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Recent research on children's testimony about experienced and witnessed events

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Abstract

Research on memory development has increasingly moved out of the laboratory and into the real world. Whereas early researchers asked whether confusion and susceptibility to suggestion made children unreliable witnesses, furthermore, contemporary researchers are addressing a much broader range of questions about children's memory, focusing not only on children's frailties but also on their competencies. In this review, we emphasize work on factors that promote the retrieval and accurate recounting of experienced or witnessed events and the implications of these findings for forensic interview practices. Research shows that children are capable of providing accurate information about their experiences, although their ability to convey the information is affected not only by the qualities of their memories, but also by the types of retrieval mechanisms employed and the quality of the communication between them and their interlocutors. We thus discuss several characteristics of to-be-remembered events that affect memory and are relevant to children's recall in applied settings; retrieval conditions and their effects on the amount and accuracy of the information that children report; and research on investigative interviews conducted in forensic contexts. Because many

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of the variables that influence memory are age-related, developmental changes in children's ability to accurately report, and recount their experiences are highlighted.

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Over the past two decades, research on memory development has increasingly moved out of the laboratory and into the real world with respect to both the questions addressed and the methodological approaches adopted. Increased awareness of the number of alleged crimes for which children are the only available sources of information has prompted extensive research on children's ability to remember and accurately recount events they have experienced or witnessed. Interestingly, this recent interest in memory development from an applied forensic perspective has historical precursors in studies about a century ago examining the ease with which young witnesses could be misled by inappropriate questioning strategies (e.g., Binet, 1900; Stern, 1910; Varendonck, 1911). Whereas these early researchers asked whether confusion and susceptibility to suggestion made children unreliable witnesses, however, contemporary researchers are addressing a much broader range of questions about children's memory, focusing not only on children's frailties but also on their competencies. For example, recent studies have probed the accuracy of children's accounts of known events staged in the laboratory or naturally occurring in the field, the extent to which children's accounts can be manipulated or 'contaminated,' and the extent to which the quality or quantity of information elicited varies depending on the ways in which children are prompted to retrieve information from their memories. We discuss all three types of research in this paper but emphasize work on factors that promote the retrieval and accurate recounting of experienced or witnessed events and the implications of these findings for forensic interview practices.

The evidence reviewed here suggests that children are indeed capable of providing accurate information about their experiences, although their ability to convey the information is affected not only by the qualities of their memories, but also by the types of retrieval mechanisms employed and the quality of the communication between them and their interlocutors. In the first section, we discuss several characteristics of to-be-remembered events that affect memory and are relevant to children's recall in applied settings. Our focus then shifts to retrieval conditions, and their effects on the amount and accuracy of the information that children report. Analogue studies examining techniques and procedures designed to enhance children's recall with potential application in forensic contexts are reviewed in this section. In the third section, we turn to research on investigative interviews conducted in forensic contexts, and the application to this real-world setting of theory and research about memory development. Because many (although not all) of the variables that influence memory are age-related, developmental changes in children's ability to accurately report and recount their experiences are highlighted in each section. Language development, emotional factors, and individual differences relating, for example, to characteristic social tendencies that affect children's willingness to talk and their eagerness to be cooperative and win the approval of interviewers are also important, but are generally beyond the scope of this review.

Event characteristics and children's memory

It was not until the late 1970s and early 1980s that research on memory development began to focus on children's memory for events in which they had been participants or witnesses (see Fivush & Hudson, 1990; Hudson, Fivush, & Kuebli, 1992; Nelson, 1986, 1993; for review). The earliest studies by Nelson and her colleagues indicated that, as children grow older, the length, informativeness, and complexity of their recall memories increase, and these findings have been widely replicated (see Fivush, 1997, 1998; Poole & Lamb, 1998; Saywitz & Camparo, 1998; Schneider & Pressley, 1997, for reviews). The early studies also showed that even very young children can provide temporally organized and coherent narratives (Davies, Tarrant, & Flin, 1989; Flin, Boon, Knox, & Bull, 1992; Nelson & Gruendel, 1981; Saywitz, 1988). In addition, although young children tend to provide briefer free narrative accounts of their experiences than do older children and adults, these accounts are generally quite accurate (e.g., Goodman & Reed, 1986; Johnson & Foley, 1984; Marin, Holmes, Guth, & Kovac, 1979; Oates & Shrimpton, 1991). As time passes, both children and adults forget, making errors of omission much more common than errors of commission among both adults and children (Oates & Shrimpton, 1991; Steward, 1993). These errors are a special problem where children are concerned because their accounts—especially their recall narratives—are often so brief.

These effects of age and time on memory, while common, are not inevitable. For example, knowledge and understanding affect how much both children and adults remember (Bjorklund, 1987; Bjorklund & Thompson, 1983; Bjorklund & Zeman, 1982; Chi, 1978; Chi & Ceci, 1987; Chi & Koeske, 1983; Clubb, Nida, Merritt, & Ornstein, 1993; Landis, 1982; Schneider & Bjorklund, 1992) and laboratory-based studies indicate that the usual age differences in memory can be eliminated or reversed when knowledge and age are pitted against each other (Chi, 1978; Lindberg, 1980). With respect to event memory, recent studies suggest that children who have more knowledge about an experienced event later recall more details about that event than children with less knowledge (Clubb et al., 1993; Greenhoot, 2000; Sutherland, Pipe, Schick, Murray, & Gobbo, 2003), although knowledge can also have negative effects (Ornstein, Baker-Ward, Gordon, & Merritt, 1997a, 1997b). Similarly, although long delays are typically associated with forgetting, as discussed in the next section, this is not always the case. Just how well children remember and recount a particular experience depends on a number of interacting variables.

Traumatic, distressing, and other unpleasant experiences

In the past, forensic professionals often dismissed the relevance of experimental research on children's memory by arguing that the stressful nature of sexual abuse makes memories thereof distinctly different. In fact, considerable controversy persists in the experimental literature concerning the effects of increased arousal or stress on the accuracy of children's memory. Deffenbacher (1983) concluded that "forensically relevant" (i.e., high) levels of stress were associated with diminished accuracy, but others have argued that stress improves children's accuracy (Goodman, Bottoms,

Schwartz-Kenney, & Rudy, 1991; Goodman, Hirschman, Hepps, & Rudy, 1991; Ochsner & Zaragoza, 1988; Steward & Steward, 1996) and still others (Baker-Ward, Gordon, Ornstein, Larus, & Clubb, 1993; Howe, Courage, & Peterson, 1994; Oates & Shrimpton, 1991; Ornstein, Gordon, & Larus, 1992; Peters, 1987, 1991; Peterson & Bell, 1996) have found that arousal either reduces accuracy or has no effect.

Although the association between stress and memory is clearly a complex one (Christianson, 1992), the inconsistent findings may be explained in part by researchers' concern with levels of stress that were generally low and varied from study to study. Recognizing these limitations, researchers have recently examined children's memories of naturally occurring experiences more similar, with respect to the intensity and duration of distress, to the experiences children might be asked to recount during a forensic interview. When the studies involved the VCUg, a painful diagnostic procedure involving genital contact, the to-be-remembered experience is also likely to have involved embarrassment or shame.

In general, children's accounts of painful and/or distressing medical procedures (Goodman, Quas, Batterman-Fauce, Riddlesberger, & Kuhn, 1994, 1997; Ornstein, 1995; Quas et al., 1999; Steward, 1993; Steward, O'Connor, Acredolo, & Steward, 1996), accidental injuries and their treatment (e.g., Howe et al., 1994; Peterson, 1999; Peterson & Bell, 1996; Peterson & Whalen, 2001), and natural disasters (Fivush, Sales, Goldberg, Bahrick, & Parker, 2004; Parker, Bahrick, Lundy, Fivush, & Levitt, 1998) appear to be influenced by many of the same variables that affect memory for neutral or mundane experiences (see Córdón, Pipe, Sayfan, Melinder, & Goodman, 2004, for a recent review). For example, age reliably predicts children's memories of mundane experiences (see Ornstein et al., 1997a; and Schneider & Pressley, 1997, for reviews) in the same way that it affects children's verbal recall of the VCUg test (Goodman et al., 1994; Merritt, Ornstein, & Spicker, 1994; Ornstein, 1995; Salmon, Price, & Pereira, 2002), accidental injuries requiring treatment at an emergency facility (e.g., Howe et al., 1994; Peterson, 1999; Peterson & Bell, 1996; Peterson & Whalen, 2001), and forensic accounts of suspected or alleged sexual abuse (Lamb, Sternberg, & Esplin, 2000; Lamb et al., 2003; Sternberg, Lamb, Orbach, Esplin, & Mitchell, 2001b). Moreover, infantile or childhood amnesia curtails the ability of children and adults alike to recall their earliest experiences verbally, whether or not they were traumatic (Fivush, 2002; Howe et al., 1994; Nelson & Fivush, *in press*; Peterson & Rideout, 1997; Quas et al., 1999). Further, children who have experienced a painful inoculation remembered some aspects of it better than those who witnessed another child experiencing the inoculation (Lindberg, Jones, Collard, & Thomas, 2001), thereby reflecting a general tendency for participants to recall events better than observers (Murachver, Pipe, Gordon, Fivush, & Owens, 1996; Tobey & Goodman, 1992). Just as understanding and knowledge influence memory of more mundane events (e.g., Greenhoot, 2000; Ornstein et al., 1997b; Ricci & Beal, 1998; Sutherland et al., 2003), traumatic experiences that are better understood or explained to children are recalled by them more fully and/or more accurately (Goodman et al., 1994).

There is some evidence that memories of negative experiences endure longer than memories of everyday events, however. When children recall neutral or positive events after extended delays, forgetting is often quite marked (e.g., Flin et al.,

1992; Goodman, Batterman-Faunce, Schaaf, & Kenney, 2002; Hudson & Fivush, 1991; Jones & Pipe, 2002; Ornstein et al., 1997a, 1997b; Salmon & Pipe, 2000; but cf. Fivush & Schwarzmueller, 1998) whereas memories of painful and stressful experiences may change little over periods of several years (e.g., Burgwyn-Bailes, Baker-Ward, Gordon, & Ornstein, 2001; Merritt et al., 1994; Peterson, 1999; Peterson & Whalen, 2001). In one study, for example, children who were very young (approximately 3 years old) at the time of an experience (a hurricane) reported even more information when interviewed 6 years later than they had in an initial interview (Fivush et al., 2004). Of course, these children were probably reminded of their experiences frequently by family members, friends, interviewers, and even by the media. In contrast, retrospective surveys of adults suggest that young victims seldom discussed their abuse with others in childhood (London, Bruck, Ceci, & Shuman, *in press*) and we know that events not discussed may not be well remembered (Fivush, Pipe, Murachver, & Reese, 1997; Fivush, *in press-a,b*). In the only field study examining the effects of delay on children's recall of alleged sexual abuse, Lamb et al. (2000) reported that children interviewed within a month of the alleged abuse were more likely to provide information in response to the interviewers' open-ended prompts and questions than children interviewed following long (5–14 month) delays, although children interviewed early provided no more details in total than those interviewed following the longest delays.

It is unclear whether memories for traumatic experiences involve unique mechanisms or can be accounted for by the same mechanisms that affect memories of other events (see Cordon et al., 2004). Traumatic experiences are often distinctive, so memories thereof might be retained over time better than memories of less distinctive or meaningful events (see Howe, 1997, 2000; and Ornstein et al., 1992; for reviews). Whether or not special mechanisms are involved, however, real-world events such as child abuse may not necessarily be better remembered than memories of events or stimuli studied in the laboratory. First of all, not all incidents of sexual abuse are painful or traumatic, and thus the potentially facilitative effects of arousal and salience cannot be assumed. Relatedly, children's ignorance or misunderstanding of sexual events may make some abusive experiences even less memorable. Second, stress may affect different types of memory encoding and retrieval (e.g., recall, recognition, and reconstructive memory) in different ways. The context in which children are asked to retrieve information about the experienced event—during interviews with child protection service workers, policemen, attorneys, or judges—may be stressful regardless of whether or not the target events were (Goodman et al., 1992). Researchers have not yet studied the effects of stress at the time of recall, although some have studied the effects of social support and of supportive interviewer practices which presumably reduce stress (Carter, Bottoms, & Levine, 1996; Davis & Bottoms, 2002; but cf. Imhoff & Baker-Ward, 1999) and it seems reasonable to expect that stress at the time of recall may hinder retrieval (Nathanson & Saywitz, 2003). Third, whether the event involves shame, perceived responsibility, embarrassment, or guilt, and whether, in turn, it is talked about, reflected on, kept secret, or even negated, may all affect how experiences of abuse or trauma are remembered and recalled over time. Overall, although salience generally affects the memorability of

experienced events, we cannot presume that instances of abuse will always be salient and thus easy to remember.

Repeated events

Early research highlighted the tendency for children to form general event representations (or scripts) of ‘typical’ events instead of remembering particular incidents when similar events were repeatedly experienced (Nelson, 1986; Nelson & Gruendel, 1981). More generally, Nelson has argued that memories serve to facilitate predictions about the future, and that, as a rule, repeated experiences permit better predictions than experiences that happened only once. As a result, children should be particularly attuned from an early age to “what usually happens” (Nelson, 1986).

Memories of repeatedly experienced events may differ from memories of events occurring a single time because there are repeated opportunities to reactivate the memories by rehearsal. Consistent with this, repeated experiences result in better recall of features that are shared across experiences than of those unique to each of them (Fivush, Kuebli, & Clubb, 1992; Murachver et al., 1996; Powell, Roberts, Ceci, & Hembrooke, 1999). Memories of features that are repeated are also more resistant to suggestion and misinformation effects (Connolly & Lindsay, 2001; Gobbo, Mega, & Pipe, 2002; McNichol, Shute, & Tucker, 1999), suggesting stronger memory representations. Components of an event that change across experiences, however, tend to be dropped from children’s accounts and may be more vulnerable to suggestion, at least under some conditions (Connolly & Lindsay, 2001; Fasig, 1999; McNichol et al., 1999; but cf. Powell et al., 1999; Powell, Roberts, & Thompson, 2000). Conversely, children tend to remember unusual events better than specific events that are congruent with their general or script memories (Farrar & Goodman, 1992).

Scripts have disadvantages too, however. When events recur with any regularity, accounts are likely to be skeletal, reflecting common components and the basic structure without the details that may vary from one occasion to another. In addition, both children and adults may blur distinctions among incidents or be influenced by their general knowledge about a class of events when reporting specific events (Martin & Halverson, 1983; McCartney & Nelson, 1981). The passage of time between experience and recall, likely to be months or even years in forensic contexts, increases both the tendency to rely on scripts (Myles-Worsley, Cromer, & Dodd, 1986; Slackman & Nelson, 1984) and the confusion of details from the different episodes (Hudson, 1990; Powell & Thomson, 1997; Slackman & Nelson, 1984). In forensic contexts, it may be important to specify exactly what happened on a particular occasion at a specific time. Inaccuracies reflecting confusions across occasions may adversely influence the perceived credibility of the witness, even though such demands for recall of specific episodes may be unreasonable given what we know about memory for repeated experiences.

Following repeated *traumatic* experiences, over-general memory retrieval may occur, with several episodes summarized by reference to their common characteristics despite requests for specific examples, characterized by distinctive information about particular events, times, locations, people, places, or activities (McNally, 1998; Wil-

liams, 1996; Williams & Dritschel, 1992). Williams (1996) hypothesized that stressful childhood experiences lead depressed individuals to adopt generic retrieval strategies, typical of earlier stages of development, in order to minimize the negative affect associated with some specific features of past events. Children who were victims, witnesses, and both victims and witnesses of family violence were significantly more depressed than children who were not victims of physical abuse (Sternberg et al., 1993) and among these children, the proportion of generic responses in the children's accounts of earlier family experiences were positively correlated with their depression scores (Orbach, Lamb, Sternberg, Williams, & Dawud-Noursi, 2001).

Recognizing the imperatives of the courtroom, several researchers have recently examined factors affecting the ability to report specific single experiences from a sequence of repeated similar experiences without confusing them (see Roberts, 2002; Roberts & Powell, 2001, for review). Powell and Thomson (1997), for example, examined how well children could recall specific details about an event that was experienced six times, with minor variations in some details but the same basic event structure. When the 4- to 5- and 6- to 8-year-old children were asked to recall the final instance of the event, they frequently recalled details from the earlier instances, rather than the final instance (see also Farrar & Goodman, 1990; Fivush et al., 1992; Hudson, 1990). These findings indicate that children can maintain accurate memories of what happened even though they may confuse episodes and not remember accurately when or as part of which specific occasion something happened. Such migration of details across episodes and confusion regarding source are more likely among younger than older children, particularly over time.

Should forensic psychologists be concerned with such "source misattributions" or should the courts be encouraged to relax the requirement that children recall specific episodes and, instead, allow children to provide generalized accounts? Although there is some justification for considering the real world implications of children's script formation, we should resist over-generalizing these findings because factors other than repetition can affect children's general event representations or scripts. Children can acquire knowledge about events not only from their own unique or repeated personal experiences, but also from vicarious sources such as conversations, television, and books (Roberts & Powell, 2001; Sutherland et al., 2003). As a result, generalized event accounts could reflect confusions not only among repeated, similar experiences, but also among similar events experienced personally and vicariously. Unfortunately, research on how information from these sources influences children's general event memories is sparse. In recognition procedures, for example, children confuse episodes they experienced as well as episodes they experienced and heard about (Poole & Lindsay, 2001) or experienced and observed (Roberts & Blades, 2000; Thierry, Spence, & Memon, 2001). It is unclear how much information from other sources is incorporated into free narratives and further systematic research is clearly needed. At present, we have to acknowledge, along with Roberts, that the children who are abused repeatedly and are most in need of intervention, may find it hardest to provide the kinds of accounts required by the courts.

Is it possible to enhance the accuracy with which children recount specific experiences, as distinct from other, similar experiences? The tendency to make script-related

confusions generally declines with age (Collins, 1970; Collins & Wellman, 1982; Collins, Wellman, Keniston, & Westby, 1978) and children are less likely to make source errors when asked for open-ended, free recall accounts than when asked specific questions (Roberts & Powell, 2001). With older but not with 3- to 4-year-olds, it can be helpful to ask explicitly whether they are describing something they saw (or experienced) as opposed to something that someone told them about (Leichtman, Morse, Dixon, & Spiegel, 2000; Lindsay & Johnson, 1989; Quas, Schaaf, Alexander, & Goodman, 2000; Zaragoza & Lane, 1994; see Roberts, 2002; Roberts & Powell, 2001, for reviews).

Several researchers have attempted to improve children's source monitoring performance and their ability to recall specific experienced events accurately and without intrusion of information from other similar experiences. Saywitz and Snyder (1993), for example, showed that script-based errors can be reduced by pre-interview counseling or instruction and Thierry et al. (2001) found that children monitored the source of their memories better when asked misleading questions after they had been trained to monitor the source of information actively. Poole and Lindsay (2002) likewise found that having children monitor the source of seen and heard events in a training phase helped 7- to 8-year-olds (but not 3- to 4-year-olds) to distinguish between activities. Conversely, asking children to recall experiences regardless of source and then asking for source attributions does not help reduce confusions (Powell & Thomson, 1997; Priestley & Pipe, 1997). Moreover, *repeatedly* recalling seen and imagined objects without regard to their source leads adults to be more confused and to make more source monitoring errors in subsequent memory tests (Henkel, 2004). This appears to be true of children, too (Goh, Thierry, Murray, & Pipe, 2004).

Recalling temporal information

In applied settings, information about temporal attributes such as the number, timing, and sequence of event occurrences may uniquely define specific autobiographical episodes (Tulving, 1972, 2002) and allow the retrospective structuring of narrative reports about experienced events. Although laboratory studies have systematically examined the development of temporal concepts (e.g., Friedman, 1978, 1992), there has been surprisingly little research on memory for temporal information in applied contexts. In a recent study, Orbach et al. (2004) highlighted developmental improvements in 4- to 10-year-olds' ability to report temporal information, both spontaneously and in response to interviewers' temporal requests, about alleged abusive incidents. The findings were consistent with previous evidence that some types of temporal information are reported by children at a much earlier age than predicted by Piaget and that the amount reported gradually and incrementally increases with age (Brown & French, 1976; Fivush & Haden, 1997; Strube & Weber, 1988), whereas reports of other types of temporal information rise more dramatically around 8–10 years of age, as predicted by Piaget (Droit-Volet, Clement, & Wearden, 2001; Friedman, 1978, 1992; McCormack, Brown, Smith, & Brock, 2004). Nearly three-quarters of the reported temporal information tabulated by Orbach and her colleagues was retrieved from recall rather than recognition memory and was thus more likely to be accurate.

In sum, it is clear that children can remember and recall experiences, sometimes over long time periods, and this is especially likely when the experience was highly distinctive, as is frequently (although not always) the case with distressing and traumatic experiences. Recalling one of several similar experiences may be particularly difficult, however, and details are likely to be confused across episodes. Accuracy can be enhanced when children successfully focus on individual events, although confusions among episodes do not necessarily cast doubt on the accuracy or credibility of child witnesses. How children are questioned can, however, have dramatic effects on their accuracy and it is to a consideration of the ways in which children's memories are tapped that we now turn.

Memory retrieval in the real world

Recall vs recognition memory

From an applied perspective, the distinction between recall and recognition memory is crucial. When adults and children are asked to describe events from free recall (“Tell me everything you remember...”), their accounts may be brief and sketchy, but are more likely to be accurate. When asked for more details using open-ended free-recall (e.g., “Tell me more about that” or “And then what happened?”) or recall (e.g., “When did that happen?”) prompts, children often recall additional details. When interviewers prompt with focused questions such as “Did he have a beard?” or “Did this happen in the day or in the night?” however, they shift from recall to recognition testing, and the probability of error rises (Dale, Loftus, & Rathbun, 1978; Dent, 1982, 1986; Dent & Stephenson, 1979; Gee, Gregory, & Pipe, 1999; Goodman et al., 1991; Hutcheson, Baxter, Telfer, & Warden, 1995; Lamb & Fauchier, 2001; Oates & Shrimpton, 1991; Orbach & Lamb, 2001), especially when the question is phrased to elicit agreement with the interviewer (Cassel, Roebbers, & Bjorklund, 1996; Greenstock & Pipe, 1996; Peterson, Dowden, & Tobin, 1999; Walker, 1997; Walker & Hunt, 1998). Recall memories are not always accurate, of course, especially when there is pressure on children to provide information of which they are unsure, the events occurred long before the interview, or there have been repeated opportunities for either pre- (Leichtman & Ceci, 1995) or post-event contamination (Leichtman & Ceci, 1995; Poole & Lindsay, 1995, 1996; Poole & White, 1993; Warren & Lane, 1995). Nonetheless, accounts based on open-ended questions are much more likely to be accurate than those elicited from the child using recognition cues or prompts because they activate recall memory. Most focused questions, in contrast, activate recognition memory, focus respondents on domains of interest to the investigator and exert greater pressure to respond or agree with the interviewer, whether or not the respondents are sure of the response. Recognition probes are also more likely to elicit erroneous responses in eyewitness contexts because of response biases (i.e., tendencies to say “yes” or “no” without reflection) and false recognition of details that were only mentioned in previous interviews or are inferred from the gist of the experienced events (Brainerd & Reyna, 1996).

Contamination of children's recall

Whatever the vagaries and strengths of children's memories, the competency of child witnesses is often doubted on the grounds that children are too susceptible to influence by misleading questions or other sources of misinformation (Bruck & Ceci, 1999; Ceci & Bruck, 1993, 1995; Ceci & Friedman, 2000). Suggestibility involves complex social, communicative, and memory processes and it is thus not surprising that research on children's suggestibility initially appeared to reveal a mixed and confusing picture (Ceci & Bruck, 1993; Ceci, Ross, & Toglia, 1987a, 1987b; Lindberg, Keiffer, & Thomas, 2000). For example, reports that children, in general, and preschoolers, in particular, appeared to be highly susceptible to suggestion (e.g., Ceci et al., 1987a; King & Yuille, 1987; Toglia, Ceci, & Ross, 1989; see Bruck & Ceci, 1999; Ceci & Friedman, 2000; McAuliff, Kovera, & Viswesvaran, 1998, for reviews) appeared inconsistent with reports that children as young as 3- to 4-years-old were seldom misled by questions such as "Did he keep his clothes on?," "Did he kiss you?," and "He took your clothes off, didn't he?" which suggested actions quite different from those that were witnessed or experienced (Goodman & Aman, 1990; Goodman, Aman, & Hirschman, 1987; Goodman et al., 1991; Goodman, Rudy, Bottoms, & Aman, 1990; Goodman, Wilson, Hazan, & Reed, 1989). When misleading questions refer to details observed or experienced in other contexts instead of being totally foreign (Roberts & Blades, *in press*) and when the actions are more ambiguous and the suggestions more plausible or congruous with the event (Lindberg et al., 2000; Pezdek & Hodge, 1999; Steller, 1991), children appear less resistant to suggestion. As Lindberg et al. (2000) point out, "The controversies in this area may therefore be more the result of differential selection of variables, tasks, contexts and populations by different investigators than anything else . . ." (p. 556).

Explanations of suggestibility have included social, cognitive, and individual difference variables. Children may respond inaccurately because they believe that the interviewer would prefer a particular response (Ceci & Bruck, 1993), are offered incentives for responding in a certain way, do not understand the questions, but are eager to be cooperative (e.g., Hughes & Grieve, 1980), respond to stereotypes about the target individual (Leichtman & Ceci, 1995), retrieve the most recently acquired information about the event in question (even if this came from a misleading conversation), although they might be able to retrieve information about the actual event if prompted to do so (Newcombe & Siegal, 1996, 1997), or suffer from genuine source-monitoring confusion that prevents them from discriminating between the original event and misinformation about it (Poole & Lindsay, 1997; Zaragoza & Lane, 1994). Moreover, misleading or suggestive questions are most likely to be influential when the memory is not rich or recent (Holliday, Douglas, & Hayes, 1999; Marche, 1999; Pezdek & Hodge, 1999; see Roberts & Powell, 2001), when the content was imagined rather than experienced (Foley & Johnson, 1985), and when the interviewers appear to have such authority or status that witnesses feel compelled to accept their implied construction of the events (Ceci et al., 1987a, 1987b). Similarly, error-inducing retrieval conditions, including reliance on recognition prompts, dolls or props or instructions to think about nonevents, "pretend," or

“guess” may all increase the susceptibility to suggestion as well (e.g., Bruck, Ceci, Francouer, & Barr, 1995; Bruck, Ceci, Francouer, & Renick, 1995; Cassel et al., 1996; Ceci, Huffman, Smith, & Loftus, 1994; Garven, Wood, Malpass, & Shaw, 1998; Leichtman & Ceci, 1995; Thompson, Clarke-Stewart, & Lepore, 1997) whereas suggestibility declines when children are counseled only to report experienced events (Poole & Lindsay, 1996).

Subtle differences in the interviewers' style may also affect children's suggestibility. Goodman et al. (1991) reported that 3- to 7-year-olds were equally resistant to suggestions by “nice” and more neutral interviewers, whereas Davis and Bottoms (2002) and Carter et al. (1996) found that 6- and 7-year-old children interviewed by supportive interviewers made fewer errors in response to misleading questions than did children interviewed by neutral or nonsupportive interviewers. Saywitz, Geiselman, and Bornstein (1992) found that “neutral detectives” elicited less inaccurate and more accurate information from 8- to 10-year-old children whereas “supportive detectives” elicited both more accurate and more inaccurate details. Goodman et al. (1989) reported that 7- and 10-year-old children were surprisingly likely to accept suggestions made “in an atmosphere of accusation” four years after the event being recalled (Goodman & Clarke-Stewart, 1991).

As discussed elsewhere in this review, students of suggestibility have focused recently on both the conditions that increase the likelihood that children will accept misleading suggestions and misinformation, including memories of whole events that never occurred as well as with the conditions that may reduce children's susceptibility to suggestion (e.g., Poole & Lindsay, 1997; Thierry, Lamb, & Orbach, 2003).

Memory retrieval techniques in applied contexts

Because the information that needs to be recounted in forensic interviews may cause feelings of guilt, shame, embarrassment, and responsibility, and because of the way children have been socialized to communicate with adults, children rarely ‘volunteer’ detailed and complete accounts of abusive events. Interviewers thus face the daunting task of eliciting information about the sexual event, the temporal and spatial context in which it occurred, and the people involved. In this section, we review recent research on techniques designed to enhance children's free-recall while avoiding the risks and errors which often accompany non-spontaneous memory retrieval.

Specific techniques examined in laboratory analog contexts include providing children with either items (Gee & Pipe, 1995; Smith, Ratner, & Hobart, 1987) or representations of items (Goodman & Aman, 1990; Price & Goodman, 1990; Priestley & Pipe, 1997; Salmon, Bidrose, & Pipe, 1995) associated with the to-be-remembered event, revisiting the context in which the event occurred (Pipe & Wilson, 1994; Priestley, Roberts, & Pipe, 1999; Wilkinson, 1988), or drawing during interviews (Brennan & Fisher, 1998; Butler, Gross, & Hayne, 1995; Gross & Hayne, 1998). Although these techniques all enhance the amount of information retrieved at least under some conditions (see Salmon, 2001, for review), investigative interviewers seldom know which props might be relevant, and need to avoid introducing props at times that

would make them suggestive. In addition, analog studies show that, when children interact with the prop items, showing as well as telling, accuracy decreases markedly, and that the effects on accuracy are even more marked when young children are shown toys and models (Gordon et al., 1993; Salmon, 2001; Salmon et al., 1995; Salmon & Pipe, 1997; Steward & Steward, 1996), presumably because young children are more vulnerable to suggestion and are less capable of representing their experiences using objects (DeLoache, 1995). In a comparison of three approaches to interviewing children, furthermore, Lindberg, Chapman, Samscock, Thomas, and Lindberg (2003) recently found that when prop items were available, the interviewers curtailed the period of free recall.

Human figure drawings, provided by the interviewer, are frequently employed by and widely recommended to therapists and forensic interviewers, but they have seldom been studied systematically (Poole & Lamb, 1998). Children may also be asked to draw during the interview. Existing studies suggest that drawing during interviews can enhance children's recall in some contexts (see Salmon, 2001, for a review). Drawing especially facilitates the retrieval of verbal information about objects rather than actions and may enhance retrieval by older children but not by 3- to 4-year-olds (Butler et al., 1995) even though younger children are precisely those most in need of external support. Following very long delays (Salmon & Pipe, 2000), or when used in combination with suggestions about false events (Bruck, Melnyk, & Ceci, 2000), drawing also tends to increase the number of errors children make. Clearly, further research is needed on how, when, and whether drawing should be introduced in forensic contexts.

The idea that reinstatement of the context in which an event occurred will result in better recall of details about the event stems from Tulving's (1983; Tulving & Thomson, 1973) principle of encoding specificity, according to which the congruence between the contexts of encoding and recall fosters accurate retrieval. Both analogue studies (e.g., Malpass, 1996; Pipe & Wilson, 1994; Price & Goodman, 1990; Priestley et al., 1999; Saywitz et al., 1992; Wilkinson, 1988) and forensic field studies (Bowen & Howie, 2002; Hershkowitz et al., 1998; Orbach, Hershkowitz, Lamb, Sternberg, & Horowitz, 2000) have confirmed that physical context reinstatement (exposure to the actual setting in which the TBR event occurred) and mental context reinstatement (the guided mental reconstruction of the setting in which the TBR event occurred) can facilitate children's recall of that event. Indeed, exposure to context information 24 h prior to an interview can have the same beneficial effects as exposure to the context during the interview (Priestley et al., 1999).

Mental context reinstatement (MCR) has most often been studied as one of the primary and most influential components of the Cognitive Interview (CI) (Bekerian, Dennet, Hill, & Hitchcock, 1990; Fisher & Geiselman, 1992; Memon & Bull, 1991). Child witnesses interviewed using the CI report more accurate information than children interviewed using other strategies (see meta-analysis reported by Köhnken, Milne, Memon, & Bull, 1999; also Bowen & Howie, 2002) and although more inaccurate details are reported, too, the accuracy rate appears to be unaffected. The CI also reduces the contaminating effects on memory of misleading information (Bekerian & Bowers, 1983; Geiselman, Fisher, Cohen, & Holland, 1986; Malpass, 1996)

and appears especially helpful when the TBR event is actually experienced rather than passively viewed.

Other techniques have also been designed to overcome children's cognitive limitations and help them recount past experiences more fully (Camparo, Wagner, & Saywitz, 2001; Poole & Lindsay, 1995; Saywitz & Moan-Hardie, 1994; Saywitz & Snyder, 1996; Warren, Hulse-Trotter, & Tubbs, 1991). The best-known of these techniques is the Narrative Elaboration Technique (NET) (Saywitz & Snyder, 1996; Saywitz, Snyder, & Lamphear, 1996) which involves pre-interview modeling, practice, and feedback about the kinds of information needed by the listener. Children are also trained to use cue cards as reminders of what to talk about (the participants, the setting, actions, conversation and affect associated with the event). In analog contexts, the NET helps children provide more complete and equivalently accurate event reports (Brown & Pipe, 2003a, 2003b; Camparo et al., 2001; Dorado & Saywitz, 2001; Saywitz & Snyder, 1996). Further, Camparo et al. (2001) reported that children trained and interviewed with the NET were not more likely than children interviewed using a standard interview format to talk about a fictitious event although some children (from all of the experimental conditions) attempted to describe this non-event during prompted recall or specific questioning when their initial denials of the event were ignored. These findings point to the risks of repeated prompting when children have repeatedly indicated that they do not recall the event.

Although the NET can facilitate children's reports of experienced events, time and resources are often limited in applied settings, making it difficult to incorporate pre-interview training sessions. Interestingly, several researchers have shown that providing verbal prompts for the same categories of information cued using the NET cue cards, even without training in how to talk about the past, was just as effective as when children were trained to use the NET (Bowen & Howie, 2002; Brown & Pipe, 2003a, 2003b; Elischberger & Roebbers, 2001). Other researchers have shown that streamlined versions of the NET, involving training immediately prior to the interview, also appear to be effective, although they increase variability in the amounts of information children recall (e.g., Brown & Pipe, 2003a; Camparo et al., 2001; Dorado & Saywitz, 2001; Saywitz et al., 1996). Indeed, variance in performance has been a feature of all studies using the NET, suggesting that some children benefit from the technique more than others do (see Brown & Pipe, 2003a, for a discussion). Similarly, Poole and Lindsay found that simply asking children to report what they saw and heard produced increases in the amounts of information reported (Poole & Lindsay, 1995), as did asking children to talk about different categories of information (see also Quas et al., 2000). In all of the studies examining the NET, however, children were interviewed about neutral or fun experiences, and were unlikely to be reluctant participants in the interview. The NET has not been explored in forensic settings where the timing of the cues relative to the disclosure of relevant information might influence their suggestiveness and thus their suitability, furthermore.

Lindberg et al. (2003) recently compared three 'realistic' investigative interview techniques in an analogue study using student interviewers. There were few differences between the Step-Wise Interview (Yuille, Hunter, Joffe, & Zaparniuk, 1993) and the Modified Structured Interview developed by the authors, and both were superior to

a doll play interview adapted from that used by a child protection agency. Free recall yielded the most accurate information, with directed recall more likely to induce errors. The decreased accuracy with additional probing may, however, reflect interviewers' reversion to specific and closed questioning techniques, as they frequently do in the field (see below). Although the student interviewers attended different 1 h training sessions, the actual questions and prompts they used were not analyzed.

In sum, many researchers have conducted laboratory-based and analog studies designed to document the vulnerability of children's eyewitness accounts to misleading questioning and suggestions, and increasing numbers have explored alternative means of enhancing children's reports without decreasing accuracy. In general, definitive conclusions about such techniques as having children draw during the interview or refer to human figure drawings must await further research, especially research in field contexts. It is to field research that we now turn.

Research on investigative interviews in the field

Research reviewed earlier in this paper suggests that interviewers should maximize the reliance on recall memory retrieval by offering open-ended prompts so as to minimize the risk of eliciting erroneous information. Unfortunately, however, focused utterances are much more common in the field than open-ended questions are. Research in the United States, the United Kingdom, Sweden, and Israel shows that the over-reliance on focused questions is evident regardless of the children's age, the nature of the offenses, the professional background of the interviewers, or the utilization of props and tools like anatomical dolls (Cederborg, Orbach, Sternberg, & Lamb, 2000; Craig, Sheibe, Kircher, Raskin, & Dodd, 1999; Davies, Westcott, & Horan, 2000; Lamb, Hershkowitz, Sternberg, Boat, & Everson, 1996; Lamb et al., 1996; Sternberg, Lamb, Davies, & Westcott, 2001a; Sternberg et al., 1996; Walker & Hunt, 1998). It has proven surprisingly difficult to change interviewers' behavior, however, even when they understand the value of high quality interviewing and believe that they are indeed following best practice guidelines, making extensive use of open-ended prompts. In addition to explaining "why" interviewers should interview differently, therefore, we adopted a more prescriptive approach, training interviewers to follow the very detailed NICHD Investigative Interview Protocol (Orbach et al., 2000), which incorporates all the practices about which there is professional consensus. The protocol thus includes an introductory phase in which ground rules and expectations are explained, and there is opportunity for rapport-building and practice in retrieving detailed accounts of neutral experienced events. The transition to discussion of possible abuse is non-suggestive, and retrieval of information about experienced events is elicited using open-ended prompts as much as possible.

Research on the NICHD protocol

Field studies show that use of the NICHD protocol indeed improves the overall informativeness of forensic interviews. Two independent field studies demonstrated

that (1) interviewers trained to use the NICHD protocol adhere to recommended practices more than interviewers who do not use the protocol and (2) children interviewed using the NICHD protocol provide more free-recall details than do children interviewed without the protocol (Orbach et al., 2000; Sternberg et al., 2001b). Overall, interviewers using the NICHD protocol elicit more information using open-ended questions, conduct better organized interviews, and are more likely to follow focused questions with open-ended probes (pairing) than are interviewers questioning alleged victims of the same age without the use of the protocol (Orbach et al., 2000; Sternberg et al., 2001b). Moreover, interviewers who follow the NICHD Protocol avoid more potentially dangerous interviewing practices than do interviewers who improvise.

Sternberg and her colleagues (1997, 2001b) showed that practice responding to open-ended prompts about neutral experienced events in the early ('presubstantive') phase of forensic interviews indeed allowed children to produce more information from recall memory in response to the first substantive prompt. Using this 'narrative enhancing' technique, interviewers refocused children on details they had provided earlier (e.g., actions, objects) and paired them with invitations to "tell everything about" them. Similarly, these interviewers used actions as temporal cues, paired with invitations to "tell what happened just before/after [...]", or during the time elapsing between two such actions ("time-segmenting cues"). The NICHD narrative enhancing technique has been extensively tested in experimental field studies (e.g., Aldridge et al., 2004; Lamb et al., 2000, 2003; Orbach et al., 2000; Orbach & Lamb, 2000; Sternberg et al., 2001b; Sternberg, Lamb, Esplin, Orbach, & Hershkowitz, 2002), although the relative effects on accuracy of providing category cues (as in the NET) and using child-provided information as cues as in narrative enhancement have yet to be examined.

Lamb et al. (2003) found that children as young as four years of age interviewed using the NICHD protocol provided substantial amounts of forensically important information about alleged abuse in response to free-recall prompts. On average, almost one-half of the information provided by 4- to 13-year-old children in the studies by Lamb et al. (2003), Orbach et al. (2000) and Sternberg et al. (2001b) came in response to free-recall prompts. In general, invitations also elicited more forensically relevant details than the other types of utterances did. Together, these findings show that young children are capable of providing most of the information (Who? What? When?) needed by forensic investigators in response to free-recall prompts, thereby reducing reliance on the more risky (potentially contaminating) yes/no and forced-choice questions.

Lamb et al. (2003) also showed that cued invitations, particularly those that remind children of actions they have previously mentioned, constitute effective ways of triggering the recall of information. Interestingly, action-based cues (e.g., C: "He touched my private." I: "Tell me more about the touching") are consistently more effective than all other types of cues, regardless of age (Lamb et al., 2003). By structuring recall of experienced events, associating them with actions that have been mentioned, and breaking them into smaller units or segments of time, cued invitations enhance the capacity of young children to reconstruct past events and to

elaborate upon their narrative accounts, avoiding interviewer contamination during the recall. At all ages, furthermore, more information would have likely been elicited if the interviewers had made greater use of cued invitations when general invitations appeared to be ineffective.

Drawings, dolls and context reinstatement in forensic settings

As noted in the previous section, human figure drawings are frequently used by clinicians and investigative interviewers, although little is known about how best to use them. In a recent study involving interviews with alleged victims of abuse, Aldridge et al. (2004) showed that anatomical drawings elicited additional forensically important information from alleged victims of sexual abuse even after the investigators believed that they had exhausted the children's memories using the NICHD protocol. The additional information was obtained at a price, however, as the interviewers relied more on focused prompts when using the drawings even though, as noted earlier, such prompts are more likely to elicit inaccurate information than recall prompts are. Interestingly, both the absolute and relative amounts of information obtained after introduction of the drawings decreased with age, suggesting that the oldest children, having better developed retrieval strategies, provided more complete accounts of their experiences in the standard part of the interview, whereas the younger children benefited more from the concrete retrieval cues (cf., Ackerman, 1981, 1985). To minimize contamination, Aldridge et al. recommended that the anatomical drawings be introduced as late as possible in the interview, that the focused prompts be non-suggestive, and that each affirmative response to a focused question be followed by an invitation for open-ended recall. It remains the case, however, that the accuracy of the information retrieved with the assistance of such tools remains unknown.

The use of dolls in forensic interviews has been controversial, because of the possibility that they are suggestive, distract children from the task of talking about the specific experience, and encourage play and fantasy (e.g., Ceci & Bruck, 1995). Thierry, Lamb, Orbach, and Pipe (2004) recently examined the use of dolls in forensic interviews and found some support for these concerns, particularly when the dolls were used with younger children. Although the study involved forensic interviews, they were not conducted following the NICHD interview protocol and the interviewers introduced the dolls at their discretion. Thierry et al. found little evidence that the dolls enhanced children's free narrative accounts (see also Lamb et al., 1996; but cf Saywitz, Goodman, Nicholas, & Moan, 1991; Goodman et al., 1997), but they did lead to a greater number of contradictions in children's accounts, and also to more fantasy and play on the part of the younger children. For the older children, the dolls appeared to facilitate verbal recall, suggesting that they played a memory retrieval rather than a communicative function. In short, Thierry et al.'s results were consistent with those of laboratory/analog studies showing that dolls should not be used when interviewing young children (e.g., Greenhoot, Ornstein, Gordon, & Baker-Ward, 1999; Salmon, 2001; Salmon et al., 1995; Steward & Steward, 1996).

Components of the cognitive interview have also been examined in field studies (e.g., Hershkowitz et al., 1998; Hershkowitz, Orbach, Lamb, Sternberg, & Horowitz,

2001). Although some forensic investigators were concerned that it might be stressful or traumatic to re-expose alleged victims to the physical contexts in which they were allegedly abused, Hershkowitz et al. (1998) reported that no children were anxious about revisiting those settings (none of the settings were the children's homes). Despite having been exhaustively interviewed in the investigators' offices, furthermore, the children were able to provide many new details (about 25% of the total) when re-interviewed at the scene of the alleged events, although it was not possible to distinguish between the effects of repeated interviewing and context reinstatement. When alleged victims were interviewed only once either in the interviewer's office or at the scene of the crime, Orbach et al. (2000) found that interviewing at the scene had no benefit, suggesting that Hershkowitz et al.'s findings might have been attributable to the benefits of re-interviewing.

Hershkowitz and colleagues (Hershkowitz et al., 2001) subsequently showed that although mental context reinstatement (MCR) did not increase the total amount of information provided by alleged victims of sexual abuse, it did enhance the amount of information retrieved using open-ended as opposed to focused prompts and hence was of benefit because freely recalled information is more likely to be accurate. In a study comparing the effectiveness of physical and mental context reinstatement (Hershkowitz, Orbach, Lamb, Sternberg, & Horowitz, 2002) MCR was found to have an especially powerful effect on the youngest (4- to 6-year-old) children (Hershkowitz et al., 2001) whose accounts of alleged abuse tend to be the most sparse and skeletal, despite earlier concerns that the CI might not be effective with preschoolers (Geiselman & Padilla, 1988; Memon, Cronin, Eaves, & Bull, 1993; Saywitz et al., 1992). MCR techniques can easily and non-suggestively be incorporated into forensic interviews. As with any technique, there may be conditions under which MCR increases errors (for example, if there is confusion about a specific event or its location), although these boundary conditions have yet to be explored.

In sum, despite widespread claims that preschoolers cannot retrieve information in response to open-ended questions, it is clear that children as young as four years old can provide substantial amounts of information in response to recall and free recall prompts. Indeed, regardless of age, children of 4- to 13-years of age can provide at least half of the information they provide in response to open-ended prompts. These levels of performance have been demonstrated using the NICHD Investigative Interview Protocol and it is not clear which of the techniques incorporated in this protocol—explanation of ground rules, practice retrieving episodic memories, substantive incident retrieval using free recall, recall, and cued recall prompts—are most important in facilitating narrative retrieval. It remains possible, if not likely, that different factors are more important at different ages.

Conclusions

The research reviewed here illustrates the dynamic interchange currently taking place between researchers exploring questions of applied relevance and those with a more theoretical focus. On the one hand, questions initially raised because of their

applied relevance, such as the effects of an event's characteristics on its memorability or children's ability to recall one of several similar experiences, have in turn raised interesting theoretical questions regarding the way in which memories are represented. In addition, new theoretical approaches to 'old' questions about suggestibility and misinformation have followed attempts to apply lessons from forensic contexts. On the other hand, research that was initially conducted only in experimental laboratory contexts, including work on effective retrieval or recall enhancement strategies, is now being conducted in both analog and forensic field settings.

Many important questions remain unanswered, but some conclusions can be offered with a degree of certainty. Specifically, children often *can* remember important details of incidents that they have observed or experienced, and although their accounts can be manipulated, sensitive interviewers who are aware of children's capacities and deficiencies can avoid many of the problems posed by questions that force children to operate at or beyond the limits of their capacities and instead take advantage of strategies and techniques that motivate children to be informative and provide them with the cognitive support or scaffolds that help them retrieve as much information as possible, uncontaminated by the interviewers' beliefs and expectations. The convergence between experimental, laboratory analog, and forensic field research in the last decade has made unprecedented progress possible (see Lamb & Thierry, *in press*).

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