

Reliability of Child Witnesses: A Decade of Research

Carole Peterson

Memorial University of Newfoundland

ABSTRACT

The ability of children to recall highly stressful emotional events was investigated in a series of studies spanning more than a decade, and their findings are summarized here. The stressful events were injuries serious enough to require hospital emergency room treatment, and the children's ages ranged from 1 to 13 years at the time of injury. Although children who had been only 1 year of age (or barely 2) at the time of event occurrence showed little reliable long-term memory after they were old enough to be interviewed, older children (including young preschoolers) demonstrated remarkably good memory. Furthermore, these former 2-13 year olds recalled the target events quite well even five years later. Although the target events used as analogs in these studies are not the same as the sorts of events about which children testify in court, an understanding of children's basic memory skills for highly emotional and aversive events is important and can help inform both police investigation and confidence in child testimony.

Preparation of the research summarized here was primarily supported by grants from the Natural Sciences and Engineering Research Council of Canada. Additional funding came from the Memorial University Undergraduate Career Experience Program and the Student Work and Service Program. I extend my thanks to the Janeway Hospital and their Emergency Room staff, and to all the recruiters, interviewers, transcribers and data analyzers who participated, and especially to Penny Voutier for her data management. As well, a thank you to Brent Snook for his help. And most of all we thank the parents and children who allowed us into their homes and cooperated so helpfully. Correspondence should be addressed to: Carole Peterson, Psychology Department, St. John's, Newfoundland Canada A1B 3X9. Telephone: 709-737-7682; Fax: 709-737-2430; E-mail address: carole@mun.ca ents

Children are often witnesses (and sometimes the only witnesses) to crimes, especially for those perpetrated against themselves. An enduring issue over the years that faces police investigators, judges, and juries is how much one can believe what a child says. Fundamental to this issue are accuracy and completeness of recall. Important questions include: Can children report accurately on the details of events in which they were emotionally involved, especially those that caused them a lot of pain and distress? How complete are their accounts? And how does the age of the child influence their memory? Another important issue is long-term recollection and how that interacts with the child's age at the time because there are numerous judicial cases in which the target forensic events took place when children were very young. In short, an understanding of children's basic memory skills is crucial if we are to effectively deal with children as witnesses.

In Canada, the Canadian Criminal Code and the Canada Evidence Act were amended by Parliament by Bill C-15 (in 1989) and Bill C-126 (in 1993); as a consequence, corroborating evidence is no longer required in trials involving children and judges can no longer warn juries that children's testimony should be viewed with skepticism (Sas, Wolfe, & Gowdey, 1996). Rather, in several recent decisions the Supreme Court of Canada has favored the view that juries were to assess evidence based on their view of the person's mental development, understanding, and ability to communicate. In addition, Bill C-2 states that children under age 14 are no longer required to take an oath but rather to promise to tell the truth. No inquiry is permitted into a child's understanding of the nature of promises, truth, or lying because the ability of children to define these concepts relies on cognitive achievements that young children have not yet acquired rather than on their ability to tell the truth. As a consequence of these changes, increasingly younger children are becoming involved with the court system.

For more than a dozen years, I and my student collaborators have been trying to obtain relevant answers

to the questions posed above by using an event that causes children a lot of pain and distress, namely injuries that are serious enough to require hospital emergency room treatment such as broken bones, lacerations requiring suturing, burns, or dog attacks. Clearly these are not the sort of events that play a role in the criminal justice system. However, they do provide an opportunity to investigate children's memory under conditions of high stress. These injuries are highly salient events that evoked considerable emotion at the time, according to adult witness reports. Furthermore, we know the details of these events because adult witnesses were interviewed at the time about the circumstances surrounding the children's injuries, and thus we can assess the accuracy and completeness of children's reports. In short, interviewing children about these injuries allows us to explore fundamental issues of memory. Of course, children were not interviewed suggestively or coercively, nor were parents or others trying to bias or alter the children's reports. Nor did these events evoke personal shame, such as in sexual assault. Nevertheless, using these injury events as an analog is still informative about how well young children can recall events that caused them considerable personal distress.

We recruited our children through placing research assistants in the emergency room of the only children's hospital in St. John's, Newfoundland. This is the sole hospital serving children in the greater St. John's area, and all children within more than a hundred kilometer radius are taken to this hospital for treatment. The children are a cross-section of the entire community and are treated equivalently regardless of socioeconomic background. However, the population of Newfoundland is 97% Caucasian of Western European descent according to Statistics Canada, and thus there is little ethnic variation in the sample. When children arrived at the hospital the research assistants asked them and their families to be part of our research and on average 80% of the families we approached agreed to participate. Over half could still be found and were willing to participate five years later.

Recall Accuracy and Completeness for 2-13 Year Olds

In a series of studies, we have tracked the memory over time of children who were between 2 years of age (specifically, 26 months of age or older) and 13 years at the time of their injury. These children were interviewed shortly after their injuries occurred (approximately a week later) as well as after the passage of months or years. Some were re-interviewed 6 months later (Peterson & Bell, 1996), some one year later, all that were still available were re-interviewed 2 years later (Peterson, 1999), and as many as could be found were re-interviewed 5 years later (Peterson & Whalen, 2001). We interviewed children about the details surrounding their injury and we

also interviewed them about what happened in the hospital emergency room. All of the data presented below involves children's recall of content information. That is, to count as a remembered detail, the children had to provide new information that was not embedded in the question they were asked. For example, they had to state a location when asked "where were you" or the name of a person when asked "who was there with you" or details of their accident when asked "what happened."

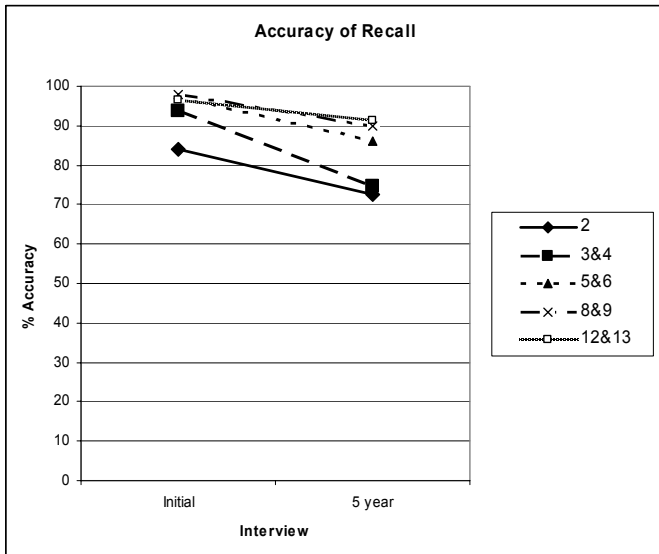
This review will consider only children's recall of the details surrounding their injury, not of their subsequent hospital treatment. Their injury was a highly salient and unique event that caused considerable pain and emotional distress in children of all ages. In contrast, these children had been in this hospital emergency room many times before their injury (as well as between their target injury and follow-up interviews) for illnesses such as the flu, colds, fevers, etc. This emergency room functions as the community's after-hours clinic where children are taken on weekends and evenings when the offices of family doctors are closed. Thus, a visit to the emergency room is not a unique event. Furthermore, it is often not apparent to children why one goes to one place and waits (the original waiting room), then another room to wait (the treatment room), then elsewhere (e.g., x-ray department), and so on. So the visit to the hospital is chronologically and logically more confusing. Furthermore, the majority of children (except for the youngest) were not that upset in the emergency room, and doctors explained to them what they were doing and why. Probably for these reasons, children's recall of their hospital experience was poorer than that of their injury. As well, the injury event (which was unexpected, unique, and highly salient) is probably a better analog for forensic events than is a visit to the same hospital that one has visited several times before for a host of reasons. Thus, only children's recall of their injury, and not of their hospital experience, is discussed here.

Recall accuracy. The most salient finding of this body of research is that the children were surprisingly accurate, even after the passage of a considerable period of time. The number of children available after five years included eleven 2 year olds, seventeen 3-4 year olds, seventeen 5-6 year olds, twenty-two 8-9 year olds, and sixteen 12-13 year olds. Figure 1 shows the accuracy of the children's reports both at their initial interview and 5 years later. All but the 2 year olds had accuracy rates of over 90% in their initial interviews, and even 2 year olds averaged 84% in accuracy during the course of a lengthy interview. The sorts of mistakes that these younger children made centered around time (when it happened, time of day, etc. - concepts that children this young have not yet acquired), the identity of bystanders, i.e., other people who were present at the accident but who played

Reliability of Child Witnesses

little role, and the identity of the very first person who responded to them after their injury (Peterson, 1996). Five years later, children who had been 8 years old or more at the time of their injury (i.e., were at least 13 at the time of their last interview) still retained an accuracy rate of over 90%. Former preschoolers (those who had been between 2 and 4 years old at the time of injury) were accurate about approximately three-quarters of the details they recalled five years later. However, when one considers whether the information was central (e.g., what happened, how it happened, how they reacted) versus peripheral (e.g., other people who were present, time of day), all but children who had been 2 years of age at the time of the injury were over 80% accurate five years later about central information (Peterson & Whalen, 2001). Thus, there is indeed a decrease in accuracy over time, but when one considers the age of these children and the fact that many were screaming hysterically at the time of injury, these accuracy rates are impressive indeed.

Figure 1. Accuracy of recall during initial and 5-year follow-up interviews for 2 to 13 year olds. (Adapted from Peterson & Whalen, 2005.)

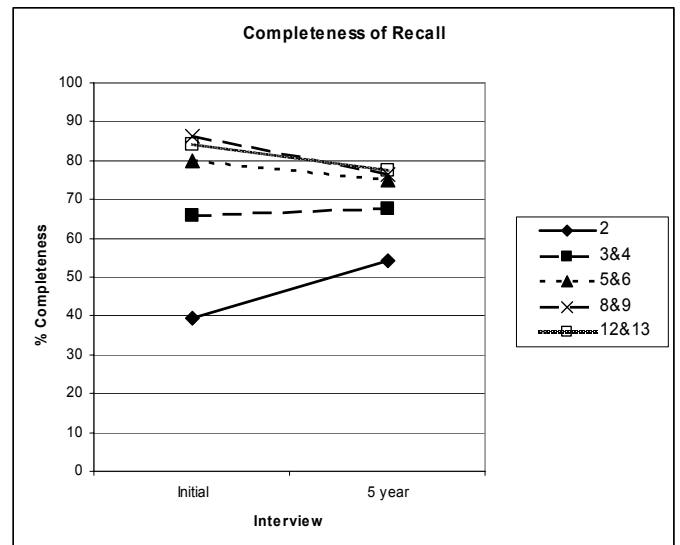


Recall completeness. In order to assess how complete children's recall was, we developed a prototype of typical information that they should be able to provide. We of course first encouraged children to tell us as much as they could in free recall, without any prompting questions. Afterwards, we asked the following questions: What time of day, where were you, who was with you, who else was around, what other things were there (in the environment), what were you doing before you got hurt, what happened when you got hurt, how did it happen, (if relevant, who did it), did you bleed and how

much, did you cry and how much, who was the first person to come and help you, who else came, what did he/she/they do, where did you go before going to the hospital, what did (x) do to treat the injury before you went to the hospital, who else helped/was there, who took you to the hospital, and when did you go there?

We calculated the percentage completeness (vis à vis the above prototype of a typical injury experience) of the children's recall, and it is graphed in Figure 2. Two year olds were more complete five years later than they were originally, but this is an artifact of the difficulty of interviewing 2 year olds. They find it difficult to sit still and answer questions for very long, and would much rather play. Children who were 5 or more years old at the time of injury were less complete five years later than they had been originally, but the decrease was relatively modest. The completeness of their recall was about 85% right after their injury and about 75% fully five years later. Thus, they still have relatively complete recall after a long period of time has elapsed. There was no significant change for 3 and 4 year olds, but this was probably due to two compensating factors: forgetting some information versus being more cooperative and informative when interviewed. I should point out that the completeness of central information recall (versus peripheral details) was better than this: The children who had been at least 5 at the time of injury recalled about 90% of central information in their initial interview and 85% of central information five years later. It is peripheral information that was most likely to be forgotten. Thus, overall, children's recall about a stressful injury remained impressively complete after a long period of time had elapsed.

Figure 2. Completeness of recall during initial and 5-year follow-up interviews for 2 to 13 year olds. (Adapted from Peterson & Whalen, 2005.)



Distress. We have explored the impact of several factors on children's recall, and one of them is the child's degree of distress. As mentioned before, some of these children were extremely emotionally upset, and when parents were asked to rate their children's degree of distress at the time of injury on a scale from 1 (not upset) to 6 (extremely upset), many described their children as off the top of the scale. There has been considerable debate about whether children's recall is poorer, better, or unchanged when they are highly distressed but in a recent meta-analytic review of studies of how stress impacts people's recall, Deffenbacher, Bornstein, Penrod, and McGorty (2004) found that although the accuracy of *adults'* recall was significantly compromised when they were highly distressed, the accuracy of *children's* recall was not. These authors point out that many of the studies about stress and memory in children did not expose children to very high degrees of distress. A typical 'high stress' event in some studies (e.g., Peters, 1997) was exposure to an unexpected fire alarm. Although the preschool-aged children looked worried and there was an increase in heart rate, none of the children cried or showed other behavioral symptoms of distress. In contrast, other studies (e.g., Quas et al, 1999) have used a medical procedure in which a catheter is painfully inserted into the child's urethra, followed by insertion of a liquid dye and then the child is required to void his or her bladder on the x-ray table while being x-rayed – and many of these children show considerable distress. In our studies, children often scream in pain at the time of injury. According to Deffenbacher et al (2004), these various stressful events are not comparable. In their review they differentiate studies in which participants experience an orienting response (such as in the fire alarm study by Peters, 1997) from studies in which a defensive response is elicited, the latter including events that threaten bodily integrity or self-esteem and thus involve considerably higher degrees of distress than events that elicit an orienting response. When the authors only looked at studies in which children were exposed to what they considered to be highly stressful events, stress had little effect on children's recall accuracy. We found the same thing in our sample of children (Peterson, submitted; Peterson & Bell, 1996; Peterson & Warren, in press). The accuracy and completeness of their recall about the details of their injury was not compromised by their degree of distress. (However, preschoolers who were highly distressed in the hospital seemed to recall less about hospital treatment).

Characteristics of child and family. Likewise, we explored the role of other factors including children's temperament and language ability, parental educational attainment, and the number of adults living in the home,

and these too did not significantly affect the children's memory accuracy for details surrounding their injury (Peterson, Sales, Rees, & Fivush, in press; Peterson & Warren, in press). However, the typical way in which parents talked with their children did make a difference. Specifically, whether or not the parents habitually talked to their children about prior events that had occurred in their lives as well as how elaboratively they did so influenced how much information they provided although not their accuracy of injury recall (Peterson et al, in press; Peterson & Warren, in press). In other words, children whose parents habitually and elaboratively talk with them about prior events are used to remembering their past and talking about it. Thus, they have more complete recall during an interview. However, the accuracy of what they recall about being injured is not affected (although how accurately they recall the details of the harder-to-recall hospital treatment is improved if their parents are in the habit of discussing past events with them in an elaborated way).

Consistency across multiple interviews. It is instructive to look at the consistency of children's responses over their several interviews which span a number of years. In a study that assessed the consistency of children's responses when interviewed right after their injury and then again after 6 months, 1 year, and 2 years (Peterson, Moores, & White, 2001), we found that all children (with the exception of those who had been only 2 years old at the time of injury) were highly consistent across interviews. That is, at least 85% or 90% of the information they provided was the same in interview after interview. This repeated information was also highly accurate. The average amount of 'old' information (i.e., information that had been present in a prior interview) and 'new' information (i.e., information never provided in a prior interview) is found in Table 1, along with the percentage accuracy of that 'old' and 'new' information.

It is apparent that the information that children repeatedly recalled was highly accurate. On the other hand, when new information appeared regarding details that they had previously been questioned about, such new additions were not reliable. That is, they were as likely to be wrong as right. But it is important to remember that this applies only to information that children had not been questioned about previously. Others have found that when children provide new information when interviewed after a significant period of time about events that had not been asked about before, parents judge most of it to be accurate (Fivush, Haden, & Adam, 1995; Fivush & Hamond, 1990; Fivush & Shukat, 1995).

Reliability of Child Witnesses

Table 1. The Mean Number of 'Old' and 'New' Details Provided by Children in Interviews at 6 Months, 1 Year, and 2 Years After Injury as well as the Percentage of These Details That Are Correct¹

Age	'Old' Information		'New' Information	
	M	%correct	M	%correct
6-month Interview				
2 Years	7.2	87%	3.5	46%
3-4 Years	13.6	89%	3.6	75%
5-6 Years	15.1	93%	3.1	81%
8-9 Years	16.2	91%	1.0	36%
12-13 Years	13.9	95%	0.8	87%
All Ages ¹	13.9	92%	2.3	69%
1-year Interview				
2 Years	10.3	80%	2.3	28%
3-4 Years	15.3	89%	2.1	58%
5-6 Years	15.9	91%	2.1	63%
8-9 Years	16.4	94%	0.7	37%
12-13 Years	14.7	93%	0.2	100%
All Ages ¹	15.0	91%	1.4	53%
2-year Interview				
2 Years	10.6	79%	3.4	50%
3-4 Years	16.5	91%	2.7	45%
5-6 Years	17.9	90%	2.2	41%
8-9 Years	17.4	92%	1.0	38%
12-13 Years	13.9	95%	0.1	50%
All Ages ²	15.9	91%	1.8	44%

¹ Adapted from Peterson et al., 2001

² The data are the mean for all of the children pooled together into one group, not the arithmetic mean of the scores of the different age groups.

Timing and frequency of interviews. One of the concerns raised by various people is the fact that these children were interviewed very soon after the target events transpired, but in the forensic world, children sometimes come forward later to talk about an event. What happens if they are not questioned right away? If their first interview is delayed for a significant period of time? We explored this in another series of studies. For the first study, we interviewed 3 to 9 year old children for the first time a full year after their injury. Other children were interviewed shortly after injury as well as a year later, although some of them were also interviewed at 6 months (Tizzard-Drover & Peterson, 2004). There were few differences depending upon whether children were interviewed once or twice prior to their 1-year interview, but younger children who had had an initial interview shortly after the events transpired had more complete and more accurate recall than those children who were interviewed for the first time a year later. When two years had gone by, we re-interviewed those children

who had had only one prior interview at 1-year post-injury as well as those children who had been interviewed initially as well as a year later (Peterson, Pardy, Tizzard-Drover, & Warren, 2005). These data for the accuracy of children's recall at their 1-year and 2-year interviews are found in Table 2 and for the completeness of their recall are found in Table 3. Although younger children whose first interview was delayed for a year were less accurate during that first interview, their accuracy rates were comparable when interviewed again two years after injury. Thus, having that interview a year after the event helped reinstate the event such that they were as accurate a year later as those children who had had earlier and more interviews.

Summary. Children who are at least 26-30 months of age at the time of event occurrence are surprisingly good at recalling highly stressful prior events, specifically serious injuries requiring hospital emergency room treatment. This is especially true if children are at least 3 years old. They also recall the details of these events consistently over time. This is particularly impressive when one considers the fact that most of these children were very upset, and many were also frightened and in considerable pain. Children's ability to recall the target events with such accuracy after five years have gone by is also very impressive, especially when one considers what percentage of their entire lifespan that five years represents when one is only 3 years old at the time of injury. However, the picture is not the same when one looks at children who are 1 or barely 2 years of age at the time they are injured.

Table 2 Percentage Accuracy of Recall One and Two Years After Injury by Children Whose First Interview Had Been a Week (Early) Versus a Year (Late) After Event Occurrence¹

Age	Time of Interview			
	1 Year		2 Year	
	Mean	S.D.	Mean	S.D.
Early First Interview				
3-4 Years	84.3%	11.7	84.6 %	11.2
5-7 Years	92.6%	3.9	86.2 %	14.0
8-9 Years	89.8%	8.9	84.8 %	8.4
Late First Interview				
3-4 Years	77.8%	12.1	85.2 %	14.1
5-7 Years	85.0%	19.9	82.0 %	17.3
8-9 Years	93.1%	6.5	86.9 %	6.5

¹ Adapted from Peterson et al., 2001

Recall by 1 Versus 2 Year Olds

We recruited the families of children who were too young to be able to be interviewed at the time about their

injury, namely children who were as young as 12 months of age. We then visited these children several times in order to interview them when they achieved the ability to talk about their past life experiences. Talking about the past (i.e., the 'there-and-then') rather than the immediate context (i.e., the 'here-and-now') is a major linguistic breakthrough for children, and until they achieve this milestone, they cannot be productively interviewed. Prior to their second birthday, children's contributions to discussions about the past are limited to minimal responses that are highly prompted by parents (Peterson, 2002). But typically between the age of 2 and 2½ years, children begin to talk about the there-and-then productively. Thus, there seems to be an important difference between 1 year olds (as well as young 2 year olds) and children who are older 2 year olds in terms of whether they can be interviewed after a target event occurs. But more importantly for forensic purposes, can those 1 year olds translate their experiences to language once they achieve linguistic competence at a later age? This is the crux of a number of court cases in which individuals claim to recall abuse that occurred when they were infants or toddlers, and is the focus of considerable debate.

In the research conducted in my laboratory, we defined a toddler as a child who could not be interviewed about past events when we did our initial visit. This included children who were not only 1 year olds but also a couple of children who were barely 2, specifically 24 or 25 months of age. We interviewed parental witnesses to toddlers' injuries right after they occurred (as we always did for children of all ages), but then revisited the children 6, 12, and 18 months later so that we could interview them once they had acquired the ability to talk about their personal past, i.e., the there-and-then (Peterson & Rideout, 1998), and then again five years after their injury (Peterson & Parsons, 2005). I am only presenting data on content-responses provided by the children and am excluding children's responses to yes/no questions. We tried to avoid using those as much as possible (and if we could not get around asking one, such as "did you cry?", we always asked for additional content information). We did this because, contrary to what many people believe about the simplicity of yes/no questions, these are not simple to young children. Many preschoolers interpret yes/no questions in terms of being cooperative or agreeable with the questioner or in a number of other ways. For example, if asked "Is red heavier than yellow?" many preschoolers will say "yes" even though the question is nonsensical (Hughes & Grieve, 1980), or will say "yes" to a question asked in a foreign language if it has the rising intonation of a yes/no question (Fay, 1975). They also have been found to say "yes" to ques-

tions that might potentially have forensic implications (e.g., "Did the man lick your knee?" "Did the man remove some of the children's clothes?") when the videotaped interactions showed no such thing happened (Ceci & Bruck, 1995). In our laboratory, we also have found that preschoolers' responses to yes/no questions were not reliable (Peterson & Biggs, 1997; Peterson, Dowden, & Tobin, 1999; Peterson & Grant, 2001),

The children are divided into younger toddlers (12 - 18 months of age), older toddlers (20-25 months) and 2 year olds (26-35 months of age) on the basis of their age at the time of their injury. Table 3 presents the mean number of accurate details and errors provided by children in the different age groups in each interview during the first two years after injury as well as the percentage of the information they provide that is correct. At the 6 month interview, the younger toddlers were still not able to be productively interviewed since they were still under age 2, but the older toddlers have acquired the ability to productively talk about their personal past. By the time of their 12 month interview, all but the very youngest of the younger toddlers were able to be interviewed, and by the 18 month interview, all children could talk about their past. Two year olds of course could be productively interviewed during each visit, and their last visit took place after 2 years instead of 18 months like the toddlers.

Table 3: Percentage Completeness of Recall One and Two Years After Injury by Children Whose First Interview Had Been a Week (Early) Versus a Year (Late) After Event Occurrence¹

Age	Time of Interview			
	1 Year		2 Year	
	Mean	S.D.	Mean	S.D.
Early First Interview				
3-4 Years	68.7	15.4	73.8	13.0
5-7 Years	78.8	9.3	81.8	12.4
8-9 Years	73.4	12.5	78.8	8.8
Late First Interview				
3-4 Years	62.3	16.4	76.4	18.4
5-7 Years	73.1	17.0	79.7	14.8
8-9 Years	83.5	6.4	89.3	13.3

¹ Adapted from Peterson et al., 2001

Even after younger toddlers acquire the ability to talk about their personal past and can provide information about other, more recent, past events, they provide little information about this highly emotional event in which they were injured seriously enough to require medical intervention. Furthermore, the information they provide is as likely to be wrong as right. Children classified as older toddlers are able to provide more information but still not very much. Accuracy rates are higher but a third of the information they provide is wrong. It also should

Reliability of Child Witnesses

be noted that five of these children could provide virtually no information at all about the target event. Only the children who had been at least 26 months of age at the time of their injury could provide a considerable amount of information (three quarters of it accurate) during their later interviews.

Table 4: Mean Number of Correct Details (C) and Errors (E), as Well as Percentage Correct (% C) for Children in Interviews Conducted 6 Months, 12 Months, 18/24 Months After Injury^{1,2}

Length of Delay Until Interview	Age at the Time of Injury								
	Younger Toddlers			Older Toddlers			2 Year Olds		
	C	E	% C	C	E	% C	C	E	% C
6 Months	0.50	0.17	75.0%	3.42	1.92	64.1%	8.33	2.50	76.9%
12 Months	2.42	2.08	53.7%	4.73	2.91	61.9%	9.10	3.90	70.0%
18/24 Months	3.57	3.43	51.0%	6.25	3.50	64.1%	13.25	4.33	75.4%

¹ The number of children contributing to the counts were as follows: 12 children at each age group during the first interview, 12 young toddlers, 11 older toddlers, and 10 two year olds contributed data during the 12 month interview, and 7 younger toddlers, 8 older toddlers, and 12 two year olds contributed data during the last interview.

² Adapted from Peterson & Rideout, 1998

What about after a considerable delay? We revisited the children 5 years after their injury and interviewed them again (Peterson & Parsons, 2005). There were 27 former toddlers in our sample, i.e., children who had been between 12 and 25 months old at the time of injury, and fully 17 of them (63%) had no recollection at all of the target event. In contrast, all but one of the 11 former 2 year olds did recall their earlier injury. The former toddlers (who are now 6 year olds) provided an average of 9.6 correct details about their injury as well as 14.0 errors, for an accuracy rate of 40.7%. In contrast, the former 2 year olds (who are now 7 year olds) provided an average of 18.5 correct details and 5.3 errors, for an accuracy rate of 77.7%. As well, most of the former toddlers who claimed to remember their long-ago injury provided us with reports that amalgamated the target event with other similar events. That is, their reports were a mish-mash of multiple events, even though the children themselves believed that they were one coherent event. In fact, only one of the former toddlers provided what we defined as a reasonable and accurate report. Our findings are similar to those of other researchers who have looked at children's later verbal recall of preverbal experiences. For example, Terr (1988) later interviewed children who had experienced serious trauma when they were young, trauma such as witnessing the rape or murder of a parent, the evisceration of a sibling, or losing a leg in an accident. Although the children still had clinical sequelae

years later, they had no verbal memory of the events if they had been under 27 months of age at the time the events occurred.

Summary. There seems to be a significant difference between children who are only one year of age (or very young two year olds) and children who are older two year olds (and obviously children who are older still). Two year olds are able to recall a considerable amount of information about highly salient and emotionally stressful events, even though they make a number of errors. However, reports of children who were under 2 years old at the time of an event seem to be suspicious at best. The majority could recall nothing about the target events, and those that did mostly combined multiple experiences into a single report. Perhaps all the various pieces of different events that they amalgamated were accurate - we have no way of knowing. However, the children believed that they were recalling one coherent event and this was clearly not the case.

CONCLUSIONS

An understanding of children's long-term memory skills can help police and the courts assess the testimony of child witnesses. Such an understanding is an important foundation for forensic applications, even though other factors (such as poor interviewing techniques) may compromise that testimony. However, if one understands that young children *can* demonstrate good long-term recall, one is in a better position to evaluate the assertions of particular children under particular interviewing circumstances.

The major questions that are asked of researchers by the courts, police, and lawyers involve the issues of suggestibility and implanting of false memories. However, basic questions about how well children can recall the details of events arise in a surprising number of court cases. These questions include the following:

Can young children remember emotionally distressing events?

Children who are at least 2½ years of age have been shown to have robust long-term memory for highly salient events, not only in research conducted in my lab but this has also been found by a number of other investigators (for a review see Peterson, 2002). In fact, 2 year olds who are younger than 2½ may also be able to provide good information, although children who are barely 2 years old may not be able to do so. Thus, the evidence is unequivocal that preschoolers, even children as young as 2 years of age, can give reliable testimony. If events are highly salient and distinctive, they can be highly memorable over remarkably long periods of time. It is undeniable that children this young are vulnerable

to misleading questions, to suggestions, and to a range of poor interviewing practices (for a review see Ceci & Bruck, 1995), but, when interviewed appropriately, preschoolers can exhibit reliable long-term recall.

Can children reliably report on events if they are not interviewed until long after they occurred?

In my laboratory, we delayed the initial interview that children experienced until a year after their injury, and although 3 and 4 year olds were not quite as good at recalling the target event as other 3 and 4 year olds who had been interviewed right after the target event occurred, they still provided extensive and mostly accurate reports. When interviewed a second time another year later, their reports were indistinguishable from those of children who had been interviewed as many as three earlier times during the prior two years. Thus, a delay prior to first being interviewed did not seem to disrupt children's ability to report this highly salient and emotional event. But only one year had passed before the initial interview. Other researchers have found similar results when the delay spanned more years (Fivush et al, 1995; Fivush & Hamond, 1990; Fivush & Shukat, 1995), but these were positive events about which children were interviewed. In terms of negative and distressing events, Quas et al (1999) re-interviewed children about the urethral catheterization medical procedure described above and found that some of the younger preschoolers had forgotten about this event. However, for those that recalled it, they continued to recall it accurately. Thus, the passage of time does not necessarily disrupt children's memory for highly salient events, although some forgetting (and for some children, a lot of forgetting) may occur.

In an earlier paper (Peterson, 2002), I asked and answered another question for which the body of research conducted in my lab can provide at least some answers. This is quoted below (Peterson, 2002: 396-397):

What can we make of the fact that children do not always describe events in the same way from time to time?

According to Steward et al. (1996: 6-7), "the consistency of a child's report was rated in a recent national survey as one of the top three criteria that professionals use to assess the accuracy of allegations of child abuse." When we assessed the consistency of the children's reports across four interviews spanning two years (Peterson et al, 2001), even preschoolers (when questioned similarly) were highly consistent across interviews when recalling their injury, with over 80% of the information recounted in later interviews being present in the earlier ones. And the information that was consistently reported from in-

terview to interview was almost always accurate. In particular, the major components of what happened were consistently and accurately reported in interview after interview.

Errors occurred, of course, and attorneys often ask what we can make of the fact that events are sometimes described differently. Some types of information are more error-prone than others; for example, any question querying information about time seems to be particularly problematic because preschoolers have a poor grasp of time concepts. Thus, they did poorly when questioned about when something happened, what time of day it occurred, and even the sequence of some events (Peterson, 1996). As another example, bystanders, onlookers, or people who played minor secondary roles were not recalled well. Some children even asserted (when interviewed 2 or 5 years after an injury) that a yet-unborn sibling was among the onlookers. In contrast, the major participants and the central actions and events were not confused.

A further finding was that information provided for the first time a year or two after the injury occurred (but not present in the earlier interviews) was not reliable. Remember however that our interviews were highly similar across time; in contrast, Fivush and her colleagues (Fivush, Haden, & Adam, 1995; Fivush & Hamond, 1990; Fivush & Shukat, 1995) found that information appearing for the first time in later interviews was likely to be accurate, but interviews differed substantially across time and often new information appeared for the first time in a later interview simply because it was not asked about in an earlier interview.

Returning to the question of what we can make of inconsistencies in young children's reports to the court, the answer depends upon what children are inconsistent about. If they are inconsistent about tangential information, people who played minor roles or who were just onlookers, or issues involving time, then such inconsistencies cannot be seen as compromising the reliability of the child's report. On the other hand, inconsistencies in terms of participants playing major roles or the central components of events are a different story. For example, in a murder case described by Poole and White (1995), a 5-year-old identified in different interviews more than a dozen perpetrators and four different murder weapons. Such inconsistency about the major components of a highly salient event was simply not found in our research. (Taken from Peterson, 2002: 396-397)

Summary. Children who were interviewed about events that caused them considerable emotional distress showed

Reliability of Child Witnesses

surprisingly good long-term recall about the details of those events. Thus, children who are at least 2½ years of age can provide considerable information that is forensically reliable. The testimony of children who are under 2 years of age at the time of target events is more questionable and there are serious concerns about the reliability of their memory. (Children between 2 and 2½ fall into that grey zone: it depends upon the child's memory skills at the time.) It is undeniable, however, that children are vulnerable to suggestion, coercion, and a host of poor interviewing techniques. Thus, it is extremely important for interviewers to be well-trained and to use techniques that have been shown to be appropriate for children. Nevertheless, even young preschoolers have impressive memory skills that can play important roles in forensic situations.

REFERENCES

- Ceci, S.J., & Bruck, M. (1995). *Jeopardy in the courtroom*. Washington, DC: American Psychological Association.
- Deffenbacher, K. A., Bornstein, B. H., Penrod, S. D., & McGorty, E. K. (2004). A meta-analytic review of the effects of high stress on eyewitness memory. *Law & Human Behavior, 28*, 687-706.
- Fay, W.H. (1975). Occurrence of children's echoic responses according to interlocutory question types. *Journal of Speech and Hearing Research, 18*, 336-345.
- Fivush, R., Haden, C., & Adam, S. (1995). Structure and coherence of preschoolers' personal narratives over time: Implications for childhood amnesia. *Journal of Experimental Child Psychology, 60*, 32-56.
- Fivush, R. & Hamond, N.R. (1990). Autobiographical memory across the preschool years: Toward reconceptualizing childhood amnesia. In R. Fivush & J.A. Judson (Eds.), *Knowing and remembering in young children*. New York: Cambridge University Press, 223-248.
- Fivush, R., & Shukat, J.R. (1995). Content, consistency, and coherence of early autobiographical recall. In M.S. Zaragoza, J.R. Graham, G.C.N. Hall, R. Hirschman, & Y.S. Ben-Porath (Eds.), *Memory and testimony in the child witness* (pp. 5-23). Thousand Oaks, CA: Sage.
- Hughes, M., & Grieve, R. (1980). On asking children bizarre questions. *First Language, 1*, 149-160.
- Peters, D.P. (1997). Stress, arousal, and children's eyewitness memory. In N.L. Stein, P.A. Ornstein, B. Tversky, & C. Brainerd (Eds), *Memory for everyday and emotional events* (pp. 351-370).
- Peterson, C. (1996). The preschool child witness: Errors in accounts of traumatic injury. *Canadian Journal of Behavioural Science, 28*, 36-42.
- Peterson, C. (1999). Children's memory for medical emergencies: Two years later. *Developmental Psychology, 35*, 1493-1506.
- Peterson, C. (2002). Children's long-term memory for autobiographical events. *Developmental Review, 22*, 370-402.
- Peterson, C. (submitted). "And I was very very crying": Comparing child and parental stress ratings as predictors of children's recall. Manuscript submitted for publication.
- Peterson, C., & Bell, M. (1996). Children's memory for traumatic injury. *Child Development, 67*, 3045-3070.
- Peterson, C., & Biggs, M. (1997). Interviewing children about trauma: Problems with "specific" questions. *Journal of Traumatic Stress, 10*, 279-290.
- Peterson, C., Dowden, C., & Tobin, J. (1999). Interviewing preschoolers: Comparisons of yes/no and wh-questions. *Law & Human Behavior, 23*, 539-556.
- Peterson, C., & Grant, M. (2001). Forced-choice: Are forensic interviewers asking the right questions? *Canadian Journal of Behavioural Science, 33*, 118-127.
- Peterson, C., Moores, L., & White, G. (2001). Recounting the same events again and again: Children's consistency across multiple interviews. *Applied Cognitive Psychology, 15*, 353-371.
- Peterson, C., Pardy, L., Tizzard-Drover, T., & Warren, K. (2005). When initial interviews are delayed a year: Effect on children's 2-year recall. *Law & Human Behavior, 29*, 527-541.
- Peterson, C., & Parsons, B. (2005). Interviewing former 1- and 2-year-olds about medical emergencies five years later. *Law & Human Behavior, 29*, 743-754.
- Peterson, C., & Rideout, R. (1998). Memory for medical emergencies experienced by one and two year olds. *Developmental Psychology, 34*, 1059-1072.
- Peterson, C., Sales, J.M., Rees, M., & Fivush, R. (in press). Parent-child talk and children's memory for stressful events. *Applied Cognitive Psychology*.
- Peterson, C., & Warren, L.K. (in press). Injuries, emergency rooms, and children's memory: Factors contributing to individual differences. In J. Quas & R. Fivush (Eds.), *Emotion and memory in development: Biological, cognitive, and social considerations*. Oxford University Press. Included in the Oxford Series in Affective Science, K. Scherer & R. Davidson (Series Eds.).
- Peterson, C., & Whalen, N. (2001). Five years later: Children's memory for medical emergencies. *Applied Cognitive Psychology, 15*, 7-24.

- Poole, D.A., & White, L.T. (1995). Tell me again and again: Stability and change in the repeated testimonies of children and adults. In M.S. Zaragoza, J.R. Graham, G.C.N. Hall, R. Hirschman, & Y.S. Ben-Porath (Eds.), *Memory and testimony in the child witness* (pp. 24-43). Thousand Oaks, CA: Sage.
- Quas, J.A., Goodman, G.S., Bidrose, S, Pipe, M-E., Craw, S., & Ablin, D.S. (1999). Emotion and memory: Children's long-term remembering, forgetting, and suggestibility. *Journal of Experimental Child Psychology*, 72, 235-270.
- Sas, L.D., Wolfe, D.A., & Gowdey, K. (1996). Children and the courts in Canada. In B. L. Bottoms & G.S. Goodman (Eds.), *International perspectives on child abuse and children's testimony: Psychological research and the law* (pp 77-95). Thousand Oaks: Sage.
- Steward, M.S., Steward, D.S., Farquhar, L., Myers, J.E.B., Reinhart, M., Welker, J., Joye, N., Driskill, J., & Morgan, J. (1996). Interviewing young children about body touch and handling. *Monographs of the Society for Research in Child Development*, 57 (4-5, Serial No. 248).
- Terr, L. (1988). What happens to early memories of trauma? A study of twenty children under age five at the time of documented traumatic events. *Journal of American Academic Child and Adolescent Psychiatry*, 27, 96-104.
- Tizzard-Drover, T., & Peterson, C. (2004). The influence of an early interview on long-term recall: A comparative analysis. *Applied Cognitive Psychology*, 18, 727-745.

CAROLE PETERSON received her B.Sc. (Hons.) in Psychology from the University of Washington in Seattle, Washington, and her Ph.D. in Child Psychology from the University of Minnesota in Minneapolis. She is currently a Professor of Psychology at Memorial University of Newfoundland, and has been named a 'University Research Professor' – Memorial University's highest recognition of research excellence. Dr. Peterson has published a number of articles and chapters in the areas of eyewitness memory in children, children's development of the ability to recount personal experience events / narratives, and infantile amnesia. Her research has been cited in numerous court cases that involve children's ability to remember stressful events and has been contacted by police departments from Tel Aviv to Tokyo. Dr. Peterson is certified as an expert witness on children's memory in the Supreme Court of Newfoundland.