

# Memory Development in Children: Implications for Children as Witnesses in Situations of Possible Abuse

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*This article reviews the physiological constructs of memory development as they relate to a child's ability to recall accurately detailed accounts of sexual abuse. Counselors are provided with practical suggestions for increasing the reliability of child witnesses.*

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For several decades, Piaget's (1954) theory of cognitive development has dominated the literature on children's thinking. His astute observations provided insight for a generation of educators and developmental experts into the qualitative changes that are associated with cognitive maturation. More recently, live viewing of the inner workings of the brain has provided an unprecedented opportunity to watch and measure activities such as synaptic development and functioning (Berk, 1994). Combining the knowledge from cognitive development theory with information from brain development research greatly increases the capability to understand how memory develops in infants and children. This information has significant implications for counselors interviewing children who may have been sexually abused. Accordingly, this article discusses the physiological constructs of memory development as they relate to a child's ability to recall accurately detailed accounts of alleged abuse. On the basis of this information, counselors are given suggestions for increasing the reliability of responses of children who have been abused.

## MEMORY DEVELOPMENT

Normal memory function involves processing the incoming information by encoding, storing, and retrieval. Because information is encoded and stored according to existing schema, retrieval is enhanced when the event is related to preexisting knowledge and is relevant to existing beliefs (Piaget, 1954). Memory retrieval is also facilitated by cues (e.g., physical environment) similar to those present at the time of encoding. For example, students given tests in the same classroom environment in which the information was presented perform significantly better than students who take the tests in environments that are much different from the original classroom (Farnham-Diggory, 1992). However, memories of individuals who have been exposed to extreme trauma may not follow normal processes (Bremmer, 1999).

It is now widely accepted that there is no single place for memory storage in the brain (Bremmer, Krystal, Charney, & Southwick, 1996). Memory is arbitrated by several brain regions, including the hippocampus (Schacter & Tulving, 1994). Memories are first stored in the hippocampus, then reorganized and placed in other brain areas. For example, visual information is stored in the occipital cortex. At the time of retrieval, elements from the various neocortical areas are reassembled by the hippocampus. Bremmer et al. (1996) found that adult survivors of childhood physical and sexual abuse had 12% lower memory volume in the left hippocampal brain area than did comparison subjects, which suggests a deficit in explicit memory ability. Because stress-induced glucocorticoids such as cortisol seem to be toxic to the hippocampus, there is reason to believe that stress-induced memory deficit is associated with damage to this region of the brain (Bremmer, 1999). Given this information, it is clear that an awareness of the mechanisms of memory development is helpful for understanding problems with the recall of childhood memories.

## Infancy

Infant memory studies suggest that newborns can recognize previously seen or heard stimuli (Kail, 1990). Recall memory is detected at 6 or 7 months. However, specific experiences from infancy typically cannot be recalled in adulthood because of storage and retrieval problems often referred to as "infantile amnesia" (Neath, 1997). Storage and retrieval failure may be best understood using information-processing theory. Information from the environment enters the sensory register (visual, auditory, tactile, olfactory, and gustatory) where the literal image is held for less than one second. The information then moves to short-term memory (STM), which is also known as "working memory." STM is limited by time and capacity, storing approximately five to nine pieces of information for 30 seconds or less. Memory strategies such as rehearsal, coding, and chunking (pieces of

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information grouped together to make them more easily recalled) must transform the information into something meaningful in order to transfer the information into long-term memory (LTM). If the information is not meaningful, it will be lost; hence, storage failure will have occurred. If the information is meaningful, it moves into LTM, which is relatively unlimited in time and capacity. Forgetting can be described as "retrieval failure," because although the information is stored, it is not always accessible without the correct cues. It is believed that infantile amnesia may be caused by memories not being encoded into LTM or by memories being encoded in such a way that the adult mind cannot reconstruct information (Neath, 1997).

Another component affecting infant memory is the myelin sheath on the neurons in the brain, which is analogous to the rubber coating on electrical wires. The coating reduces the random spread of impulses between neurons and develops progressively in the brain. As neurons are myelinated, impulses can pass more rapidly and efficiently. Most myelination is complete by age 2, but some sheaths do not develop until adolescence. Areas that govern motor behavior, vision, and audition are first to be myelinated, while those that govern higher order processes lag behind. Improvement in myelination is directly related to the cognitive abilities of the child (Case, 1985).

The corpus callosum is one of the last structures of the brain to myelinate. One of the major functions of the corpus callosum is to transfer information from one brain hemisphere to another. In most people, the right hemisphere controls perception; analysis of visual patterns, such as wavy lines, faces, spatial relations; and emotions. The left hemisphere controls the production and understanding of language. To accurately report an event, the two sides of the brain must communicate. Myelination of the corpus callosum is not complete until about age 10, although communication between the hemispheres is mature enough for simple transfers by age 5 (Galín, Johnstone, Nakell, & Herron, 1979).

### Childhood

Piaget's (1954) research shows that children in the preoperational stage of development, ages 2 to 6, have serious limitations in thought and perceptions. They understand the world in intuitive, egocentric ways, seeing only one aspect of an event or situation (Craig, 1999). There are no gray areas; everything is black or white, good or bad. In addition, children reason "transductively" (from one specific to the next) rather than deductively (from general to specific) or inductively (from specific to general). For example, a child may reason that because the water goes down the drain when the stopper is removed, he or she will also disappear down the drain (Piaget, 1954), which could induce a fear of water. This type of thinking influences the way memories are stored and fosters distortions in both recall and recognition.

Animism is another characteristic of young children's cognition. This is the belief that all things both animate and

inanimate are able to think and feel. A child may be disturbed about a haircut because the "hair will be sad" (Piaget, 1954). As children develop and their brains mature, their perceptions become more selective; their attention improves; they can better explain sequences of behavior; and they can make inferences about others' behavior, thoughts, and feelings. Feelings-related memories are easily stored, but the affect may be inappropriate because of the inability of young children to take another person's perspective.

At about age 7, children enter Piaget's concrete operational period, which is characterized by the ability to logically organize experiences, understand another's perspective, and use mental operations such as conservation and reversibility. However, children at this stage tend to interpret communication literally because they do not understand satire or metaphors. It is not until the stage of formal operations, which occurs around age 11 or 12 at the earliest, that children can deal effectively with abstractions and hypothetical-deductive reasoning (Craig, 1999).

### Repressed Memories

A discussion of memory development would not be complete without examining the controversial subject of repressed memories. There is a growing body of conflicting evidence about the validity of recovered repressed memories of abuse (e.g., Howe & Courage, 1993; Lief & Fetkewicz, 1995; Loftus, 1993; Pendergast, 1995). Studies suggest that recovered repressed memories of abuse can be accurate; however, false memories can also occur (Ceci, Loftus, Leichtman, & Bruck, 1994). Piaget had a memory of being kidnapped at age 2, a fact that he maintained until age 15 when he learned that his nanny had concocted the story to get a reward.

Many researchers attribute false memories to *source amnesia*, the inability to recall the origin of the memory of an event. Source amnesia is common, as when one recognizes an actor in a movie but cannot recall a previous movie in which the actor was seen. Foley, Johnson, and Raye (1983) presented a list of words to adults and children of varying ages. All were asked to repeat some words aloud and to imagine repeating others aloud. Later, the experimenters presented each word and asked the participants to decide if they had really said it aloud or just imagined saying it aloud. The older children and the adult's decisions were equally accurate, and the decisions of both were more accurate than those of children age 6 and under. In a similar study by Foley and Johnson (1985), participants performed 12 activities, such as communicative gestures and exercises, and imagined performing 12 others. Later, each activity was mentioned and the participants decided if they had performed the activity or only imagined doing so. Again, adults were more accurate than were 6- and 9-year-olds.

Research shows that many children can be easily convinced that something that they only imagined or that was suggested to them actually occurred (Ceci, Ross, & Toglia, 1989). Source confusion studies of Foley and Johnson (1985)

and Ceci, Huffman, Smith, and Loftus (1994) demonstrated that some (as many as 25%) young children are resistant to efforts aimed at removing implanted inaccurate events, even when they are told by researchers and parents that the memories were concocted. One experiment involved preschoolers playing a game, which included some touching (Ceci, Loftus, et al., 1994). The children were interviewed 1 month later. Each interviewer had a one-page summary of what might have occurred, with some accurate and some inaccurate information. The interviewer was to determine how much of the information the children could still recall. The interviewers were told to use any type of questioning that would elicit the most factually accurate recall. When the questions were based on accurate information about the child's experience, the information extracted included no false memories. However, when the interviewer had inaccurate information, 34% of the 3- and 4-year-olds and 18% of the 5- and 6-year-olds confirmed one or more false events. Thus, bias of the interviewer may encourage children to confabulate, that is, to fabricate information to fill in gaps in memory.

Studies such as these have been criticized because they do not recreate the trauma and stress that is experienced by children who have been abused. Therefore, in an effort to examine the relationship between stress and memory, researchers observed responses of children who were in stressful situations. Goodman, Hepps, and Reed (1986) tested two groups of children, the first having a blood sample drawn at a clinic and the second having a washable tattoo rubbed onto their arm. A few days later, when asked to recall the experience, children in both groups did equally well. There was no evidence that children's short-term recall of stressful events was more or less accurate than their recall of comparable nonstressful events. Other similar studies (Bremner et al., 1996) have suggested that small children are reliable and resistant to suggestion, although as the age of the children decreases, there is an increase in suggestibility and a decrease in reliability. A study of trauma memory in children who survived a devastating earthquake found that although 90% remembered the quake, they remembered very selectively, recalling events that had personal meaning for them (Azarian, Lipsitt, Miller, & Skriptchenko-Gregorian, 1999). Such egocentricity is supported by Piaget's (1954) theory and is considered to be an important mechanism in trauma memory impairment.

Ceci, Loftus, et al. (1994) reported the effects of persistent, erroneous suggestions made over time to children in a day care center. Interviewers using accepted forensic procedures (acclimating supportively to the child, eliciting free narrative, using probes, urging children to say when they do not recall, taking breaks) questioned children about their recall of two nonevents (actions that did not take place but were referred to as actual occurrences) from weeks and months before. The more the interviewers made erroneous suggestions over time, the greater the likelihood of the children to give false details. Three- and 4-year-olds were more suggestible than were older children. When Ceci presented a videotape of the children at a conference of therapists and

law enforcement officers who work with abuse victims, all failed to detect which children were accurate and which were not. This lends further confirmation to the already established position that the veracity of memories cannot be ascertained by either the confidence of the reporter or the strength of his or her affect (Ceci & Bruck, 1993).

Other studies confirm the substantiality of repressed memories of abuse. Feldman-Summers and Pope (1994) surveyed 500 male and female professionals and found that of the 79 professionals reporting abuse, 32 (40.5%) experienced a period in which they could not remember the abuse. Of this group, 47% reported having corroboration of the abuse. In another study, 57 sexual abuse survivors who participated in group therapy (Herman & Schatzow, 1987) were encouraged to find verification for their abuse. Seventy-four percent were able to verify the abuse, and 64% of the women who verified the abuse reported some degree of amnesia regarding the abuse. Pope and Hudson (1995) reported that a 38-year-old male professor experienced delayed recall of sexual abuse, which occurred while he attended a boys camp in his early adolescence. He did not remember that he had been molested until his sister told him that his nephew was going to a similar camp. The professor began sinking into a depression but did not know the cause until he awoke one night with the beginnings of the memory of his molester. He then phoned several other men who had attended the camp and they told similar stories of molestation by the same man. The professor then phoned the perpetrator, who ultimately confessed.

### IMPLICATIONS FOR COUNSELORS: INTERVIEWING

When interviewing children who have been abused, the goal of the counselor must be to provide not only optimal conditions for obtaining reliable information but also support and understanding of the child. Researchers who have studied ways in which to enhance reliability and diminish distortions in children's recall of an experience have focused on the role of the interviewer, the timing and frequency of the interview, the interview process, and the interview context (Goodman & Saywitz, 1994; McGough, 1994; Sternberg et al., 1997).

Several studies indicate that interviewer bias leads to inaccurate statements from the party being interviewed (Belli, 1989; Ceci & Bruck, 1993; Saywitz & Snyder, 1993). Skillful interviewing requires a nonbiased, supportive atmosphere in which the child understands that there are not right or wrong answers. To achieve and maintain this type of environment, the interviewer must take special care to remain objective. Forming beliefs regarding the alleged abuse based on information received from third parties (e.g., another professional or the nonoffending parent or caretaker) can cause the interviewer to conduct the interview in ways that seek to confirm or support those preexisting beliefs (Vogeltanz & Drabman, 1995). For example, influenced by the emotional recollection of a mother concerning the sexual abuse her child has endured from a grandfather, an interviewer may

lose all objectivity and might phrase questions and use nonverbal communication in ways that seek to gather support only to confirm the alleged abuse. As Vogeltanz and Drabman stated, "even without interviewer awareness, the interviewer's verbal and nonverbal behavior may reinforce and shape the child's responses, leading to a distorted statement or memory" (p. 584). Therefore, to minimize bias and maximize accuracy, the interviewer must remain neutral when communicating with third parties about the details of the case.

The timing and frequency of pretrial interviews also influence the reliability of testimony. Children apparently forget both relevant and irrelevant information more rapidly than adults do (Warren & Lane, 1995). Recall errors also increase over time at a more rapid rate for children than for adults (Flin, 1993). In addition, repeated questioning over time, even if it is unbiased, elicits increasing inaccuracies. A solution to this problem is to videotape interviews. This not only reduces the number of interviews, which are necessary, but also provides incentives for interviewers to use appropriate questioning and helps prepare the child for trial testimony. (*Reader's note.* If the counselor decides to videotape the interview, it is important to prepare the child for the session, e.g., answering questions about the "mechanics" of recording the session, why a videotape is being used, who will see the videotape. The purpose is to supportively prepare the child for this experience and reduce the level of anxiety that may be associated with being videotaped.)

The interview process requires the knowledge and skill of the interviewer. A well-accepted approach, known as the "stepwise interview" (Yuille, Hunter, Jaffe, & Zaparnick, 1993), begins with rapport building and then asks for two specific but neutral events. Then a free-narrative session focusing on the target event is elicited, followed by general questions, then specific questions, and finally a period of closure.

Successful interviews require that the interviewer first establish rapport with the child (Perry & Wrightsman, 1991). Giving children an opportunity to get to know the interviewer and feel comfortable with the interview setting is critical (Steinmetz, 1997). In fact, children who develop rapport with the interviewer are found to have fewer recall errors than those children who do not (Matthews & Saywitz, 1992). Interview settings that are child-friendly are most conducive to establishing rapport. Age-appropriate toys, art supplies, pictures, puppets, and dolls are but a few of the items the interviewer may want to have available. Cheerfully painted walls, plenty of lighting, and comfortable furniture also help the child feel relaxed (England & Thompson, 1988).

Beginning the interview with neutral, non-abuse-related questions is also an effective technique for building rapport. Having a standard set of questions readily available is the best way to facilitate this step: "Do you have a dog/cat?" "What's his name?" "What does he eat?" "Where does he sleep?" This technique also prepares the child for the interview process of answering questions and educating the interviewer (Steinmetz, 1997). In addition to facilitating trust and openness between the child and the interviewer, the

rapport-building phase also provides the interviewer with an insight into the ability of the child to render further information concerning the alleged abuse. Verbal and nonverbal responses will reflect the child's level of expressive and receptive language skills, which can guide the interviewer for the remainder of the interview.

Collecting as many factual details as possible regarding the alleged abuse is the primary goal of the interview. Because memory development plays such a vital role in recalling events, the child's cognitive development must first be considered when structuring the interview. To evaluate the child's ability to recall an event, the interviewer should begin by asking two specific but neutral statements (e.g., "Tell me what you learned at school today," "Tell me about your favorite TV shows," "Tell me about your favorite toy," "Tell me about your favorite hobby"). Responses to these types of questions will give the child an opportunity to express a variety of details about specific events as well as any emotions surrounding those events. These responses will allow the interviewer to appraise a child's language skills and capacity to report information.

The ideal format for interviewing includes a free-narrative session that focuses on the alleged abuse, followed by a wide range of broad, open-ended questions, which may then be followed by more closed or direct questions if necessary (Faller, 1998). Free-narrative sessions are designed to obtain as much information as possible without asking specific, detailed questions. This format is widely recognized as the most reliable method for obtaining accurate information (Yuille et al., 1993). To begin the session, the interviewer may simply say, "I understand things haven't been going so well for you lately. Tell me what's been happening so that I can better understand." If the child has difficulty relating specific information, the interviewer may then follow up with an open-ended statement such as "Tell me what took place the last time you remember it happening" or "Tell me a little more about what happened to you last week." These statements can prompt the child's memory without mentioning any specific details of the alleged event, thus eliminating the fear of suggestibility on the part of the interviewer.

Because of their limited free-recall skills, younger children typically provide less information during the free-narrative sessions than older children (Steller & Boychuk, 1992). Therefore, closed, concrete, and structured questions designed to trigger the child's memory may be needed as the interview progresses (e.g., "Where did she touch you?" "Did it happen one time or a bunch of times?" "What did he say to you?" "Where were her hands?"). Although the information obtained in this way is thought to be less reliable, Meyers (1998) found that such questions do encourage younger children to talk about these difficult circumstances. Frequent prompts (e.g., "Uh huh, yes, and then what happened?") may encourage younger children to continue their stories (Meyers, 1988). Because of the limited language skills of some children, interviewers should also be prepared to repeat or rephrase questions when necessary.

Children's memories can also be triggered through the use of nonverbal aids and toys. Dolls with genitalia, known as "anatomical dolls," are widely used to help children recall the specific details of an abusive event (Yuille et al., 1993). Although many child development specialists warn against using anatomical dolls, citing that they are overly suggestive and can precipitate false reports (Aldridge, 1998; Bruck, Ceci, Francoeur, & Renick, 1995; Everson & Boat, 1994), most studies support the use of these dolls, especially for younger children with limited recall ability and verbal skills (Adams-Tucker, 1984; Boat & Everson, 1998; Britton & O'Keefe, 1991). A less controversial approach is to use ordinary play dolls, which have been found to be equally effective in helping children relate the details of the sexual abuse (Britton & O'Keefe, 1991). Children who are resistant to playing with the dolls will often respond to anatomical drawings, another widely used tool. These drawings allow children to use markers to communicate the details of the alleged abuse.

Crayons, markers, paints, and paper make excellent tools for having children report the nature of the abuse through a nonverbal exchange. This technique works well for those children who are initially anxious about or fearful of the interview process, are embarrassed by what has happened to them, or lack the language skills to fully communicate the details of the abusive event (Steinmetz, 1997). Feeling cards (i.e., pictures with faces expressing different emotions) can help children remember and identify the feelings they have associated with an abusive incident. Once again, younger children with less free recall ability can benefit greatly by having their memories prompted through these types of nonverbal stimuli.

The lasting impression of the interview can be an important factor later in the child's recovery (Steinmetz, 1997). In concluding the interview, the child should be praised for participating, regardless of the outcome (e.g., "Thank you for answering all my questions today. I know this was a pretty tough thing to have to do, but you did a good job. I really appreciate the way you paid attention and did your very best."). The interviewer should not hurry through this stage of the interview process. Enough time should be spent so that the child leaves feeling valued as a person, not just as a reporter of information (Perry & Wrightsman, 1991; Steinmetz, 1997).

Understanding the implications of memory development for a child's ability to recall important information is critical for the counselor gathering information regarding an alleged sexual abuse event. Without this knowledge the interviewer is likely to miss some very important details, thus rendering an incomplete or invalid interview. Through proper interviewing techniques, however, all children, regardless of their level of cognitive development, can provide accurate testimonies of the sexual abuse they have endured. Sexual abuse allegations should, of course, not be based solely on one interviewing technique. Having a variety of tools available gives the interviewer the greatest opportunity of gaining a full understanding of the extent of the abuse. Finally, if the results of the interview indicate

that the child has poor recall ability, the counselor should (a) report that the child's ability to recall is limited and (b) suggest that other means are necessary to solicit information to validate the occurrence of abuse.

## CONCLUSION

There are few definitive answers regarding the reliability of a child's detailed account of alleged sexual abuse. Those who study the implications of using children as witnesses seem to agree that children may have difficulty recalling and reporting these events (Cole & Loftus, 1987). Advanced technological studies of the brain further explain how a child's memory develops and what limitations for recalling specific events may exist at certain age levels. It is clear that children of all ages can provide at least some information about previously experienced events.

Research verifies that recall memory improves with age and that younger children are typically more suggestible than older children and adults (Ceci & Bruck, 1993). However, although older children have more mature brains, they may not necessarily be better witnesses because they tend to make too many inferences. Younger children sometimes cannot report details about what they have seen, and they may not be able to draw conclusions. These factors lead to errors of omission by younger children and errors of commission by adolescents and adults (Goodman & Helgeson, 1988).

Because memory is reconstructive, both children and adults are likely to report some erroneous information. The task for counselors is to find techniques that will elicit more accurate and complete testimonies. It has been found that training in developmental psychology and in forensic procedures contributes to improved methods of interviewing and fact-finding. Also, understanding the physiological implications of memory development can guide all those who work with sexually abused children in forming more appropriate recall expectations. Interviewing techniques that recognize the recall capabilities of children are sure to elicit more reliable information.

## CLOSING REMARKS

It is imperative that counselors who work with sexually abused children adhere to the ethical standards of the American Counseling Association (ACA, 1997) and practice within the boundaries of their competencies. Only counselors who are sufficiently knowledgeable about the cognitive development of young children and who have trained specifically to interview this population can be expected to demonstrate the necessary expertise. Counselors wishing to commit themselves to this specialty area and serve as expert witnesses must obtain appropriate education, training, and experience.

Young children are often referred to therapy for diagnostic purposes because of suspected (and unconfirmed) sexual abuse (Berliner & Briere, 1999). Counselors who are experienced with questions and techniques that decrease the possibility of eliciting biased or false statements will pro-

ceed with caution, and their testimony will be more likely to endure the scrutiny of the judicial system (Merskey, 1996). Finally, it is vital that counselors refrain from any detailed querying of a child until official investigative interviews have taken place in order to avoid the possibility of encouraging false or distorted recall. Counselors can be supportive, attentive, and understanding as they determine the ethical and most effective course of action.

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