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What happened?: a look at events and their impact on memory and suggestibility

Jennifer Marie Knopf
University of Dayton

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WHAT HAPPENED?: A LOOK AT EVENTS AND THEIR IMPACT ON
MEMORY AND SUGGESTIBILITY

Thesis

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by


Jennifer Marie Knopf

UNIVERSITY OF DAYTON

Dayton, Ohio

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APPROVED BY:



Lane Geddie Pullins, Ph.D.
Chairperson, Thesis Committee Member




Carolyn Roecker Phelps, Ph.D.
Thesis Committee Member



Robert J. Crutcher, Ph.D.
Thesis Committee Member

CONCURRENCE:



David W. Biers, Ph.D.
Chairperson, Department of Psychology

ABSTRACT

WHAT HAPPENED?: A LOOK AT EVENTS AND THEIR IMPACT ON MEMORY AND SUGGESTIBILITY

Name: Knopf, Jennifer M.
University of Dayton, 2005

Advisor: Dr. Lane Pullins

Due to a growing number of sexual abuse allegations, professionals must evaluate each allegation to determine whether the child's statement is an accurate account of the event. Therefore, it is important to investigate how aspects of an event affect memory and suggestibility. The literature on aspects of the event, such as presentation modality, touch, repeated experiences, trauma, and actual sexual abuse on memory and suggestibility are examined. Limitations of the research include limited ecological validity in laboratory studies, the inability to verify the details of a child's account in field studies, limited ecological validity in prospective studies of children's memory, the potential for memory decay in retrospective studies, and the difficulty in comparing data across studies. Directions for future research are discussed.

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What Happened?: A Look At Events and Their Impact

On Memory and Suggestibility

In response to a growing number of child sexual abuse allegations (Miller-Perrin & Perrin, 1999), professionals are being increasingly called upon to determine the validity of these allegations. Medical evidence of child abuse is relatively rare, occurring in approximately 25% of child abuse cases in which a perpetrator has confessed and there is often an absence of corroborating evidence. (Kerns, Ritter, & Thomas, 1992). Therefore, much of the investigation typically rests on the child's testimony. Factors such as the degree of stress experienced and aspects of the event itself may influence the child's memory. Therefore it is essential to examine children's memory for the effects of trauma as well as evaluating what aspects of an event, such as presentation modality, repeated experiences, secrecy, stereotypes, and touch influence memory and suggestibility. Aiding in this endeavor is professionals' use of the Criterion-Based Content Analysis to examine what types of details children are typically able to provide in a forensic interview.

Memory and Trauma

One of the most important reasons for studying memory and suggestibility lies in examining the testimony of child sexual abuse witnesses. Stress is an inevitable

component of sexual abuse because of the level of unwanted touch, secret keeping, and the subsequent interviews and legal proceedings that occur after the abuse is discovered. Describing sexual abuse as “stressful” is likely an understatement. In fact, it may be prudent to classify sexual abuse as traumatic, especially in light of the number of psychological disorders (i.e. PTSD, depression, phobias) that have been known to develop in sexual abuse victims (Eisen, Goodman, Qin, Davis, 1998).

The most critical debate in the traumatic memory literature involves whether stress experienced during an event enhances or inhibits later recall. While some published studies suggest that stress hinders memories (e.g., Bugental, Blue, Cortez, & Fleck, 1992; Meritt, Ornstein, & Spicker, 1994), another body of research suggests that stress is a benefit to recall (e.g., Goodman, Hirschman, Hepps, & Rudy, 1991; Ridley, Clifford, & Keogh, 2002). In trying to understand these conflicting results, professionals must examine the methodology of the study and the degree of stress that the child experienced.

Theories of Encoding

In their review of the existing literature, Eisen and Goodman (1998) summarized several competing theories as to how traumatic memories are encoded, with each affecting how the memory is recalled over time. The first theory posits that stress aids in memory recall, while the remaining three posit that stress inhibits recall.

In the first theory, stress during a traumatic event leads to improved attention and processing for core details, while peripheral details are only minimally encoded. Following the traumatic event, the child rehearses the narrative to self or others, and in doing so strengthens the memory. As a result, distortion is minimal even when the child

is presented with misleading information. To add a twist to this perspective, Howe (1997) posits that a traumatic memory may be retained better because of the salience of the event, not necessarily because the memory is negative. A positive salient memory, such as a wedding or a trip to an amusement park, may follow the same pattern of encoding and forgetting as a negative memory.

The remaining three theories posit that trauma inhibits subsequent recall, albeit for different reasons. According to the first inhibitory theory, memories of a traumatic event may not be well maintained because of limited rehearsal after encoding. This theory assumes that memory for a trauma is encoded in a way that is similar to the encoding of a non-traumatic memory. However, following the encoding, the child does not rehearse it because it is too painful to relive, especially without a supportive environment in which to discuss the trauma. Inevitably, the narrative memory fades with time in a normal pattern of forgetting.

A second inhibitory theory posits that traumatic events are encoded similarly to non-traumatic events; however, in the midst of retention and rehearsal, post-trauma information is introduced and interferes with the memory for the event. For example, this could occur while a child is being interviewed, or as Cordón, Pipe, Sayfan, Melinder, Goodman (2004) proposes, while an adult is helping a child create the narrative with words they have not yet mastered. Depending on other factors affecting suggestibility, this new information is incorporated into memory.

The third inhibitory theory states that the child may not focus on details of the event itself due to the increased internal focus inherent during traumatic events. The inward focus could take the form of stress, bodily sensations, safety, or feelings of fear or

hatred. According to Eisen and Goodman (1998), if the feelings of anxiety or fear are overwhelming enough dissociation or repression could occur.

In an attempt to understand how trauma affects memory and suggestibility, there are two distinct bodies of research. The first body of research examines how traumatic memories differ from positive and neutral memories. The second body of research examines whether stress hinders or helps in memory recall and suggestibility.

Research on the Differences In Recall for Positive and Negative Events

One of the most central points of disagreement across the four theories proposed by Eisen and Goodman (1998) involves whether recall of traumatic events is better or worse than that of positive or neutral events. Several researchers have examined if and how positive and neutral memories differ from negative memories. Berliner, Hyman, Thomas, and Fitzgerald (2003) hypothesized that children's memories for traumatic events would be less clear and less accurately remembered than memories for positive events. Participants in the study included thirty 8- to 12- year-old children who were receiving therapy following a traumatic stressor including sexual abuse, assault, attempted kidnapping, or witnessing a fatal accident. The children were asked to select a "very positive" memory, such as a birthday, vacation, or special performance that had occurred at a time close to the traumatic event. The children were only asked to name the positive event. They were not asked to describe either the traumatic or positive event. For both memories, the children completed the 40-item Children's Memory Characteristics Questionnaire (CMCQ). This questionnaire consisted of questions about various aspects of the event, including vividness/intensity, sensory qualities, frequency of

rehearsal, doubts, feelings, meaningfulness, impact of the memory, and how often it was talked about.

Items from the CMCQ were grouped into three scales. The Sensory Detail/Coherence scale included items relating to visual details, vividness, sketchiness, smell, sound, and order. The Temporal/Spatial scale included items relating to what happened before and after the event, as well as the location of people and objects. The Meaning/Impact scale included items assessing how often the child thought of the event, how significant the event had been at the time and how significant it is now, as well as how the event impacted the child's thoughts and self concept. A significant difference was noted in the characteristics of positive and traumatic memories on the Sensory Detail/Coherence scale, $t(29) = -3.06, p < .01$, and the Impact/Meaning scale, $t(29) = 2.39, p < .05$. The results indicated that for traumatic memories, children reported less sensory detail, but more information concerning the impact and meaning of the event to them.

The authors speculated two possible reasons as to why children exhibited fewer sensory details and coherence in their memories for traumatic events, both of which supported the third inhibitory theory discussed earlier. First, they suggested that it is possible that traumatic experiences are not fully processed because children may not be able to pay attention to the specific events of the trauma. Along similar lines, they suggested that children may be so traumatized during the event that they pretend that it is not really happening. The results from this study should be interpreted with caution for a number of reasons. First, the sample size was small and participants were picked for convenience rather than for experiencing a specific type of trauma. Second, the traumatic

events used as target memories were diverse and had occurred at varying points in time. Third, the researchers chose the traumatic event and the participants were allowed to choose the positive event. However, the researchers did not independently verify that the positive event occurred at about the same time as the traumatic event, nor was any measure used to determine that the positive event was as salient as the traumatic event. Finally, it should be noted that some of the traumatic events occurred multiple times, while the positive events were typically single episodes. While the results should be interpreted with caution, they suggest that a lack of vividness or coherence does not necessarily imply that the traumatic event did not take place.

These results are in contrast with the results obtained in a study conducted by Fivush, Hazzard, Sales, Sarfati, and Brown (2003), who used a similar methodology. Twenty-nine 5- to 12-year-old children were recruited while waiting for a physical at the Pediatric Appointment Clinic of a local hospital. The children were predominately from a low socio-economic status home and living in typically violent communities. After families agreed to participate, their mothers completed the Screening Survey of Children's Exposure to Violence, which consisted of 50 true-false statements by which parent's responded to the rate of violence to which their children had been exposed. Mothers also nominated two positive and two negative events, when the events occurred, and often the children had discussed the events in the preceding months. While all of the children lived in a violent neighborhood, not all of the events nominated were directly harmful to the child, nor were they a discrete episode. Of the negative events nominated 12% included a serious illness or a death in the family, 24% included witnessing a violent altercation, 12% included witnessing a minor physical altercation, and 12% included a

parental separation. The mothers used a 7-point scale to rate their children's emotional reactions to each event. Only one positive and one negative event was used for the study. Children were interviewed by a research assistant who asked the children to recall as much as they could about each event. The researchers followed up the free-recall responses with more specific questions to obtain information that had not already been provided (i.e., "When did this happen?" and "Who was there?"). The Peabody Picture Vocabulary Test- Third Edition (PPVT-3) was administered and children were also asked to rate their emotional reaction (i.e., "really happy/scared," "happy/scared," or "not happy scared.") on a 3-point scale. The children's interview responses were transcribed and coded with a focus on content and coherence.

The results indicated that children reported negative events ($M = 1.76$, $SD = 1.01$) more coherently than positive events ($M = 1.48$, $SD = 0.96$). The coherence of recall was correlated with both age ($r = 0.58$, $p < 0.01$) and with the PPVT-3 ($r = 0.08$, $p < 0.01$). However, neither age ($r = 0.08$, $p < 0.67$) nor PPVT-3 score ($r = 0.12$, $p < 0.52$) were correlated for the coherence of positive events. Overall, older children and those with better language skills produced a more coherent narrative. However, while the child's age and language skill contributed to a more coherent narrative of the negative event, neither the child's age nor their language skill affected the coherence of the narrative of the positive event.

In comparing the two studies, Berliner et al. (2003) found that when relaying a negative memory, there was less coherence, while Fivush et al. (2003) found that negative memories were more coherent than positive ones. The results presented in the Berliner et al. study may be accounted for by Eisen and Goodman's (1998) proposed

theories of encoding. For example, children may have been focused on their own internal states, or their focus on what they believed to be central details may account for their lack of coherence. Conversely, the types of negative experiences studied in the Fivush et al. study were chosen by the parent, and while the events were no doubt traumatic to the child and family, not all of the events may have been viewed as stressful by the children themselves. In addition, nearly a quarter of the negative memories proposed were ongoing (i.e., mother's illness or parent's separation), which may have accounted for a higher level of coherence, thus the types of memories studied may account for the differences in the results presented. Finally, the children in the Berliner et al. study were all victims of a violent crime, while the Fivush et al. study included both victims and witnesses, which may have also accounted for the differences. One limitation of both studies is the retrospective nature of the research design. Because memories tend to change over time, it is possible that time delay, and events occurring after the positive and negative target events, could serve as confounds. For this reason, it is also important to examine prospective studies of recall for traumatic events.

Prospective Studies of the Impact of Trauma on Recall

In contrast to retrospective studies, several experimenters have sought to study memory prospectively. Due to ethical limitations, it is difficult to design a study that would approximate the stress experienced by children during sexual abuse. Therefore, researchers have elected to study children using paradigms such as natural disasters and visits to medical professionals, which allow them to measure the child's level of stress. Many studies have used doctor's visits to provide a close approximation of sexual abuse scenarios because they involve undressing and body touch by an unfamiliar adult, as well

as the added fear many children experience when undergoing an inoculation or other medical procedure.

The benefit to using prospective studies is the ability to objectively measure stress. This is done in a number of ways including reports by parents and medical professionals, which are often compared to ensure that ratings are as accurate as possible. Other researchers are able to obtain stress ratings through physiological measures such as heart rate (HR) and skin conductance level (SCL). Bugental et al. used these methods to measure stress in their 1992 study. The measures were obtained while 5- and 6- year-old children viewed a tape of a same-age child receiving a routine medical examination. Sharp spikes in HR and SCL were evidenced in the observers when the child in the video exhibited distress. More importantly, the increase in arousal was consistent with an increase in processing errors, which were detected during a subsequent interview. The conclusion that stress prohibits adequate processing of memories cannot be generalized to victims of sexual abuse because the children in this study were only witnessing an experience and they are also focusing on the emotions of another child, rather than their own feelings and experiences during an event, but this may have important implications for understanding the responses of witnesses to sexual abuse.

Merritt et al. (1994) also used objective measures of stress to demonstrate a negative correlation between stress and recall. Participants included 23 children between the ages of 3- and 7-years of age who were undergoing a voiding cystourethrogram (VCUG), a painful and invasive medical procedure that requires an adult's physical contact with the child's genitalia. Measures of distress were collected via parent's report and salivary cortisol assays. A structured interview was conducted immediately

following the procedure and again after a 6-month delay. When the results of the initial and delayed interview were compared, relatively little forgetting had occurred. In addition, there was a negative correlation between distress and recall at the delayed interview, suggesting that stress may hinder memory.

While Bugental et al. (1992) and Merritt et al. (1994) demonstrate that stress hinders memory, other researchers have presented contradictory findings. Goodman et al. (1991) studied the memory and suggestibility of children who experienced stress through a paradigm involving a doctor's visit. The authors recruited 48 children (ages 3- to 4-years-old and 5- to 6- years old) who attended an immunization clinic. Parents rated each child's pre-venipuncture and post-venipuncture stress level (1 was "very happy or relaxed" and 6 was "extremely frightened or upset."). The attending nurse also rated each child on the same scale and this was found to adequately correlate with the parents' scores ($r = 0.68, p < 0.001$). While the child was in the examination room, the attending nurse administered the inoculations. An interview took place 3- to 4- days or 7- to 9- days later. The interviewer was an unfamiliar research assistant who asked 18 specific and 9 misleading questions.

The results indicated that there was a main effect for stress such that participants who were rated as most stressed recalled more information ($F(1, 43) = 4.65, p < 0.05$) and were less suggestible ($F(3, 43) = 3.44, p < 0.05$). Further support for this conclusion was evidenced in a subsequent study, which included 17 additional participants who were matched with children from the initial study. The methodology was the same, except that children received a temporary tattoo from the nurse rather than an inoculation. The results indicated that children in the more stressed control group recalled significantly

more correct information ($F(1, 15) = 6.37, p < 0.05$). Based on the Goodman et al. studies, it appears that stress produces a beneficial effect on memories to at least some degree, since the most highly stressed children recalled more correct information and were also more resistant to suggestibility.

Ridley et al. (2002) studied the effect of state-anxiety on memory and suggestibility of children and found results consistent with Goodman et al. (1991). They recruited 83 participants whose mean age was 9.9 years. The children were randomly assigned to either receive subsequent misleading questions or neutral questions. In the first phase of the experiment, the children were told to imagine that they were walking on a country road and they witnessed the following car accident, of which they were shown a three-minute video clip. Following the video, the children were given a questionnaire containing 15 questions. For half of the children, five of the 15 questions were misleading, and for the rest of the children five of the questions were presented in a neutral manner. During a 10-minute interlude, the children completed measures of state-anxiety and depression. In the final phase, both groups of children received the same questionnaire. Suggestibility was measured by the number of children's responses that contained misleading information.

Participants were divided into high- and low-anxiety groups based on their state-anxiety scale scores. The results showed that there was a significant anxiety and misinformation interaction, such that the high anxiety group showed more resistance to suggestion than the low-anxiety group ($F(1, 60) = 4.13, p < 0.047$).

This study does not examine how memory and suggestibility are affected when the child is experiencing an abnormal amount of stress, as would probably occur during a

sexually abusive experience. This only speaks to suggestibility and the disposition of the child at the time of the study. However, when taken with the 1991 results of Goodman et al., there is some evidence that stress and anxiety may provide some protection for memories and improve resistance to suggestibility.

The studies cited thus far presented contradictory results. Studies conducted by Bugental et al. (1992) and Merritt et al. (1994) suggest that stress hinders memory, while studies conducted by Goodman et al. (1991) and Ridley et al. (2002) suggest that stress aids memory. There are two possible explanations for these differences. First, methodological differences may account for differences in the results. The Bugental et al. and Merritt et al. studies measure stress physiologically, while the Goodman et al. and Ridley et al. studies measure stress through parent, nurse, and child report. It could be that one type of measurement is superior to the other in measuring stress for these purposes, thereby producing contradictory findings.

Assuming that the physiological, self-report, and parent report measures used all adequately record levels of stress, the second possibility lies in the different levels of stress that are measured. An inverted U-shaped curve could account for these differences such that too little or too much stress hinders memory, while a moderate amount of stress aids memory. The inverted U-shaped curve was evidenced in a 1998 study conducted by Bahrnick, Parker, Fivush, and Levitt. Study participants included 100 preschool age children who had witnessed Florida's Hurricane Andrew in 1992. Their level of stress was objectively defined as low, moderate, or high depending on the severity of the damage to the child's home. Children were interviewed two to six months following the

hurricane. The interview consisted of free-recall and a series of standardized questions that were increasingly more specific.

When the authors examined the effect of stress on recall, they discovered an inverted U-shaped function. More specifically, the increase in recall from low to moderate damage severity was significant ($F(1, 94) = 5.86, p = 0.009$), and the decrease in recall from the moderate to high damage severity groups was also significant, ($F(1, 94) = 2.19, p = 0.071$). These findings suggest that stress aids memory until a very high rate of stress is reached, at which point the high degree of stress is a hindrance to memory.

Conclusions

In summary, few prospective studies have been conducted examining the impact of stress during the event and subsequent recall, and those that have been conducted appear to be contradictory. Some research studies suggest that stress hinders memory (e.g., Bugental et al., 1992; Merritt et al., 1994). Conversely, others have shown that some stress aids memory (e.g., Goodman et al., 1991; Ridley et al., 2002). One of the most difficult problems in assessing the affects of stress on memory is that it is difficult to compare the levels of stress and recall across studies. However, the pattern that seems to emerge is one of an inverted U-shaped function evidenced by Bahrack et al. (1998). For example, both Bugental et al. (1992) and Merritt et al. (1994) concluded that stress had a negative effect on memory. The methodology that Bugental et al. used involved children watching a videotape of a peer's inoculation, which may not have produced enough stress to aid memory. Merritt et al., meanwhile, employed the highly painful and invasive VCUG procedure, which may have produced too much stress to be beneficial to memory. In contrast, Goodman, et al. (1991) concluded that stress was beneficial to

memory following their study in which participants were inoculated and subsequently interviewed. It may be argued that when considering the inverted U-shaped function, the level of stress induced by an inoculation was not as high as the level of stress induced by the VCUG, which would account for the discrepancies between the studies.

The practical implication of this research for forensic interviews is that it is essential to consider the child's level of stress at the time of the abuse. A high level of stress does not preclude the child from recalling details of the event, until a level of stress is reached that is so high that the child becomes overwhelmed.

In addition to considering the child's level of stress at the time of the event, it may also be important to consider the differences in the number of central and peripheral details encoded while a child is under stress. It was noted earlier that Eisen and Goodman (1998) proposed that central details are encoded at the expense of peripheral details, and this theory appears to be validated in the literature (Lamb et al., 2003). The encoding of central versus peripheral details is a mediating factor that appears to be especially pertinent, particularly in light of the information that needs to be acquired during a sexual abuse interview.

Stress is a unifying factor in victims and witnesses of sexual abuse. The differences in each of their experiences come from factors during the actual event. Therefore it is essential to understand how these varying factors affect memory and suggestibility as well.

Aspects of the Event Which Impact Memory and Suggestibility

Suggestibility in its narrowest sense occurs when an individual is exposed to post-event information and incorporates this information into his or her memory as being factual (Gudjonsson, 1986). This definition is primarily concerned with the unconscious acceptance of post-event information into one's memory as fact. Ceci and Bruck (1993) attempt to broaden this definition to include social and psychological factors that can influence memory, especially in reference to children's memories. Their definition expands on Gudjonsson's by including conscious factors influencing memory such as threats or social demands, which may influence one to assent to leading question and subsequently incorporate the information into one's memory. Factors influencing the degree of suggestibility are numerous but can be grouped into three categories: the characteristics of the child, circumstances of the interview, and the event the child experiences. While several publications review the characteristics of the child and the circumstances of the interview, there has not been a recent systematic review of the impact of the event. Several aspects of the event have been studied in recent literature, including presentation modality (e.g., Gobbo, Mega, & Pipe, 2002; Murachver, Pipe, Gordon, Owens, & Fivush, 1996;), repeated experiences (e.g., Connolly & Lindsay, 2001; Farrar & Goodman, 1992), secrecy (Hartwig & Wilson, 2002; Wilson, Powell, Raju, & Romeo, 2004), stereotypes (Leichtman & Ceci, 1995), and touch (e.g., Krakow & Lynn, 2003; Pezdek & Roe, 1997).

Presentation Modality

Children acquire information through a variety of sources, including participation, observation, viewing pictures, and hearing stories. The acquisition method affects how

children remember information, which then affects how well they are able to relay that information to others (Murachver et al., 1996). Whether children directly experience sexual abuse, observe it, or hear about it from another can affect their degree of resistance to any misleading questions that may be presented to them from family members and professionals alike.

In order to understand the effect of presentation modality on suggestibility, researchers first have to examine how presentation modality affects memory in general. Murachver et al. (1996) studied this issue using 5- and 6-year-old children. Seventy-six children participated in an event called "Visiting the Pirate," which researchers determined to be a novel event for all of the children involved. Visiting the Pirate included four sets of activities, each consisting of five core actions. Of the 44 children participating in the Single-Experience Condition, 16 directly experienced the event, 16 were told a story about the event, and 12 observed other children participating in the event. Of the 32 children assigned to the Repeated Experience Condition, 16 directly experienced the event three times and 16 heard a story about the event three times. There was no observation group in the Repeated Experience Condition. Three to four days following the event, the children returned for a structured verbal interview and a reenactment. During the reenactment portion of the interview, children were led to the Pirate Room and provided with all of the necessary props. If the child failed to reenact all of the activities on their own, the interviewer used the props to prompt the child for any activities that were left out.

When comparing the amount of information recalled from children who participated in the event versus children who either observed it or heard a story about it,

there were several significant findings. First, the authors determined that during the verbal interview, children reported significantly more core events when they had participated in the event ($M = 2.73$, $SD = 0.69$) compared to the children who had observed ($M = 1.23$, $SD = 1.01$) or heard ($M = 1.44$, $SD = 0.57$) about the event. There was no significant difference in verbal reports between children who had observed or heard about the event. The results also indicated that children who participated in the event ($M = 4.08$, $SD = 0.53$) and children who observed the event ($M = 3.77$, $SD = 0.42$) were significantly better at reenacting the core actions of the event compared to children who only heard the story ($M = 2.61$, $SD = 1.15$). There was no significant difference between the number of core events reenacted by children who had participated and children who had only observed the event. In addition, verbal fewer errors were produced by participants ($M = 0.56$, $SD = 0.60$) than by observers ($M = 2.58$, $SD = 2.55$) or those who had heard the story ($M = 3.75$, $SD = 1.24$). Finally, more errors were produced in a reenactment ($M = 3.16$, $SD = 3.51$) than in verbal recall ($M = 1.44$, $SD = 1.51$). These findings suggest that when comparing children who were abused and children who are considered witnesses, victims should be able to report more central information than witnesses. In addition, a child who saw the abuse taking place will be able to recall more information than one who only heard about it.

Gobbo et al. (2002) also examined the amount of information provided by participants as opposed to observers. However, they expanded the study to examine how presentation modality affects children's resistance to suggestion. The authors recruited sixty 3- and 5-year-old children to participate in an event at school. The children either participated in the making of an animal figure from salt-dough while an assistant gave

them step-by-step instructions, watched the assistant make the animal figure without participating, or only listened to instructions for making the animal figure. Per the parent's report, making an animal figure out of salt-dough was a novel event for all of the participants. Immediately following the event, a research assistant who used a structured interview interviewed children individually. The interview included two misleading, two leading, and four test questions designed to assess the effects of the misinformation. After one week, the children participated in a second interview, which included free recall and the four test questions asked at the end of the first interview.

The initial results were similar to those found by Murachver et al. (1996) in that participants ($M = 4.34$, $SD = 1.19$) remembered more details than the observers ($M = 3.51$, $SD = 1.13$) or those who only listened to the instructions ($M = 3.10$, $SD = 1.20$). When the children were asked test questions following the presentation of misleading information, participant's answers ($M = 1.40$, $SD = 0.72$) were significantly more accurate than the answers of the children who had only observed ($M = 0.98$, $SD = 0.66$) or listened ($M = 0.80$, $SD = 0.72$) to the narration. The authors concluded that participants recall more information and are more accurate when faced with misleading information than are observers or those who only listened to the information. However, there appears to be a problem with the methodology. This study is difficult to compare to others examining presentation modality or to generalize to a real-world setting. It would be difficult to engage the attention of preschool and kindergarten age children with a list of instructions rather than a story. In an actual abuse investigation, if a child were hearing about the details of sexual abuse encounter, it would probably more closely resemble a narrative rather than a list of actions.

Despite the potential shortcomings of the Gobbo et al. (2002) study, the results are consistent with those presented earlier by Muachever et al. (1996) as well as with results published by Roeber, Gelhaar, and Schneider (2004). In the 2004 study, the authors showed 270 kindergarten and school age children a magic show in person, via videotape, or via slide show. One week later, the children participated in an interview, which contained non-leading questions as well as misleading questions. The results indicated that those who watched the magic show in person recalled more correct information (60.0%) than did children who watched the video (57.7%) or the slide show (52.4%). When misleading questions were asked, there was a significant difference in presentation modality with those at the live show (65.2%) answering more of the misleading questions correctly than those who watched the video (55.2%) or slide show (49.3%).

Contrary to the results presented above, an earlier study, conducted by Rudy and Goodman (1991), found that participants did not recall significantly more information than did bystanders. This discrepancy may be accounted for by the research assistant's praise of the observing child. Throughout the event, the research assistant praised the observing child and insisted that he or she had a very important job, thereby involving the observing child in the event.

The above studies suggest that children who directly experience abuse may be more resistant to misleading questions than those who witness the abuse of other children. However, all of the studies presented took place in a laboratory and utilized innocuous events and interview questions. This poses the question as to whether or not these results would hold true when considering the sensitive nature of sexual abuse.

According to Lamb, Sternberg, Orbach, Hershkowitz, and Horowitz (2003), a “surprising” number of sexual abuse instances occur in the presence of a child witness. Therefore, it is extremely important to examine children’s recall of these sensitive issues in a naturalistic manner. Lamb et al. (2003) were able to empirically study this issue by using a structured interview developed by the National Institute of Child Health and Human Development to question actual sexual abuse victims and witnesses about their knowledge of the abuse. Twenty-six witnesses were matched with victims on the basis of age, relationship with perpetrator, and type of offense, all of which were factors that the authors believed may affect the number of details provided in the interview. All claims of sexual abuse were judged to be valid by investigators, but corroborating evidence was rare. Therefore, the researchers could not determine the veracity of the children’s statements. The structured interview was designed so that the interviewer only moved on to forced-choice questions when the extensive list of open-ended questions was exhausted. Suggestive utterances (e.g., “He took off your clothes, didn’t he?”) were discouraged. The children’s responses were coded to determine how many new details were provided throughout the course of the interview.

The results indicate that there was no significant difference in the amount of information provided by witnesses and victims. However, there was a difference in the types of information provided. Witnesses ($M = 155.08$, $SD = 140.25$) supplied significantly more peripheral details than did victims ($M = 101.12$, $SD = 73.18$). Peripheral details, such as clothing or hairstyle, were described as “forensically relevant,” but a change in them would not have changed the actions of the perpetrator or victim. The authors did not find a significant difference in the amount of central details provided

by witnesses and victims. Central details are defined as details affecting the flow of the action. The lack of a comparable finding for central details suggests that the peripheral details recalled by the witnesses did not make up for a dearth of memories for central details.

The authors provided several insights as to why their results are inconsistent with other published studies (Gobbo et al., 2002; Murachever et al., 1996; Roebbers et al., 2004). They speculated that the victims in their study were not able to produce significantly more information than witnesses due to their level of distress. They also speculated that the victims did not provide significantly more information because they may have been reluctant to share embarrassing details. Finally, an analysis of the types of questions asked revealed that interviewers used significantly more open-ended questions with witnesses and more forced choice questions with victims, increasing the opportunities for witnesses to provide details and decreasing the opportunities for victims to provide details.

The principal problem evident in the Lamb et al. (2003) study is that without corroborating evidence, field studies can only examine the amount of information provided, not the accuracy. Therefore, researchers cannot fully claim that the testimony of witnesses is as complete as a victim's testimony because it is unclear how many of the details were accurate. This issue is one that is inherent in field studies, which is why laboratory studies are also necessary to examine memory and suggestibility.

In general, laboratory studies indicate that participating in an event, compared to observing or hearing about it, increases a child's recall and resistance to suggestibility. However, when examined in a real-world context these findings have not been replicated

(Lamb et al., 2003), perhaps due in part to differences in emotional arousal between victims and witnesses of abuse.

Repeated and One Time Experiences

In contrast to a single salient event, some abuse occurs over a period of time. Connolly and Lindsay (2001) report that child sexual abuse is often alleged to have occurred either as part of a normal routine (i.e., bedtime or bath time) or as a deviation from a routine. When children are asked to testify regarding multiple instances of sexual abuse, they must be able to recall specific details of at least one instance. The difficulty in interviewing children regarding repeated experiences versus a single experience lies in that children may confuse the details of various repeated instances. Therefore, it is important to understand how a series of similar events compares to a single event in a child's memory.

Powell and Thomson (1996) examined this issue by testing the recall of children who had either participated in a single event or in a series of six similar events. Participants included 106 children aged 3- to 5-years-old and 6-to 8-years-old. The central event for the study was "Monash Activities," a series of 20 activities such as sitting on a mat, listening to a story, and putting a puzzle together. The type of activities remained constant across repetitions, but the details of each activity changed. For example, in one instance the children heard a story about an elephant, but in another instance they heard a story about a person. The "critical event" was the instance about which the children were questioned. In order to orient the children to the critical event, they wore a colorful badge on that day. The critical event was either the single event experienced or the last day in the series of six repeated experiences. One week or one

month later, the children were interviewed by an unfamiliar research assistant. They were asked to recall something they did during the "Monash Activities" and how often it had occurred. The children in the repeated experiences group were asked to recall the day that they wore the badge and when it had occurred (i.e., the first day, in the middle, or the last day). The interviewer instructed all the children to recall what they could from the day that they wore the badge. Their answers were later coded as "general" or "specific" information. Children recalled general information when they recalled an activity (e.g., reading a story), but they did not refer to a specific detail or instance. Children recalled specific information when they specified a detail about an activity. Following the free recall, they were asked 20 direct probes that coincided with the 20 activities. This was followed up with 20 forced-choice items about the activities. The choices offered included the detail that occurred on badge day, one that had occurred during a separate instance, and one that had not occurred at all.

The results indicated that children who repeatedly participated in the event ($M = 3.15$, $SD = 1.65$) recalled more general information than did those who only participated once ($M = 1.95$, $SD = 1.23$). However, those who repeatedly participated in the event ($M = 1.33$, $SD = 1.27$) recalled fewer specific details than those who only participated once ($M = 2.90$, $SD = 1.86$). In terms of suggestibility, the most compelling finding was that children in the repeated experience group made no external intrusions. That is, they did not report any activities or details that did not occur. They did, however, make internal intrusion errors. That is, they included activities and details that had occurred on a day other than badge day. Half of the errors made by children in the single experience group were external intrusions.

The findings of Powell and Thomson (1996) can be generalized to child sexual abuse interviews. If children are repeatedly abused and then questioned about a specific instance of abuse, they may make internal intrusion errors by providing details from a separate occasion. They are also less likely to incorrectly deny details or confuse details from within the same instance. However, this study did not examine how repetition interacts with suggestion to affect recall.

A study conducted by Connolly and Lindsay (2001) examined the interaction of repeated experiences and suggestibility. Participants included 96 children who were 4, 6, and 8 years old. Half of the children in each age group were assigned to experience a play session only one time (1-S condition) and the other half were assigned to experience a play session four times (4-S condition). Each play session consisted of a smelling game, a paper folding game, and a magic trick. Each activity consisted of fixed details (e.g., game location, prop color) as well as variable details (e.g., paper folding item, magic word phrase). The research assistant declared it was "Apron Day" and wore an apron during the only play session in the 1-S condition and during the final play session in the 4-S condition. These sessions were identical and the apron was used to later orient the children to the specific play session. Four days following "Apron Day," the children participated in a biasing interview. An unfamiliar research assistant questioned the children about each activity from "Apron Day" and an activity that had not occurred at all. Prior to each set of activity questions, the interviewer provided a brief account of the activity, which contained inaccurate information and served as a basis for subsequent interview questions. The biasing interview that followed contained two control and two suggestive questions for each activity's fixed and variable details. The next day a final

memory test was conducted to determine if the children had accepted the suggestions. A second unfamiliar research assistant questioned the children about "Apron Day" using free recall, cued recall, and a set of 20 yes/no questions.

The authors examined the mean proportion of incorrect responses to the 20 yes/no questions asked during the final memory test. Consistent with Powell and Thomson (1996), the results indicated that when responding to questions about fixed items, children in the 1-S condition ($M = 0.20$, $SD = 0.25$) incorrectly responded 'yes' significantly more often than did children in the 4-S condition ($M = 0.08$, $SD = 0.17$). The results also indicated that when responding to questions about variable items, children in the 4-S condition committed more errors to questions about suggested items ($M = 0.57$, $SD = 0.34$) than did children in the 1-S condition ($M = 0.43$, $SD = 0.29$). These results were consistent with results found in a subsequent experiment (Connolly & Lindsay, 2001.) These findings suggest that when an event is repeatedly experienced and paired with misinformation, children are more likely to acquiesce to the suggestion when it pertains to a variable item rather than a fixed item.

Powell, Roberts, Ceci, and Hembroke (1999) reported similar findings after testing children's recall and suggestibility for incidents that occurred during a single-experience event versus a repeated experience event. The design of this study was similar to that used in Powell and Thomson (1996). Participants in Experiment 1 included 59 4- to 5-year-old children and 69 6- to 8-year-old children who were matched for age and gender and assigned to experience an "Aussie Activities" event either one time or six times. A research assistant and a teacher's assistant were in charge of the event, which included a story, a puzzle, music, relaxation, and a sticker. Of the 24

instances occurring in the event, 12 were fixed (i.e., the person who reads the story, the assistant's hairstyle, the puzzle) and 12 were variable (i.e., color of the leader's cloak, content of the story, theme of the sticker). The children were then interviewed twice about the "target event." For the children in the single-experience group the target event was the event in which they participated. For the children in the repeated-experience group the target event was the final event in which they participated. The variable occurrences in the target event were the same for both groups and children wore a badge on the day of the target event to later orient them. In the first "biasing interview," children were asked a series of yes/no questions. The purpose of the first interview was for the research assistant to suggest things that may have occurred during the Aussie Activities. For half of the questions regarding the fixed items, the questions presented an item that happened (fixed-true suggestions) and for the other half the questions presented an item that had not happened (fixed-false suggestions.) For the variable items, half of the questions presented the instance that had not occurred during the target event or in previous events (variable-false suggestion). The remaining six questions, the variable-true suggestions, differed between groups. The children in the single-experience group were presented with items that had occurred in the target event. The children in the repeated-experience group were presented with items that had occurred in a non-target event. On the following day, the children were interviewed with 24 direct, cued-recall questions regarding the badge day to determine if they had incorporated the items previously suggested items into their memory.

When comparing the children's answers from the fixed item questions in the first interview, the results revealed a main effect for event. Children in the repeated-

experience group correctly answered more fixed-true questions ($M = 5.84$) compared to children in the single-experience group ($M = 4.17$). Children in the repeated-experience group also rejected more of the fixed-false questions ($M = 5.37$) than did children in the single-experience group ($M = 3.88$). However, there was no significant difference between the groups when comparing the children's answers to the variable-true and variable-false items. This indicates that children who repeatedly experience an event are more resistant to suggestion when questioned about aspects of the event that are held constant. However, their level of suggestibility regarding variable items is comparable to children who only experienced the event once.

The results from the second interview resembled the results from the initial biasing interview. Children in the repeated-experience group recalled more correct information ($M = 11.03$) than children in the single experience group ($M = 5.17$). Children in the repeated-experience group were also less likely ($M = 0.08$) to report a fixed-false instance that had been suggested in the biasing interview compared to children in the single-experience group ($M = 0.86$). In addition, children in the repeated-experience group were less likely to include an external intrusion of a novel instance ($M = 0.03$) than were the children in the single-experience group ($M = 1.08$). Children in the repeated-experience group made more false-suggestion errors in response to questions about variable items ($M = 0.60$, $SD = 0.73$) than about fixed items ($M = 0.10$, $SD = 0.30$).

The authors noted that these results should be interpreted cautiously for a number of methodological reasons. First, neither the assignment of event items as either fixed or variable, nor the assignment of items to either accurate or suggested questions, was counterbalanced. Therefore, the results may have been due to the assignment of an item

rather than an experimental manipulation. Second, when the children were questioned, both the single-experience and repeated-experience group was cued to remember the "Aussie Activities" event. Therefore, the children in the single-experience group may have received a stronger suggestion because they only participated in one "Aussie Activities" event. Finally, the variable-true questions presented in the biasing interview were not constant between the groups. The variable-true questions presented to children in the single-experience group contained information from the one instance they participated in the event, whereas the questions presented to children in the repeated-experience group contained information from all six occurrences of the event. Therefore, it is difficult to determine if the results are due to the effects of a single versus repeated experience or due to the information presented. Further bolstering their conclusions, the authors conducted a second experiment to control for these methodological problems and the results obtained were consistent with the results from Experiment 1, as well as with results obtained by Connolly and Lindsey (2001).

The presented results suggest that when compared to children who experienced an event once, children who repeatedly experience an event more accurately recall the details of an event when those details are held constant (Powell & Thomson, 1996). Children are less likely to assent to suggestions of false occurrences of the events and they are less likely to include instances that did not occur during any of the events (Connolly & Lindsay, 2001; Powell et al., 1999). However, the detrimental effect to the memory of children who repeatedly experience an event is that they may include details from instances other than the target event about which they are being questioned (Powell et al., 1999; Powell & Thomson, 1996). These results offer important considerations

when evaluating a child's testimony regarding repeated instances of sexual abuse. What may be considered errors in a child's testimony may not necessarily be fabrication or the effects of suggestion. The errors may likely be intrusions of accurate details that occurred in other instances of sexual abuse.

Secrets

Children who possess a secret prefer that the secret be told rather than concealed (Hartwig & Wilson, 2002). Therefore, sexual abuse perpetrators have an incentive to convince their victim to keep the abuse a secret, and they may accomplish this through threats or bribes. If the abuse is discovered, they face legal prosecution, social stigma, financial and sometimes familial losses. Therefore, it is advantageous to determine if asking a child to keep a secret enhances his or her memory and reduces the incidence of suggestibility.

Wilson et al. (2004) hypothesized that older children would be significantly less suggestible when they are told to keep a portion of an event a secret. The authors based this hypothesis on a theory proposed by Lane and Wegner (1995), which posits that in an attempt to conceal a secret, people focus their thoughts on what they need to suppress, thereby initiating memory rehearsal. The memory rehearsal would enhance the memory for the secret and would subsequently reduce the susceptibility of suggestibility.

The authors recruited 108 5- and 6-year-old children and 124 7- and 8-year-old children through two Catholic primary schools in the Sydney, Australia school system. Children were collected in groups of six to watch the female experimenter make a finger puppet and the children were then allowed to make their own puppets. After the project had been completed, the children's puppets were sprayed with glitter spray. The

children in the Secret condition were told that the experimenter had taken the glitter spray without permission from her boss in Disneyland and were asked to keep this a secret. The children in the Control condition were told that the glitter spray belonged to the experimenter's boss at Disneyland, but they were told that the experimenter had permission to use it. Children were interviewed one week following the event. They were first asked to recall everything they could about the event and the interviewer used neutral prompts (i.e., "And then?") to obtain as much information as possible. When the children could not recall anymore, the interviewer asked them to recall as much as they could about the glitter spray. Finally, the children were asked 14 suggestive questions, half of which had a correct 'yes' response and half of which had a correct 'no' response. A manipulation check was used to ensure that children understood what a secret is.

The results indicated that only 0.02% of children in the Secret condition mentioned the secret, but 50% of all the children mentioned the glitter spray. The children who spontaneously discussed the secret also reported significantly more details. Younger children recalled significantly less information than the older children, both during free recall, and when questioned directly about the glitter spray. After being questioned directly, 35% of the younger children revealed the secret as compared to 65% of the older children. In addition, when children reported the secret, they were significantly more likely to correctly report to whom the glitter spray belonged. Of the younger children, 76% of the "secret reporters" answered this question correctly compared to 47% of the "secret keepers." Of the older children, 97% of the "secret reporters" answered correctly compared to 83% of the "secret keepers." This suggests that children who did not share the secret exhibited a memory deficit rather than the

ability to keep a secret. When asked the leading and misleading questions, the younger children were also significantly less accurate than the older children. However, there were no other effects of secrets on suggestibility. The authors concluded that telling the children that something is a secret did not significantly enhance their memory, as the amount of information recalled by children who told the secret approximated the amount of information recalled by children in the control group. The findings that younger children generally recall less information than older children and that younger children are generally less accurate when given suggestible questions are consistent with previous research in memory and suggestibility (Ceci, Ross, & Toglia, 1987; Ceci, Loftus, Leichtman, & Bruck, 1994).

Despite the study's conclusion that secrets do not enhance memory, the findings cannot be wholly applied to sexual abuse scenarios for a number of reasons. First, this methodology studies the effect of a non-traumatic secret on suggestibility and the children may not have been emotionally invested in keeping the secret. While the children were involved in the use of the stolen glitter spray, they were not involved in the actual act of stealing the glitter spray. They did not believe that they would be given a reward or that they will be in trouble for telling the secret as some children in sexual abuse scenarios may be told. Second, the children were told to keep the secret while in a group, which reduces the anxiety of keeping a secret on one's own. Finally, the children were only asked to keep a part of an event a secret, while in some sexual abuse cases children may be asked to keep the entire instance a secret. Ethical limitations preclude designing a study in which these limitations would be addressed, therefore, it is difficult

to determine the effects of keeping a secret on suggestibility for an event as traumatic and emotionally isolating as sexual abuse.

Stereotypes

Stereotyping occurs when one makes generalizations about the attributes of a situation or a person to help organize information. It can occur before or after an event. For example, in some custody battles the custodial parent may frequently make negative comments about the estranged parent's character, which in turn may influence the child's expectations of the estranged parent's actions (Leichtman & Ceci, 1995). Conversely, the stereotype may be introduced after the target event in the form of questions asked by numerous individuals trying to elicit the information they believe to be reality. These various interviewers will most likely follow a theme (i.e., alleged perpetrator is "bad") and introduce stereotypes consistent with that theme (Thompson, Clarke-Stewart, & Lepore, 1997).

Leichtman and Ceci (1995) demonstrated that stereotypes may contribute to suggestibility, particularly when coupled with suggestive questioning. Three- to four-year-old children and five- to six- year- old children were randomly assigned to one of four groups: control, stereotype, suggestion, or stereotype plus suggestion. In this paradigm, all of the children witnessed a visitor ("Sam Stone") stop by their classroom and were given a forensic interview about his visit approximately 10 weeks following the visit. In the control condition, the children received no prior information about Sam Stone. In the stereotype condition, children heard three stories about Sam Stone being a clumsy individual once a week for four weeks prior to the visit. In both the control and stereotype condition, the children were interviewed neutrally once a week for the four

weeks following the visit. The children in the suggestion condition did not receive information prior to the event, but were interviewed in a suggestive manner once a week for the four weeks following the visit about events such as Sam Stone ripping a book and soiling a teddy bear. Those assigned to the stereotype plus suggestion condition were exposed to both the stereotyped information prior to the event and the suggestive questions following the event.

Analysis showed that both age groups were equally impaired by the stereotypes. Furthermore, the results indicated that during the forensic interview 10% children in the control condition initially answered positively to the misleading probe conditions, compared to 37% in the stereotype condition, 35% in the suggestion condition, and 72% in the stereotype plus suggestion condition. When asked if they actually saw Sam Stone rip the book or soil the teddy bear or if they had only heard about it, the percentage of children assenting to the probe question dropped to 5% in the control condition, 18% in the stereotype condition, and 12% in the suggestion condition, and 44% in the stereotype plus suggestion condition. When gently prompted to tell the truth, 10% of children in the suggestion condition and 21% of children in the stereotype plus suggestion condition continued to insist that they had seen Sam Stone rip the book or soil the teddy bear. This evidence suggests that the children's responses to the misleading questions may have been due to demand characteristics rather than to actual suggestibility. However, it is difficult to determine if the children did not incorporate the memory and only assented to the misleading questions due to demand characteristics, or if they did incorporate the memory and relented after being questioned multiple times. The study conducted by Leichtman and Ceci (1995) is one of the few studies that has attempted to determine

whether children's assents to misleading questions are due to actual memory change, or to the demand characteristics surrounding the interview. It is possible that children in laboratory experiments may succumb to suggestive questions because of demand characteristics rather than actual suggestibility. This is because the person who presented the misinformation also asked the leading questions. Therefore, children may have felt pressured to go along with the suggestion, even though they did not actually believe it. Thus, the results may reflect the child's response to demand characteristics rather than an actual change in the memory.

While the results should be interpreted with caution, the findings do offer important insight into the potentially detrimental effects of stereotyping and suggestion. Most importantly is that nearly a quarter of the participants in the stereotype plus suggestion condition continued to assent to Sam Stone's misbehavior even when gently prompted to tell the truth, suggesting that demand characteristics may not account for all assents to misleading questions. This indicates that while stereotypes influence children's memories, a situation involving stereotypes with the addition of leading questions is more dangerous.

Touch

Young children typically experience genital touch through normal activities such as normal washing, drying, etc. of the genital area. According to Green (1991), these normal caretaking practices are at times misconstrued as inappropriate, which leads to a subsequent sexual abuse allegation. Therefore, it is essential to understand how children respond to questions about touch and their own bodies, because the goal of a forensic

sexual abuse interview is to understand if, how, and why an alleged perpetrator touched a child.

Pezdek and Roe (1997) explored touch as a salient feature of an interaction to determine if memories of touch can be changed, implanted, or erased. Participants included 80 4-year-old and 80 10-year-old children who viewed a series of slides upon which they were later tested. When a picture of a flower was shown, the research assistant either touched the child's hand or shoulder or did not touch the child at all while pointing out a detail of the picture. Following the series of slides, the research assistant read the child a story and then reviewed with the child what they had done that day. The review contained one of three statements to suggest that a touch had changed (i.e., from a touch on the hand to a touch on the shoulder), that no touch occurred when in fact it had, or that a touch occurred when in fact it had not. The same research assistant who presented the slides and the suggestion also administered a memory test consisting of questions about the slides as well as touch.

The authors reported that the suggestions to plant and erase memories were not successful. However, there was a significant difference when the researchers attempted to change a memory for the body part that had been touched. Children who had been touched either on the hand or shoulder were significantly more likely to accept the suggestion that they were touched on the other body part. This was true for both 4-year-old children and for 10-year-old children.

In terms of sexual abuse research, these results indicate that it would be relatively difficult to convince children that they had been inappropriately touched when they had not and it would be easier to change a child's memory for a touch which had actually

been experienced. However, before professionals assume that these results hold true for child sexual abuse allegations, several problems with this study must be noted. First, the touch in question was not secretive, nor was it one that was emotionally laden. In fact, touches on the hand and shoulder occur quite frequently. It may be that touch on the hand and shoulder occur frequently and innocuously enough that the children found it interchangeable. This does not necessarily generalize to the more personal touch occurring during sexual abuse.

A more significant limitation may be that the same person who touched the child, presented the suggestion, and administered the memory test. The authors should not say with certainty that the children succumbed to the suggestion presented by the research assistant. It may be that the children acquiesced to the questions because the authority figure asking the questions already knew the answer and the children wanted to please her. In addition, no manipulation check was conducted to determine if children answered the way they did because their memory had been changed or if it was due to demand characteristics. The possibility that children in laboratory experiments may succumb to suggestive questions because of demand characteristics of the experiments, rather than actual suggestibility, was also an issue in the Leichtman and Ceci (1995) study described in the section on stereotypes. These studies underscore the importance of considering the ecological validity of laboratory studies when attempting to generalize results to actual abuse situations.

Krakow and Lynn also attempted to examine touch as a salient feature of an interaction in their 2003 study. They recruited 48 4- and 5-year old children to play "Twister" and "Shapes" with an unfamiliar research assistant. The games were designed

so that the participants were touched innocuously (e.g. on the hand, arm, calf, and foot) 40 times or they were not touched at all. Each game movement was controlled so that the research assistant maintained similar physical proximity to the child in both conditions. The game of "Shapes" was designed for this particular study and it consisted of the research assistant drawing shapes on the participants arm with his or her finger and having the participant guess which shape she was drawing. In the touch condition, the research assistant drew on the participant's arm, and in the no touch condition the research assistant drew in the air above the participants arm. One week later, a second unfamiliar research assistant interviewed the children through free recall, "abuse touch" questions (e.g., "Did Amy kiss you?"), correctly leading questions, and misleading questions.

The authors had hypothesized that children who were touched would provide more information during free recall, and would be more likely to falsely assent to questions that are similar to those that would occur in a forensic context. The results indicated that during the free recall portion of the interview, children who were touched innocuously did not recall more information than those who were not touched. Results also indicated that there were no significant differences between children who were touched and children who were not touched in the way they responded to direct questions (e.g., "Did Amy hug you?"). However, children were significantly more likely to assent to abuse touch questions when a tag question ($M = 0.49$), such as "Amy kissed you, didn't she?", was used rather than when a direct question was used ($M = 0.07$).

The previously presented studies provide important information to the field of child sexual abuse research. However, they were conducted in laboratories and do not

provide the ecological validity of a study that includes genital touch and the induction of stress. As was previously mentioned, due to obvious ethical limitations, this type of study is difficult to create. Saywitz, Goodman, Nicholas, and Moan (1991) attempted to construct a more ecologically valid paradigm by designing a study that includes genital contact with an unfamiliar adult through a medial examination. Participants included 72 female children between the ages of 5 and 7 years old. Each child was scheduled for an individual appointment with an unfamiliar female physician. Each girl received a physical exam from the doctor while her mother and a nurse were present. In addition, half of the participants received an anal and genital exam (genital condition) and the remaining participants received a scoliosis exam (non-genital condition), which consisted of tapping on the spine only. One week or one month later the child returned for an interview with an unfamiliar research assistant who was blind to the child's condition. The interview consisted of free recall, reenactment with anatomically detailed dolls, as well as direct yes/no and misleading questions. The misleading questions included questions similar to those existing in sexual abuse interview (i.e., "How many times did the doctor kiss you?").

The results indicated that false assents from children in the non-genital condition did not occur during free recall and were rare in response to direct questions. Of children in the non-genital condition, 2.86% falsely assented to vaginal touch and 5.56% falsely assented to anal touch. In comparison, 21.74% of children in the genital condition falsely assented to a scoliosis exam. Both age groups showed a high resistance to misleading questions regarding abuse touch. In response to misleading abuse touch questions, 7-year-old children ($M = 0.99$, $SD = 0.03$) were more accurate than 5-year-old children (M

= 0.96, $SD = 0.10$), but both age groups produced a near perfect performance. Although children were not likely to falsely assent to genital touch, 7-year-old children in the genital condition recalled less information than 7-year-old children in the non-genital condition, through both free recall ($M = 20.58$, $SD = 16.55$ vs. $M = 35.94$, $SD = 12.81$) and reenactment ($M = 46.22$, $SD = 15.45$ vs. $M = 68.36$, $SD = 32.54$). There was no significant difference for 5-year-old children. Since there was no evidence of memory impairment when 7-year-olds in the genital condition were asked yes/no questions, the authors speculated that the older children edited their recollections during free recall due to social forces, such as feeling embarrassed at discussing genital contact with an unfamiliar adult.

While the authors attempted to create an ecologically valid study, there are two limitations that hinder the generalization to sexual abuse scenarios. First, the genital touch about which children were questioned occurred in the presence of a parent and a nurse. Second, the children were also aware that the doctor was intending to heal them, not hurt them. This is very different from a typical sexual abuse scenario and may create differences in the way children answer abuse-related questions. Furthermore, this study highlights the difficulty in separating out accuracy of memory from motivational forces, such as social desirability. While the data may indicate a memory deficit, the lack of information recalled by older children may be attributed social factors rather than a memory impairment. Similar to the limitations of demand characteristics noted in the Pezdek and Roe (1997) and Leictman and Ceci (1995) studies noted earlier, it is important for researchers to conduct ecologically valid studies and use caution when

generalizing to sexual abuse situations because there may be processes other than cognitive ones influencing the way children answer abuse-related questions.

Subsequent studies using a similar medical paradigm have found similar results. Steward et al. (1996) reported that when questioned about touch and their own bodies, children's accuracy was high. Out of the 130 3- to 6-year old children, 81% made no errors in response to body touch and the number of children falsely assenting to body touch was less than 1%. Other studies have examined the effect of suggestion and question type through "abuse touch" questions and have also found a very low rate of false assents (Krakow & Lynn, 2003; Rudy & Goodman, 1991; Quas & Schaaf, 2002). The study conducted by Rudy and Goodman (1991), for example, included 7-year-old children and 4-year-old children, half of which were randomly assigned to be a "participant" and half were assigned to act as a "bystander." One participant and one observer of the same age and sex entered a trailer with an unfamiliar male research assistant. The participant child engaged in several activities with the assistant while the second child watched. Approximately 10 days later, a second research assistant individually questioned each child using a structured interview consisting of free recall, specific, and misleading questions. The interview also included questions meant to mirror a sexual abuse interview (e.g., "The person in the trailer didn't touch you, did he?", "Did he kiss you?"). The authors noted that with regards to errors in response to abuse questions, only one child made an error of commission, resulting in a false assent rate of 0.05%.

Studies such as Pezdek and Roe (1997) and Krakow and Lynn (2003) demonstrate that there is a continuum when considering suggestibility. Changing the memory of an

event that actually occurred appears to be relatively easy, while planting or erasing a memory appears to be significantly more difficult. This is not to say that a child's memory is consistently malleable because there are other factors affecting suggestibility, such as question type. In addition, the type of touch in question also appears to be a factor. More ecologically valid studies (Saywitz et al., 1991; Steward et al. 1996) using a medical paradigm have found that children are highly accurate when denying that they had been touched. Therefore, it appears to be less likely that children will accept misinformation about being touched and subsequently report it during free recall or direct questioning. However, children are significantly more likely to report that a touch has occurred when the questions is formed as a "tag question." It is possible that this trend may reflect demand characteristics of the interview rather than an actual change in memory.

Conclusions

The existing research on how aspects of an event influence memory and suggestibility has practical implications when considering forensic child sexual abuse interviews. First, when a child is testifying about something he or she experienced, as opposed to something he or she witnessed or only heard about, the child is more likely to provide more accurate information (Murachver et al., 1996) and show an increased resistance to suggestion (Gobbo et al, 2002; Roeber et al., 2004). This is not to say that witnesses cannot provide accurate information as demonstrated by Rudy and Goodman (1991) and Lamb et al. (2003). One caveat to note is that according to Lamb et al. (2003), participants in an event provide fewer peripheral details than do observers, but this will be discussed further in the next section.

A second finding of interest to professionals concerns how many times instances of sexual abuse occur. Research has indicated that children who experience an event multiple times more accurately recall the details of an event that are held constant. The disadvantage to experiencing an event multiple times, however, is that children are much more likely to confuse instances that they experienced (e.g., Farrar & Goodman, 1991; Fivush et al., 1992; Pearse et al., 2003). This can lead to conflicting reports, which may call their ability to testify into question. Research also indicates that children are less likely to falsely assent to something that did not happen when they have experienced an event multiple times (Connolly & Lindsay, 2001; Powell et al., 1999).

Children are also highly unlikely to assent to genital touch when none occurred (Saywitz et al., 1991; Steward et al., 1996). Even when presented with misleading information, children are highly accurate when describing events concerning their own bodies. However, the two studies mentioned previously both employed a paradigm using medical exams, which involved genital touch. Another laboratory study (Pezdek & Roe, 1997) presented conflicting results, which indicate that changing a memory is fairly easy, but the limitations of this study include the use of a frequently occurring innocuous touch and a poor methodology.

Finally, aspects of the event affecting memory and suggestibility may be complicated even further by secrecy and stereotypes. A sexually abused child may be asked to keep a secret in order to earn a reward or to avoid punishment. Due to the ethical limitations of the study (Wilson et al., 2004), it is difficult to generalize the results to sexual abuse. Therefore more research needs to be conducted in order to determine how the act of being asked to keep a secret, as well as attempting to keep the secret,

affect memory and suggestibility. In addition, stereotypes also affect the information presented by children (Leichtman and Ceci, 1995). Professionals should be aware that if children are exposed to a stereotype (i.e., repeatedly hearing that their accused perpetrator is a "bad person"), they will be more likely to provide information that coincides with that description.

The findings presented are valuable in that they provide researchers and professionals with information about how various aspects of an event influence memory and suggestibility. However, the majority of the studies presented in this section were laboratory studies that did not include children who were victims of sexual abuse. Examining what types of details children are able to provide after an alleged instance of sexual abuse offers additional insight as to what to expect from children in a forensic interview.

Studies Examining Sexual Abuse as the Event

Although the large majority of studies have involved events designed to approximate abuse, some studies have used testimony from actual sexual abuse interviews to examine what types of details children are actually able to provide. Professionals are asked to make determinations about the likelihood that an event occurred based on factors present in a child's testimony. The Criterion-Based Content Analysis (CBCA) was developed as part of the Statement Validity Assessment (SVA), an instrument to aid professionals in making that determination. The basis of the CBCA is Köhnken's (1989) theory that there are certain criteria that are more likely to be present in a truthful account than in a fabricated one. In the first phase of the SVA, the individual

tells his or her account of the offense with minimal prompting from the interviewer. Appropriate prompts such as "What happened next?" are used to elicit as much information as possible. The second half of the SVA involves professionals evaluating the interview transcripts to assess the presence or absence of certain criteria. The CBCA employs 19 criteria that are grouped into five categories. The first category, General Characteristics, includes the criteria Logical Structure, Unstructured Production, and Quantity of Details. The second category, Specific Contents, includes Contextual Embedding, Descriptions of Interactions, Reproduced Conversation, and Unexpected Complications. The third category, Peculiarities of Content, includes Unusual Details, Superfluous Details, Accurately Reported Details Misunderstood, Related External Associations, Accounts of Subjective Mental State, and Attribution of Perpetrator's Mental State. The fourth category, Motivation-Related Contents, includes Spontaneous Corrections, Admitting Lack of Memory, Raising Doubts About One's Own Testimony, Self-Deprecation, and Pardoning the Perpetrator. The final category, Offense-Specific Elements, only contains one criterion, Details Characteristic of the Offense (Steller & Köhnken, 1989). It is assumed that a person's testimony can be judged true or false by evaluating the presence or absence of these criteria.

Vrij (2004) conducted a review of the existing CBCA literature, which included all published articles and book chapters that appeared in a PsychLIT search using the search terms Criteria-Based Content Analysis, Statement Validity Assessment, and Statement Validity Analysis. In addition, the author included all known CBCA/SVA conference papers. Vrij's review summarized the results of both field and laboratory studies. Field studies using the CBCA are invaluable because they actually use the event

in question to determine what children can recall and what factors are present in their testimony about a traumatic event. Unlike laboratory studies, there is no gold standard to help researchers determine whether the research participants actually experienced abuse. The legal outcome of the case is often the criterion for determining if sexual abuse actually occurred. However, it is important to note that a low score on the CBCA or a perpetrator's exoneration does not necessarily mean that the sexual abuse did not occur. It may simply mean that the child was not able to convincingly portray what he or she experienced due to limited language skills. While laboratory studies are able to establish whether a child's testimony is true or false, events used in laboratory studies are typically unlike a sexual abuse experience in that there is a lack of negative emotional arousal and loss of personal control. For the purpose of this review, only field studies will be considered because they are able to consider the emotional arousal associated with sexual abuse.

Vrij (2004) cites field studies, all with similar results. He reported that Esplin et al. (1988) and Lamb et al. (1997) all published similar, significant results. The findings of each study indicated that significantly more criteria were present in the testimony of plausible accounts rather than in a fabricated testimony. Further bolstering support for the CBCA, Vrij reported that inter-rater reliability is high for each of the criterion calculated individually. In addition, when inter-rater reliability is calculated for the CBCA as a whole r generally exceeds 0.75. These findings demonstrate that the CBCA is able to differentiate between highly plausible and fabricated accounts. Furthermore, research conducted using transcripts from interviews with children whose experiences of

sexual abuse were judged to more plausible offer insight into what details they are able to recall.

Presence of Individual Criteria

Vrij (2004) summarized how frequently each individual criterion was judged as being present in seven published field studies, all of which used transcripts from alleged sexual abuse victims ranging in age from 2- to 19-years-of-age. When possible, Vrij examined the percentages of criterion present in highly plausible and false accounts separately. His summary indicated that Logical Structure was present 100% of the time in highly plausible accounts and Quantity of Details was present nearly 100% of the time in highly plausible accounts. In addition, Contextual Embedding was present more than 80% of the time in highly plausible accounts. Across all seven studies the criteria Accurately Reported Details Misunderstood, Raising Doubts About One's Own Testimony, and Self-Deprecation were each found in less than 10% of transcripts.

One of the studies included in Vrij's 2004 review was conducted by Lamb et al. (1997) and it is one of the most extensive field validation studies on the CBCA. The authors obtained 1187 transcripts of interviews with alleged sexual abuse victims in Israel. No standard interview technique was used, but Israeli youth investigators, who work for a single government agency and specialize in sexual abuse allegations, conducted all interviews. The authors included only cases for victims between the ages of 3- and 14-years of age involving physical contact and for which there was sufficient independent evidence relevant to the validity of the claims. Out of the 1187 possible transcripts, only 98 cases were included in the final analysis. The transcripts were

evaluated by raters who had been trained extensively to use the CBCA and who agreed on the absence or presence of the criteria 90% of the time. Based on independent evidence (e.g., medical or physical evidence, eyewitness statements, perpetrator confession) allegations were rated as Very Likely, Quite Likely, Questionable, Quite Unlikely, and Very Unlikely.

As expected, the results indicated that the highest CBCA scores were assigned to cases that were independently deemed Very Likely ($M = 7.13$). The categories of Very Likely and Quite Likely were combined into a new category, Plausible. Likewise, the categories of Very Unlikely and Quite Unlikely were combined into a new category, Implausible. The mean CBCA score of the Plausible group ($M = 6.74$) was significantly higher than the mean score of the Implausible group ($M = 4.85$). Furthermore, the authors analyzed which individual criteria were more likely to be present in Plausible accounts versus Implausible accounts. The following criteria were present significantly more often in Plausible accounts: Logical Structure, Unstructured Production, Quantity of Details, Contextual Embedding, Interactions, and Conversations. The presence in Plausible accounts of one criteria, Unusual Details, approached significance. Finally, the following criteria were rarely present: Superfluous Details, Misunderstood Details Accurately Reported, and External References. These results suggest that children are able to produce coherent and consistent narratives, which are not told in a chronological sequence. Furthermore, children's narratives contain a significant number of central details, references to time and space, descriptions of interactions and conversations, as unusual, but meaningful, details. While these conclusions presented by Vrij (2004) and Lamb et al. (1997) offer important insights, they were reached by examining the

testimony of children of all ages without considering how CBCA scores are affected by the age of the child.

Age Differences and the CBCA

Lamb et al. (1997) examined testimonies from children between 3 and 14 years of age, while Vrij (2004) compared all published field studies resulting in an age range of 2 to 19 years of age. Meanwhile, several studies (e.g., Anson, Golding, & Gully, 1993; Craig, et al., 1999; Ruby & Brigham, 1998) have demonstrated a correlation between the interviewee's age and the number of criteria that are present. Buck, Warren, Betman, and Brigham (2002) theorized that differences in age groups may be due to limited language abilities and structural coherence in younger children. These researchers attempted to examine which criteria were most likely to be present in the accounts of young children by using actual sexual abuse interviews, keeping raters blind to the child's age, and using a wide range of age groups. The 104 transcripts used in the study were obtained from prior research studies. The age ranges considered by the authors were 2 to 3 years, 4 years, 5 to 6 years, 7 to 8 years, 9 to 11 years, and 12 to 14 years of age.

Trained raters who were blind to each child's age evaluated the transcripts. Each CBCA criterion was rated as present or absent, and presence was further coded as to whether it was spontaneously reported or interviewer prompted. This yielded three different coding methods: lenient, standard, and strict. The lenient coding method evaluated children's responses regardless of whether they were produced spontaneously or in response to an interviewer's prompt. The strict coding method evaluated children's responses only if they were spontaneously produced. The standard coding method called

for different standards of presence for different criteria. Seventeen criteria were considered present whether they were either interviewer prompted or spontaneously reported. Accounts of Subjective Mental State and Spontaneous Corrections were considered only if they were spontaneously reported.

The results indicated that the total CBCA score, as well as the totals for the five CBCA criterion categories, correlated positively with age for all three coding methods. Post hoc analysis indicated that, for all three coding methods, significantly fewer criteria were noted for 2- to 3-year-old and 4-year old children, demonstrating that it is more difficult for young children to obtain a CBCA score high enough to support the veracity of their statement. In addition, there were also some individual criteria within the groups that did not correlate with age. These included Misunderstood Accurate Details, Perpetrator's Mental State, Doubting Own Testimony, Self-Deprecation, and Pardoning the Perpetrator. Consistent with previous studies, these criteria were present in less than 10% of transcripts. These results demonstrate that 5 of the 19 individual criteria may not be useful when considering the testimony of children, due to their low frequency of occurrence. These results suggest that when young children are interviewed, they are less likely to be able to produce the same quantity and types of details that older children are able to produce.

Conclusions

The results presented by Lamb et al. (1997) were consistent with the other results presented by Vrij (2004). Overall, it appears that when children are reciting a highly plausible account of sexual abuse they are able to produce coherent and consistent narratives that contain a significant amount of central details and that include references

to time and space. Lamb et al. also reported that children are able to describe interactions and conversations, as well as to provide unusual, but meaningful, details. Lamb et al. also noted that children are unlikely to report superfluous details or details that are not part of the allegation but are related to it. Consistent with Vrij's summary, Buck et al. (2002) also noted that children, especially those younger than 5-years of age, were unlikely to raise doubts about their own testimony or make self-deprecating comments.

The results garnered from CBCA field studies are invaluable to both researchers and professionals. Through examining actual sexual abuse testimony and evaluating it with a standard measure, researchers are able to present evidence as to what types of details children are able to recall following a traumatic event.

Discussion

Whether a sexual abuse allegation is a "good-faith" allegation, or a deliberate attempt to convict an innocent person, professionals are asked to make decisions about the veracity of the child's statement, often without medical or other corroborating evidence (Kerns et al., 1992). Consequently, much of the investigation rests on the child's testimony. Therefore, there is a need to examine the factors of the event in question to determine how children's memory and suggestibility are affected. In an attempt to study these factors many researchers conducted laboratory studies, which offer more control, but are less ecologically valid. To address this issue, some studies have been conducted with naturally occurring stressful events, as well as with samples of children involved with sexual abuse allegations.

Existing research has provided several conclusions as to how aspects of an event influence memory and suggestibility. First, participating in an event increases the child's accuracy and reduces suggestibility (Gobbo et al., 2002; Murachver et al., 1996; Roeber et al., 2004). Second, participating in an event multiple times increases the accuracy of recall for details that are held constant, but decreases the accuracy for details that are variable (Farrar & Goodman, 1991; Fivush et al., 1992; Pearse et al., 2003; Powell & Thomson, 1996). Research also reports that children are also less likely to falsely assent to something that did not happen when they have experienced an event multiple times (Connolly & Lindsay, 2001; Powell et al., 1999). Third, children are accurate when describing events concerning their own bodies and are also highly unlikely to assent to genital touch when none occurred (Saywitz et al., 1991; Steward et al., 1996). Finally, while only a limited number of studies have been conducted, research suggests that memory and suggestibility are complicated by secrecy and stereotypes.

Many of the studies presented were conducted in a laboratory, and while they have provided a number of insights into memory and suggestibility, they do not reflect the emotional responses evoked during sexual abuse. Studies that have examined stress and memory appear to have conflicting results (see Bugental et al., 1992; Goodman et al., 1991; Merritt et al., 1994; Ridley et al., 2002). However, it may be that the emerging pattern is one of an inverted U-shaped function such that a moderate level of stress improves memory functioning, while too much or too little stress hinders memory.

Research using actual sexual abuse testimony that is evaluated by the CBCA is as important as the laboratory studies presented because it offers evidence of what children are actually able to recall following a traumatic event. The results presented by Vrij

(2004), Lamb et al. (1997), and Buck et al. (2002) are consistent with many of the results presented in laboratory studies. For example, the CBCA research determined that even young children are able to produce coherent and consistent narratives that contain a significant amount of detail. In addition, children are able to describe interactions and conversations that they have experienced. It should be noted, however, that while field studies provide information as to what types of details children recall during interviews, there is no way of knowing how accurate their testimonies are, which is the benefit of laboratory studies.

In a perfect world, researchers could use the information presented to create a model of factors affecting memory and suggestibility. They could consider a number of variables (e.g., age of the child, frequency of the abuse, child's level of stress) to decide if the child's testimony was accurate. Unfortunately, that capability does not exist, so professionals have to work with the existing literature to make determinations.

Unfortunately, two critical areas of research have yielded highly conflictual results, providing very little guidance for professionals. Research involving children's memory for touch and for stressful life events are conflictual, in part, because events containing touch and stress can be so variable. There appears to be a continuum as to how difficult it is to change memories regarding touch, based upon the type of touching experienced. For example, some studies have investigated more innocuous touches, and others have investigated touches involving private areas of the body. It appears that it may be relatively easy to change a memory for an innocuous touch, but that it may be more difficult to do so for a touch occurring in a private area of the body. There also appears to be a continuum for memory and trauma research, with some studies

investigating events which may have been highly stressful for the child, and others which may have not been very stressful at all. The differences in the findings may be due to differences in the nature of the touches or stressful events, as well as to the children's interpretation of the same touches and stressors.

The issue of a child's interpretation of an event is, perhaps, more difficult to address than the issue of the actual event itself. In terms of the literature on memory for touch, it may be that on one end of the spectrum changing memory for an innocuous touch is relatively easy. At the other end of the spectrum, changing a memory for an abusive touch may be relatively difficult, especially given the very low rates of false assents. However, in the middle of the spectrum, children's interpretation of touch is likely to be more variable. Children, especially young children, are routinely touched in their genital area during the course of normal caretaking activities. This gray area is a danger zone because children are required to interpret whether the touch was helpful or harmful. This highlights one of the inadequacies of both field and laboratory studies. Saywitz et al. (1991) presented one of the strongest methodologies for approximating a sexual abuse scenario (i.e. using a medical paradigm involving a genital exam), yet it was unlikely that the children questioned whether the physician's touch was hurtful, especially since the child's parent was in the room as well. Consequently, professionals must use other factors in making determinations of what actually occurred, such as whether the child was asked to keep it a secret. The knowledge of what details children are able to present based on the CBCA is helpful in this aspect as well because professionals are aware that children are able to report on things such as conversations and interactions, but are unlikely to be able to testify to the perpetrator's mental state, for

example. Professionals are aware that just because a young child cannot testify to the perpetrator's intent, does not preclude the existence of abuse.

The literature on children's ability to recall stressful events poses a similar problem. As noted earlier, the existing research suggests that there is an inverted U-shaped pattern such that too little or too much stress hinders memory, while a moderate amount of stress aids in memory. The risk in putting this pattern to use is that it is difficult to determine where each child will fall on the curve. This is a particular problem for children falling into the gray area noted above. If they are unsure as to how to interpret the touch, their confusion may create additional stress. Further complicating the continuum of stress is the issue of children who are abused multiple times. Earlier, research was presented indicating that children who experience an event multiple times are more accurate and more resistant to suggestion, but this research was conducted using non-threatening activities. It is unclear if these findings would remain consistent in the face of multiple sexual abuse instances, which may produce varying degrees of stress. This example illustrates the need for professionals to make determinations by looking not only at the degree of stress, but by putting it into context with factors such as the child's temperament, narrative coherence, and the severity of the reported abuse.

Limitations

Before applying each study's findings to the field of forensic sexual abuse interviews, it is important to understand the limitations and methodological shortcomings of some of the studies. Limitations include problems presented by both field and laboratory studies, the problems with retrospective and prospective studies, and the difficulty in comparing results across studies.

Perhaps the most significant limitation of the research is the inherent problems of both field and laboratory studies. Field studies are beneficial because they allow the examination of the testimony and experiences of children who have actually been sexually abused. This allows professionals to consider the emotional response not evoked in a laboratory study. However, since there is no gold standard to help researchers determine whether the research participants actually experienced abuse or not, the legal outcome is often the criterion for determining whether sexual abuse actually occurred. As stated previously, a low score on the CBCA and a perpetrator's exoneration may coincide because the child was not able to convincingly portray what he or she experienced due to a lack of language skills.

While field studies allow researchers to study the affects of stress resulting from sexual abuse, there is no way to control for the actual event. Laboratory studies, conversely, are able to establish whether a child's testimony is true or false, but they do not evoke the negative emotional arousal and loss of personal control noted in sexual abuse situations. This allows researchers to conclude how aspects of an event affect memory and suggestibility, but these results cannot necessarily be generalized to sexual abuse scenarios because of the lack of emotional arousal. Another limitation inherent in laboratory studies is the issue of demand characteristics. The danger lies in researchers' assumptions that the appearance of suggestibility indicates an actual change in memory, rather than the participant merely responding to expectations of the interviewer. Including a debriefing question to assess if children's memories were actually changed could easily control for this specific limitation and this would allow researchers greater confidence in stating which factors influence suggestibility. However, there is no easy

solution to control for the more inherent limitations presented by both field and laboratory studies. In addition to continuing to conduct both laboratory and field studies and look for converging evidence, researchers must continue to be innovative in creating laboratory studies that approximate sexual abuse. One promising way to look at stress, for example, is by continuing to use studies involving the VCUG. Pezdek et al. (2004) interviewed physicians familiar with features of sexual abuse and the VCUG. They concluded that the VCUG was a very good approximation of sexual abuse because it involved forced genital contact while the child was undressed, as well as aspects, such as voiding the bladder in front of a physician, that may be perceived as embarrassing by the child. While this is still an experience that is sanctioned by the parents and done for the well-being of the child, the very nature of the experience may offer insight as to how children respond following a painful, embarrassing, and unpleasant experience.

Similar to the debate between field and laboratory studies, the second limitation involves the use of prospective and retrospective studies. Both types of studies were cited in this review and each has its own benefits and limitations. Prospective studies allow researchers to directly observe and measure a child's level of stress through physiological measures and parent and self-reports at the time of the event, thus reducing possible bias inherent in retrospective recall. However, the paradigms prospective studies employ, such as medical procedures, only approximate the level of stress produced by sexual abuse. To study actual memories of sexual abuse, researchers sometimes use retrospective studies, which create another set of problems. Retrospective studies examine memories for events that have previously occurred. The time delay between the event and recall could affect the memory, as could any subsequent

experiences and conversations. Again, there does not appear to be an ethical way to resolve this issue and it appears that the best alternative is to conduct both types of studies and look for converging results. However, a possibility in improving the research may lie in researchers' attempts to limit the time between the stressful event and the retrospective study, thereby reducing the effects of the time delay and any post-event information that may be introduced.

In order to look for converging evidence from field, laboratory, prospective, and retrospective studies, researchers have to compare data across studies. However, this effort is complicated by the varying measures of memory, suggestibility, and stress that are employed. Some researchers studied memory through free recall (e.g., Murachver et al., 1996), while others studied it through 'yes/no' or forced-choice questions (e.g., Powell & Thomson, 1996; Powell et al., 1999). Fortunately, many researchers have addressed this issue by using both free recall and direct questions in their final interviews (e.g., Connolly & Lindsay, 2001; Saywitz et al., 1991). Similar to this issue, is the difficulty in comparing rates of suggestibility across studies because researchers used different measures of suggestibility. For example, suggestibility has been measured following a number of question types such as tag questions, direct questions, misleading questions, and free recall. In addition, when examining studies that feature a traumatic event, it is difficult to determine the magnitude of the stress for the child because some studies use child or parent reports, while others determine the magnitude through physiological measures. To address this limitation, research would benefit from the use of multiple measures of stress and memory, which would allow for a more efficient

comparison of results across studies. This would also serve as a reliability measure when using subjective measures such as parent or child report.

Directions for Future Research

The limitations presented underscore the need for continued research in the field of traumatic memory and suggestibility. The findings presented previously are based on a large body of published work, which is by no means complete. There are several avenues of research professionals might take in order to add to the existing literature. These additional directions include employing similar measures, creating large, multi-site studies of children's memory, exploring the severity of abuse and the amount that children are able to remember, expanding on research involving secrecy, as well as central and peripheral details, and the usefulness of the CBCA.

One of the limitations discussed earlier is the difficulty in comparing data across studies. One simple way to address this issue is for researchers to use multiple measures in a single study. A more difficult, but more beneficial way to address this issue is for researchers to use the same measures. Researchers would continue to examine issues in their areas of interest, but using the same measures to examine suggestibility and memory, as well as the same measures of stress. This would allow for greater efficiency in comparing results. Researchers would then be able to focus on the overarching themes and patterns that emerge when child characteristics, aspects of the event, and interviewing techniques interact to affect memory and suggestibility.

To take this idea one step further, is to conduct multi-site studies that examine children's memory in a more systematic way. These studies would include the same

measures for common variables, while allowing for variability in the specific research question across studies. For example, a multi-site field study of children's memory in actual abuse situations might include only children whose abuse has been corroborated by witnesses, perpetrator confessions, and medical evidence. This examination could include data not only on the quantity and quality of details the children provided about their sexual abuse, but could also examine a wide range of factors associated with the number of details children are able to provide. Such factors might include the number of times the abuse occurred, the relationship of the perpetrator to the victim, the severity of the abuse, and a report of how stressed the child felt at the time of the abuse versus at the time of the testimony. In addition, looking at child characteristics, such as temperament and IQ, as well as the interviewing techniques employed, would allow for researchers and professionals to look for patterns in memory and suggestibility. Different sites might examine different sets of factors, while increasing the potential for collaboration across different studies on common areas of interest, using common measures. The potential for a larger sample size for some of the common questions might facilitate statistical power, particularly if more stringent criteria for abuse are established for inclusion in the sample.

A second direction for future research involves the consideration of stress and how it affects memory and suggestibility. In research that has been conducted thus far, an inverted U-shaped pattern has emerged, such that too little and too much stress hinder memory and a moderate amount of stress appears to aid memory. This inverted U-shaped pattern would be an excellent tool to aid professionals in determining how accurate a child's memory is for an event based upon their level of stress. However, there is one major caveat: individuals experience stress in varying degrees. An incident

that may be moderately stressful for one child may result in extreme trauma for another. In addition, time since the abuse likely affects level of stress as well. For example, one child may feel less stress the more removed he or she becomes from the incident, while another child may develop Post-Traumatic Stress Disorder and memories of the abuse continue to create stress. Therefore, it is important to understand how individual characteristics and the severity of the stress affect memory and suggestibility, and both field and laboratory studies have the potential to address this issue.

A field study could address this issue by examining the relationship between the severity of sexual abuse in cases with corroborative evidence, and the quantity and quality of the details that children are able to provide about their abusive experiences. Research indicates that severity of abuse is correlated with post-abuse adjustment in children, and would seem to be logically associated with stress, and research in this area may offer professionals insight as to how stress affects accuracy of recall. Laboratory studies also provide valuable insights, but methodologically it is extremely difficult to design a study in which children experience more than one degree of stress. One answer may involve the children who are scheduled to receive inoculations, as well as the VCUG. It may be beneficial to test the memory and suggestibility of a child who had received the relatively stressful inoculation and then test his or her memory following the more stressful VCUG. A collection of data on the individual characteristics of the children, such as temperament and IQ, would allow researchers to examine how these characteristics interact with the level of stress experienced to influence memory and suggestibility.

A third direction for future research is the expansion of research on secrecy.

Secrecy is such an inherent part of sexual abuse that Hartwig and Wilson (2002) argued that some professionals feel an obvious indicator of sexual abuse is a child's testimony that he or she was told to keep a secret. Yet there is little research in this area and there are several questions that need to be answered. Does trying to keep a secret enhance memory because the child is trying to remember what they cannot tell, or does it ultimately result in the repression of the memory? It may be possible that initially keeping a secret improves memory, but that after a significant amount of time the secret is repressed. Another consideration is children's moral view of keeping the secret. If they feel that they are doing something wrong through a lie of omission, this may ultimately impact the stress that is experienced, which may in turn affect their memory. Finally, it is also important to consider whether the child was asked to keep a secret or to forget what happened. The former asks the child to acknowledge the sexual abuse, but to not disclose it to anyone, while the latter is directing the child to erase the incident from his or her memory. Research (Harnishfigger & Pope, 1996) has demonstrated that directed forgetting is possible with word lists, and that the ability to obey an instruction to forget increases with age. It would be good to expand research in this area to include more emotionally salient memories. The ability to obey an instruction to forget something as emotionally arousing as sexual abuse may not occur quite so easily.

A fourth avenue of research that may produce valuable information involves central and peripheral details. Earlier it was noted that Eisen and Goodman (1998) proposed that when traumatic memories are encoded, the individual focuses on central details at the expense of peripheral details. This theory received some validation by

results published by Lamb et al. (2003). For an account to be considered valid, one would expect to see a certain number of details that are deemed as central. However, one of the difficulties with this theory is that it is difficult to define what exactly constitutes a central detail versus a peripheral detail. Creating this distinction is problematic enough for adults and may be even more so while when considering a child's perspective. As Eisen and Goodman point out, something that may be significantly relevant to an adult, may not be as relevant to a child. Research to aid in this distinction would be beneficial to professionals who must determine if a child's testimony is true based on the quality and quantity of details provided.

A fifth direction for future research is to continue to examine the usefulness of the CBCA as a tool to discriminate true and false accounts. Based on the present research, the CBCA is not admissible in the United States court system because it does not meet the guidelines established by the Supreme Court, but it has been used in European countries for several years (Vrij, 2004). Researchers should continue to study the utility of the CBCA and examine ways to improve upon its reliability and validity. Based on the data that suggest that several of the existing criteria are present in less than 10% of children's testimonies, it may be necessary to revise the CBCA standards that are in use. For example, one of the problems noted with CBCA is that it may not be beneficial for use with younger children. Due to the limits of their language skills and ability to produce a coherent narrative, they may unfairly receive a score that indicates a fabricated account. Buck et al. (2002) suggests that there are several solutions that warrant further investigation, such as allowing a young child to meet fewer criteria than an older child and comparing the total CBCA score to those obtained by peers.

Research has made a great deal of progress since the time it was thought that children were very unreliable witnesses. Today, professionals have at their disposal a vast amount of information about how events, child characteristics, and interview techniques influence memory and suggestibility. Nevertheless, there is much more to be done. By addressing the existing limitations, as well as continuing with and expanding on the present body of literature, there is no doubt that researchers will eventually be able to give professionals the tools necessary to make accurate determinations between true and false accounts of child sexual abuse.

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