodman, Taub, Jones, and England (1992) monitored 218 children who were involved in legal proceedings stemming from sexual abuse accusations, 55 of whom eventually testified in court. Children who reported greater distress at having to face the defendant were less likely to answer the prosecutor's questions than those who reported lower distress. Thus, the completeness of children's accounts was compromised by the distressful experience.

It is unclear why increased stress at retrieval impairs memory. Malloy, Mitchell, Block, Quas, and Goodman (2007) suggested that children's inability to communicate effectively under high emotional arousal may be due to residual stress from the original event, resulting in focused attention to coping rather than searching memory for relevant information. Alternatively, and more speculatively, increased stress at retrieval may trigger a release of stress hormones that can negatively affect recall. Recent research shows that levels of stress hormones comparable to those that enhance memory consolidation at encoding can also induce impairments at retrieval. de Quervain et al. (2003) reported that adult participants with increased cortisol levels showed impaired cue recall of word pairs learned 24 hours earlier. This impaired recall was also associated with decreased activity in brain regions believed to be important in memory retrieval. Although these are viable explanations for the effect of stress at retrieval, more research is necessary to examine the exact mechanisms and conditions that may mediate this effect. It seems clear, however, that children do experience increased distress in legal settings, which can adversely affect their ability to recall their experiences accurately and in complete form. This condition, however, can be improved by a supportive social context.

Delay

Information stored in memory is likely to fade after long delays. The greatest loss of information occurs in the period immediately after an event. As with adults, children are susceptible to forgetting after an initial experience but the rate of forgetting is steeper. Flin, Boon, Knox, and Bull (1992) compared forgetting rates of young children, 9- to 10-year-old children, and

adults. The target event involved witnessing an argument among adults, which was equally engaging to all age groups. Whereas at the initial interview (1 day after the event) there were no significant differences in overall accuracy among the age groups, at a 5-month interview overall accuracy significantly dropped for children but not for adults. Furthermore, the drop in accuracy was greater for children younger than 9- to 10-years old. The authors concluded that the details of the event were encoded at similar levels by all groups, but the information faded at a greater rate for the children, especially the younger group.

Delay is a relevant factor in forensic settings because children commonly will not provide testimony about criminal acts until months or even years after the original event. In the Goodman et al. (1992) study, some children waited more than 7 months to testify in hearings or in open court. Furthermore, research shows that children who are abused tend to delay disclosure (see Lyon, Chapter 2, this volume). Hershkowitz (2006) reported that, in a sample of approximately 26,000 Israeli children suspected of abuse, 74% delayed disclosures for at least a month after the alleged crime. The effect of delayed disclosure compounded by long intervals in legal proceedings can have an adverse effect on children's memory and their accounts.

Although some studies show that children's memories for salient events can remain accurate over long delays (e.g., Peterson, Parsons, & Dean, 2004), others report that delay increases children's susceptibility to suggestion and reduces accuracy and completeness of their accounts. Burgwyn-Bailes, Baker-Ward, Gordon, and Ornstein (2001) interviewed 3- to 7-year-olds three times (after a few days, at 6 weeks, and at 1 year) following treatment at a plastic surgeon's office for facial lacerations. Interview protocols included various types of questions about events that did or did not occur. To determine one aspect of suggestibility, at each interview, children were asked suggestive questions about absent features of the medical event (e.g., "Did Dr. Hanna put something cold on the hurt place?"). Overall rates of recall were high and did not significantly change over time (78%, 73%, and 72%, respectively); however, assent rates to suggestive questions significantly increased over time (12%, 18%, and 22%, respectively). Because the same protocol was used at each interview, it is possible that repeated testing with the same questions contributed to the highly stable memory trace of both true and suggested events (a topic that is covered in another section). However, because errors were evident even at the first interview, these results also indicate that memory for a highly salient and distressful experience is not immune to suggestibility effects. Furthermore, field studies show that children report significantly less information after a long delay. Lamb et al. (2000) reported that, in a sample of 145 cases of alleged sexual abuse, long delays (5-14 months) were associated with significantly less information reported by children than short delays (less than a month).

An important question is, what happens over long delays when false events have been suggestively planted in children's memory? This question is relevant here because if a child is suggestively questioned during a forensic interview, resulting in the development of a memory for nonexperienced events, it is important to know the likelihood that the false memory will remain after long delays. To determine the long-term stability of false memories, Huffman, Crossman, and Ceci (1997) interviewed a group of children who had participated in a false memory study 2 years earlier (see Ceci, Huffman, Smith, & Loftus, 1994). This reinterviewed group consisted of children who originally assented to having experienced suggested false events (e.g., getting their hand caught in a mousetrap and having to go to the hospital) and had not been convinced that the suggested events were false during debriefing attempts (i.e., children were not fully debriefed). In this second study, children were presented with the same true and false events from the earlier study. The results showed that, whereas the assent rate to true events did not significantly change from Study 1 (80%) to Study 2 (77%), the assent rate to false events from Study 1 (22%) significantly *decreased* in Study 2 (13%). Moreover, further analyses revealed that children were more likely to recant false events than true events. It appears from these results that the rate of survival of memories for suggestively planted events is likely to be low after long delays. It is possible that initial assent rates and errors in these studies were likely due to the demands of the social context rather than real changes in memory (see Brainerd & Poole, 1997, for a review of these issues).

Thus, increased delays between an event and an initial interview are associated with more forgetting and increased suggestibility. Although it is not yet clear what the long-term fate of implanted false memories is, evidence suggests that children's implanted memories are not likely to survive long delays.

FACTORS THAT REDUCE CHILDREN'S SUGGESTIBILITY AND FALSE MEMORIES

In this section, we review relevant literature on factors associated with children's reduced suggestibility and memory distortion and thus increased accuracy: prior event knowledge, repeated experience, multiple nonsuggestive interviews, and source monitoring ability and training.

Event Knowledge

The type of knowledge base children possess about events is an important factor that has been linked to decreased suggestibility. For example, in Goodman et al. (1997), an association was reported between children's prior

knowledge of the VCUG procedure and higher rates of correct responses to suggestive questions. Similarly, Ornstein et al. (2006) found that, controlling for age, prior knowledge about routine doctor's visits was significantly associated with increased recall of a target pediatric examination. Presumably prior knowledge helps children attend to, encode, and integrate relevant details of events, resulting in a well-organized interconnected structure that is easily accessible during retrieval attempts (Ornstein et al., 2006).

The effect of knowledge base on children's memory takes a distinct form when the suggestion involves an entirely new experience. Pezdek and colleagues (Pezdek, Finger, & Hodge, 1997; Pezdek & Hodge, 1999) showed that children are more suggestible if they have schematic representations in memory for the target event. Using information provided by parents, Pezdek and Hodge (1999) asked 19 5- to 7-year-olds and 20 9- to 12-year-olds about true events and suggested that they had also experienced a plausible ("been lost in a mall") and an implausible ("receiving an enema") event. Although across age groups the majority of children (54%) did not report memory for either suggested false event, when they did, it was more likely to occur for the plausible event than the implausible event. Pezdek and colleagues concluded that this effect is due to a lack of event-related knowledge stored in memory for implausible events. When it is suggested to children that an event occurred, they will search in memory for similar episodes of the event. If this search generates related details, then it is likely that the process of constructing a memory of the suggested event will begin. If, on the other hand, the search does not result in activation of related event information, it is likely that the constructive process and resulting false memory will not occur. Thus, because information about implausible events is less likely to exist in memory, memories for suggested implausible events will not be planted. This is an important finding relevant to forensic contexts because an event such as child sexual abuse is reported to be a relatively implausible event for most people. Pezdek and Blandón-Gitlin (2008) reported that the majority of adult participants from the general population (65%) perceived child sexual abuse to be a personally implausible event. Certainly, if the event is plausible for the circumstances of an individual child and the interviewing conditions are highly suggestible, there is an increased risk of planting false events in the child's memory. This problem is further compounded by the fact that in some cases it is difficult to discriminate between accounts of true events and those that are false but familiar to children (see Blandón-Gitlin, Rogers, Pezdek, & Brodie, 2005; Pezdek et al., 2004).

In sum, event knowledge has two distinct effects on children's memory depending on the type of suggestion. Prior knowledge can help children encode and store information about target experiences in a manner that allows them to resist misleading suggestions about an experienced event. However, under some conditions, knowledge about related episodes of a

suggested event can increase the likelihood of children developing false memories.

Repeated Experience

Some criminal acts against children, particularly sexual abuse, rarely occur in isolation. When an experience is repeated, children can be quite accurate and resistant to suggestion. Repetition has been shown to strengthen memories of events. Pezdek and Roe (1995) presented 4- and 10-year-old children with a slide sequence of an event in which four target slides were presented one or two times each. Afterward, a narrative was read to the children that misled them about two target items. On a subsequent recognition memory test, for both age groups, stronger memories (those viewed twice) were more resistant to suggestibility than weaker memories (those viewed once). Powell, Roberts, Ceci, and Hembrooke (1999, Experiment 1) extended these findings to an event that children experienced once or six times over several weeks. They, too, reported that repetition increased memory for the event and resistance to suggestibility. In this study, repetition had a powerful effect of attenuating the detrimental effects of suggestibility, age, and delay on memory. However, if the event was repeatedly experienced with some details varying across repetitions, when children were subsequently asked about specific details of an event that varied across repetitions, the accuracy of their memory was less reliable and they were more vulnerable to suggestive questions. These findings suggest that children's memories of repeated experiences involving fixed details will be strong, and accounts based on those memories are likely to be accurate.

Multiple Interviews

In forensic settings it is common for children to be repeatedly interviewed and sometimes over long periods of time (Goodman et al., 1992; Malloy, Lyon, & Quas, 2007). For example, Malloy and colleagues (2007) reported that, in a sample of sexual abuse cases from Los Angeles, children were formally interviewed, on average, 4.26 times with a range of 1 to 25 times. Informal interviews with the nonoffending parent, siblings, or therapists averaged 1.65 with a range of 0 to 7. Thus, the frequency of recounting the event was greater than four times in some cases. Consequently, it is important to understand how multiple interviews affect children's memory and suggestibility. The general finding is that repeated interviewing, if suggestive, has a detrimental effect on children's memories. For example, Erdmann, Volbert, and Böhm (2004) found that multiple interviews in which nonexperienced events (e.g., falling off a horse, knocked over by a big wave at the beach) were repeatedly suggested to children led to increases in assent

rates over time and resulted in descriptions of false events that could not be distinguished from accounts of true events. However, other research shows that nonsuggestive interviews, like repeated experience, can have a beneficial effect on children's memory.

Potentially, each interview can reactivate the memory of the original event, which can serve to maintain it, reduce the rate of forgetting, decrease suggestibility, and lead to increased recall. This is especially true if an initial interview is conducted shortly after the occurrence of the event. Peterson et al. (2004) interviewed children who had been part of another study assessing memory for a traumatic injury. These children had been interviewed immediately (Interview 1) and 6 months (Interview 2) after the injury. The goal of the Peterson et al. (2004) study was to determine the effects of a delayed suggestive interview on children's recall. Results showed that misleading questions at a 1-year interview (suggestive intervention) had little effect on children's recall during two subsequent interviews conducted 1 week later (Interview 4) and 2 years post-injury (Interview 5). Scores on recall measures were very high—almost at ceiling—even after the misleading interview, which indicates that children's memory for the injury was strong most probably because of repeated interviews with the same interview protocol.

Direct comparisons of delay, repeated interview, age, misleading questions, and interviewer bias on children's reports were made by Quas, Malloy, et al. (2007). In their study, 3- to 5-year-old children played by themselves for 10 minutes in a university's laboratory. This session was followed by a single interview 3 weeks later or three interviews 1 week apart, which included suggestive questions about an interaction with a man. Half of the children in each interview condition were interviewed by a highly biased interviewer who implied that the children had played with a man; the other half were interviewed by a more neutral interviewer who did not imply any interaction. The key comparisons revealed an interesting picture. The worst performance was for children in the *biased single-interview* condition. In memory and suggestibility assessments, this latter group was less accurate than (1) children in the neutral single-interview condition and (2) children in the repeated-interview conditions (biased and neutral). More specifically, despite repeated biased interviews, children in the repeated-interview conditions were more accurate and less likely to falsely report interactions with a man than children who were interviewed once in a biased manner. The age effect was in the predicted direction in most conditions; in general, younger children were less accurate than older children. The researchers concluded that interviewer bias is particularly a problem when children's memories are weak, as was the case in the biased group interviewed for the first time 3 weeks after the event. These results again highlight the importance of an early interview; it can "inoculate" children against the effects of forgetting and bias in subsequent interviews.

Some researchers have not found beneficial effects of multiple interviews, however. The Ornstein et al. (2006) study, in which children's memory for a target pediatric examination was assessed, included delayed interviews at 3 and 6 months after the event. Recall of true information and the ability to deny the occurrence of incorrect details declined over time. Thus, there are conditions under which repeated interviews may not help children's memory. In addition, as previously mentioned, in cases of sexual abuse, children tend to delay disclosure; thus, an initial interview may take place long after the event, which can result in increased vulnerability to suggestion. Therefore, it is possible that in forensic settings the benefit of repeated interviews may not always be realized.

Source Monitoring Ability and Training

Source monitoring refers to the theoretical cognitive process by which we attribute source to a particular memory (Johnson, Foley, Suengas, & Raye, 1988). Certain characteristics of memory representations (e.g., perceptual detail, vividness, contextual, and semantic information) can allow us to determine whether a particular memory is based on real experience (external source) or is the product of our imagination (internal source). Source monitoring errors can occur when we mistakenly attribute an active memory representation (e.g., image of closing the garage door) to a real experience when, in fact, we only thought about it. In forensic settings, source monitoring ability is important because children are likely to be interviewed multiple times by various individuals who, in some cases, may suggest erroneous details. Children may confuse information they heard earlier with memory for a real experience. This risk is compounded when children are asked to "think really hard" or visualize episodes of the events.

Leichtman, Morse, Dixon, and Spiegel (2000, Experiments 2 and 3) reported significant correlations between performance on suggestibility and source memory tasks. Children ages 3 to 6 who were found to be more vulnerable to suggestion showed decreased ability to identify the sources from which information was obtained (e.g., performed vs. imagined, seen vs. heard). Part of this suggestibility effect is thought to be related to social demand mechanisms, whereby children believe that information from a trusted adult is reliable even when it is not. This suggests that source errors can be partly reduced by training children to make careful judgments about the sources of information stored in memory (Poole & Lindsay, 2002).

Poole and Lindsay (2002) used a source training procedure that can be easily implemented in forensic settings. Children experienced target activities during a session with a man referred to as "Mr. Science." Three months later, parents read a story to children about the session with "Mr. Science," which included information about true and false activities. Soon after this

suggestive session, but just before an interview, children assigned to a source training condition were shown three preparation activities by the interviewer that showed differences between performed and talked about actions. For example, in one preparation activity, the interviewer told children that she was going to wipe off the tape recorder, which she proceeded to do. Following this, she told children that sometimes she pushes the button on the recorder to "set the counter," but she did not actually perform this action. Immediately after, children were asked to report, and were given feedback, on which actions she performed and which she only discussed. Analysis of children's recall during a subsequent forensic-style interview showed that, although 3- to 5-year-olds did not benefit from the source training, 6- to 8-year-olds did. For this older group, the error rate in response to focused questions (some of which were suggestive) was half that of the no-training group. Moreover, accurate reports did not decrease with training. This is an important finding because it suggests that a simple procedure in source training can be beneficial in reducing inaccuracy in children's reports.

Although the younger children did not benefit from source training in Poole and Lindsay's (2002) research and other similar studies (Poole & Lindsay, 2001; Leichtman et al., 2000), Thierry and Spence (2002) found that source monitoring training reduced preschoolers' suggestibility. Three- and 4-year-old children saw live and video versions of a science show that included target events. A few days later, before a target interview, children were trained to discriminate between what they had seen live and in the video. Compared with children in a control condition, those in the training condition were more accurate in responding to suggestive questions. This study may have resulted in better training for younger children than in Poole and Lindsay's (2002) research because children had to reach a specified training criterion before they were interviewed, and the interval between the original event and the interview was substantially shorter (3-4 days) than the 3 months in Poole and Lindsay (2002).

Similarly, Bright-Paul, Jarrold, and Wright (2005) found that using age-appropriate source-orienting tasks can substantially reduce preschoolers' suggestibility. Their source-orienting procedure involved verbally or pictorially directing 3- to 7-year-old children to sources of information (film or misleading narrative). The verbal orienting procedure simply asked children whether target information was from the film or narrative, and the pictorial version showed children a card with pictures of a television to represent the film source and a book to represent the narrative source. As expected, suggestibility decreased with age, but the magnitude of the difference between older and younger children was reduced when the picture source-orienting procedure was used.

Together, these studies show that being able to identify the source of information stored in memory can reduce children's suggestibility and inac-

curacy in their reports. Older children benefit from relatively easy-source-training procedures, and provided age-appropriate and favorable conditions preschoolers benefit also.

INDIVIDUAL DIFFERENCES ASSOCIATED WITH SUGGESTIBILITY

An important feature of recent research on social and cognitive factors affecting children's memory is the inclusion of assessments of individual differences, which may be helpful in determining particular children's propensity to suggestibility and false memories. This is important knowledge because in legal settings it is likely that the outcome of a case largely depends on an individual child's report.

In a recent qualitative review of the literature, Bruck and Melnyk (2004) summarized the results of 69 studies that examined the relationship between 17 individual difference factors and suggestibility. They concluded that, although no single factor consistently predicted children's vulnerability to suggestibility, a few factors did show high correlations with suggestibility. In this section, we review five factors found to have a strong association with children's suggestibility and relevant to forensic contexts: age, language ability, inhibitory control, working memory capacity, and attachment styles.

Age

Intuitively, it can be expected that because of lack of experience, children, compared with adults, are more suggestible and their accounts of events less accurate and detailed. The empirical research presented thus far, along with studies that directly examined developmental trends in memory performance, supports this intuition. In a review of six programs of research on the construction of false events in memory, Pezdek and Hinz (2002) concluded that young children are more suggestible than older children and both of these groups are more suggestible than adults. Pezdek and Hodge (1999) found that, whereas 53% of the younger children developed a false memory for nonexperienced events, only 35% of older children did so, and these percentages differed from the 15% of adults in Pezdek et al. (1997) who developed a memory for a plausible false event.

Some studies have shown, however, that children as young 4 years can be resistant to suggestions about abuse-related events (Rudy & Goodman, 1991) and can free recall as much information in forensic interviews as 8-year-olds (Lamb et al., 2003). Similarly, in a short qualitative review of seven studies assessing children's memories for the VCUg procedure,

Sjöberg and Lindholm (2005) reported that, whereas there were expected age-related differences in commission errors (i.e., recall of nonexistent details) when focused suggestive questions were used, there were no age-related differences in regard to the amount of correct information freely recalled. Results such as these have led some researchers to suggest that age differences may be exaggerated in the literature and that tendencies to emphasize young children's heightened suggestibility may be misguided because older children and adults are also susceptible to suggestion (Bruck & Ceci, 2004). In general, however, most studies show clear developmental trends in suggestibility.

Language Ability

The ability to use and understand language has been linked to decreased suggestibility in young children. The complexity of language used by adults in suggestive interviews can be confusing for children. For example, Imhoff and Baker-Ward (1999) found that using developmentally appropriate language during interviews (e.g., "Did you pour some blue slimy stuff into a big spoon?") resulted in preschoolers' reduced suggestibility compared with using standard interview language (e.g., "Did you pour some blue slimy stuff into the big measuring spoon?").

Bruck and Melnyk's (2004) review showed that half of 12 studies assessing various aspects of language ability reported an association with suggestibility in preschoolers: Children with advanced language ability were more resistant to misleading information than those with less advanced language ability. Moreover, significant relations between language ability and suggestibility emerged more clearly when comprehensive language tests were used than when a single measure was administered (Bruck & Melnyk, 2004). For example, Clarke-Stewart, Malloy, and Allhusen (2004) assessed 5-year-olds' language skill using various measures (e.g., language comprehension, expressive communication, language with adults) and assessed their correlation to suggestibility. Children participated in a target event followed by an interview that included various types of suggestive questions. The main finding was that higher scores on all language measures were associated with decreased overall suggestibility. Because language ability improves with age, it would be expected that research involving older children would show similar patterns of results.

Mental Processing Abilities: Inhibitory Control and Working Memory Capacity

These two factors involve the ability to mentally process information effectively. "Inhibitory control" refers to the ability to ignore irrelevant informa-

tion, and "working memory capacity" refers to the ability to hold information online for efficient processing. These two cognitive processes are related to suggestibility because increased ability on both of these dimensions theoretically allows children to ignore irrelevant or suggestive information (inhibitory control) while keeping track of relevant original event information (working memory capacity; Bruck & Melnyk, 2004). Although Bruck and Melnyk (2004) suggested that results of studies examining the relations of these aspects of mental function and suggestibility are too inconsistent to make definite conclusions, it is likely that the reason for this apparent lack of consistency is due to many factors, including the interview context (Bottoms, Quas, & Davis, 2007), differences in tasks (Roberts & Powell, 2005), and measures of suggestibility (Lee, 2004; Scullin & Bonner, 2006) that have been used within and across studies. This variability in methods can account for the difficulty in interpreting results.

However, recent findings suggest that these aspects of mental functioning account for unique variance in children's suggestibility. Alexander et al. (2002) reported that, after controlling for other important factors, inhibitory control significantly predicted children's suggestibility. Three- to 7-year-olds were tested on their ability to remember a traumatic event (inoculations during a regular checkup), and their cognitive inhibition ability was tested using a Stroop-like task in which children were instructed to respond to conflicting stimuli (say "moon" when a card depicted a sun). After statistically removing the effects of age, socioeconomic level, stress, and parental attachment, children with greater ability to ignore irrelevant information reported fewer incorrect details during free recall and were less likely to make errors when suggestively questioned.

Similarly, Clarke-Stewart et al. (2004) investigated the relations between suggestibility and inhibition in real-life situations by creating a composite measure called "adaptive-inhibitory control," which included experimenter observational data and parents' assessment of (1) children's self-control, (2) ability to follow directions, and (3) functioning in demanding situations. Children with better adaptive-inhibitory control were less likely to succumb to suggestion about nonexperienced harm and body touching than were children with lower inhibitory control. Together, these results suggest that inhibition as assessed with single laboratory tasks or multiple observational measures appears to predict children's suggestibility.

Research also shows that working memory capacity predicts children's suggestibility. Ruffman, Rustin, Garnham, and Parkin (2001) found that, after statistically accounting for age and language ability, children with high working memory capacity were more accurate than those with low working memory capacity in responding to questions about an experienced event. However, this relation may be moderated by contextual factors. In Bottoms et al. (2007), 6- to 7-year-old children determined to have low or

high working memory capacity were interviewed about a laboratory experience by either a supportive or an unsupportive interviewer. Across interview conditions, children with low working memory capacity were more suggestible than children with high working memory capacity, confirming earlier findings. In addition, when the interview conditions were considered separately, a large correlation emerged between working memory capacity and suggestibility for children in the nonsupportive interview condition but not for those in the supportive interview condition. Thus, children with low working memory capacity were more suggestible if interviewed in a nonsupportive manner, but the negative effect of low working memory capacity was reduced if the interview was conducted in a supportive manner.

Maternal Attachment and Quality of Parent-Child Relationship

Goodman and colleagues (e.g., Alexander et al., 2002; Edelstein et al., 2004; Goodman et al., 1997) have proposed an association between mothers' attachment patterns and children's ability to remember distressing events. Mothers who show secure attachments in their relationships with significant others, usually defined by lower levels of anxiety and less discomfort with close relationships, are more likely to discuss negative events that their children may experience. These discussions help children encode and store coherent and elaborate representations of such events. On the contrary, insecurely attached mothers, as defined by higher levels of anxiety and discomfort with close relationships, may transmit more fear and be less comforting to their children in the face of negative experiences. This state can lead to weaker encoding and poorer maintenance of the event memory, rendering children more vulnerable to suggestions.

As indicated in Bruck and Melnyk's (2004) review, children of securely attached mothers were less likely to acquiesce to suggestive questions than children of insecurely attached mothers in five of the six studies. In addition, recent research directly examining the quality of parent-child relationships (e.g., parents' attitudes and behaviors toward their children) shows an association between parents' relationships with their children and suggestibility. Clarke-Stewart et al. (2004) reported that fathers' positive support of their children (e.g., enjoys going to places the child likes) and mothers' healthy attachment styles were related to reduced overall suggestibility in children.

Also, of importance is that children of insecurely attached parents may be protected from suggestibility under some conditions. In the Bottoms et al. (2007) study, there were interactive effects of attachment style and interview condition. Children of insecurely attached parents reported less accurately in the unsupportive condition than in the supportive condition. Children

with securely attached parents were not affected by interview condition. Thus, children of insecurely attached parents may be more suggestible in unsupportive forensic interviews. This effect, however, may be reduced if a supportive interview style is adopted.

CONCLUSION

The quality and quantity of information obtained from children in forensic interviews can be increased by understanding and considering social-cognitive factors that affect children's memory abilities and implementing appropriate evidence-based procedures known to enhance children's ability to provide accurate reports. Forensically relevant factors that increase children's suggestibility and reduce the quality of their reports include (1) focused interview questions and props such as anatomically detailed dolls and human figure drawings, (2) high arousal or stress during retrieval of information, and (3) increased delays between initial experience and interview. When interview protocols include focused questions or props, it is likely that children's memory and their reports will be contaminated, thereby decreasing the reliability of the information. The use of props with young children is especially risky: Although props may help to elicit more correct details, they are equally likely to increase errors. Whenever possible, investigators should avoid these interview techniques and implement protocols such as the one developed by researchers at the National Institute of Child Health and Human Development (NICHD; see Lamb, Orbach, Hershkowitz, Esplin, & Horowitz, 2007, for a review of this procedure; see also Saywitz and Camparo, Chapter 6, this volume). Briefly, the NICHD protocol instructs interviewers to use open-ended questions with children of all ages, and if focused questions must be used to deal with omission of critical information, it is recommended that interviewers follow such questions with open-ended prompts.

Stress or increased arousal experienced during retrieval of events can increase children's suggestibility. Research shows that, although traumatic events can be highly memorable, stress experienced at retrieval impairs children's ability to recall details of events. This stress may be experienced during many legal proceedings, including the unsupportive interview context. The deleterious effect of stress may be reduced by providing a supportive environment in which children can focus more on searching memory for important information rather than on self-regulation. Finally, the longer the delay between an experience and the initial interview, the more likely it is that children will forget the experience and consequently be vulnerable to suggestive influences. Increased delay is especially a problem in sexual abuse cases, where children usually delay disclosure of the negative experience. In

these cases in particular, it is important to use investigative techniques that reduce children's suggestibility.

Forensically relevant factors that decrease children's suggestibility and increase the quality of their reports include (1) knowledge base, (2) repeated experience, (3) multiple interviews, and (4) source memory training. Children's knowledge about events may help them resist misleading suggestions and avoid false memories in some cases. Prior or schematic knowledge about events helps to encode new information in a more coherent and well-organized manner that is more resistant to suggestive influences. This can increase the reliability of children's reports. However, under some conditions, prior knowledge may render a child susceptible to false memories. This is when a false event is considered plausible and suggestive interview procedures are employed. However, an important forensic-relevant event, sexual abuse, is perceived to be a personally implausible event by most people in the general population. Thus, it is likely that in the case of sexual abuse the lack of event knowledge reduces children's susceptibility to false memories.

Repeated experience of the same event and multiple nonsuggestive interviews can help children guard against suggestive influences. Repetition serves to keep event memory strong, elaborated, and active over long periods of time. Children's reports under these conditions can be quite reliable. Finally, children's ability to determine whether a particular detail in memory is from suggestions or from actual experience is a cognitive skill that may be influenced by social factors. Thus, it is possible, under some conditions, to train children before providing their accounts to carefully assess whether the to-be-reported information is from interviewer discussions or from actual experiences. This can decrease the detrimental effects of demand characteristics and improve the quality of the information obtained in a forensic interview.

Individual difference factors associated with lower levels of suggestibility include (1) increased age, (2) better language ability, (3) better mental processing abilities, and (4) parents exhibiting healthy attachment styles. Research shows that, although many factors can interact with age to influence levels of suggestibility, the general finding is that younger children are more suggestible than older children and these two groups are more suggestible than adults. Thus, although knowing a child's age is not enough to determine suggestibility, it can be a useful factor to consider when determining appropriateness of interview protocols. Ability to understand language can facilitate young children's resistance to suggestions; children better able to understand questions posed by interviewers are less likely to report erroneous information. Additionally, increased inhibitory control and working memory capacity, aspects of mental processing abilities, can protect children against misleading suggestions. Finally, children whose parents have posi-

ative attitudes toward them and who are securely attached are less suggestible than those whose parents do not show these characteristics. Although in forensic settings it may not be feasible to determine a particular child's mental processing capabilities or parents' attachment styles, it is important to note that a supportive interview context can help children overcome potential deficits in these and other domains.

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