QUESTIONING PROCEDURES USED WITH CHILDREN: DOES DISTRESS INFLUENCE CHILDREN'S EVENT RECALL?

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NOTE TO USERS

Questioning Procedures Used with Children: Does Distress Influence Children's Event Recall?

By

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Abstract

Children between 2 and 9 years who suffered trauma injuries were recruited from the emergency room. Children and their parents were interviewed about their injury and the subsequent hospital treatment within two weeks. Parents were asked to rate their child's distress at the time of the injury on a 5-point scale. Responses provided by children were divided into those provided in free recall, to open-ended questions, direct prompts, and yes/no questions. Children's responses for each type of question were compared across the different distress levels. Age effects revealed that older children provided more information in response to free recall, open-ended questions, and direct prompts while younger children provided more information in response to yes/no questions. Although distress did not influence the completeness of children's recall, it did influence the number of adjectives and the number of coherence markers children provided, particularly in response to direct prompts.

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Questioning Procedures Used with Children: Does Distress Influence Children's Event Recall?

Over the past two decades there has been an increase in the number of children who are asked to testify in court (Bala, 1999). Legal authorities have recognized that child testimony may be valuable for prosecuting offenders and as a result children are being asked to provide information about crimes they have either witnessed or experienced (Bala, 1999). Much is yet to be learned about children's ability to testify and as a consequence there is concern about what children can recall about the crime and how best to elicit relevant information from children. As child testimony has become more common, research assessing children's abilities has begun to proliferate.

Children who witness or experience crime may experience varying levels of distress in response to the crime. Yet, relatively little is known about whether distress influences how children recall the crime. Some studies have shown that the quantity and quality of children's memory differs with perceived distress. For instance, children who are distressed do not readily volunteer information (e.g., Quas, Goodman, Bidrose, Pipe, & Craw, 1999). However, researchers have failed to examine how distress influences the questioning needed for children to provide full accounts of an event. It seems plausible that distress might lead children to be unwilling or unable to discuss an event freely and that if more distressed children do not freely volunteer information as readily as less distressed children, interviewers may need to use more direct questioning techniques to elicit complete recall. The present study examines the relationship between distress and how children recall a negative event by assessing the discourse of children with

varying levels of distress after experiencing trauma injuries. By comparing the questioning needed to get children who have experienced varying levels of distress in response to a trauma injury to recall their injuries, a better understanding of the relationship between distress and recall ability may be obtained.

People have begun to question the methods interviewers use to question children. Child witnesses and victims need to provide the maximum amount of accurate information that they can. It is important that questioners be aware of variables that could influence children's ability to describe an event in order to adequately interview children. Good interviewing techniques are essential not only because they allow questioners to obtain maximum accurate information from children, but also because juries perceive poor questioning techniques negatively (Tubb, Wood, & Hosch, 1999). Finding a relationship between distress and the type of questions needed for children to completely recall an event would inform questioners that distress is a variable that should be considered.

When questioning children about an event, questioners need to be concerned with how the questions asked might influence children's responses. By asking children questions that might indicate a specific answer, questioners risk having children respond the way they think the questioner wants them to respond rather than with a true memory. Thus, questions ideally should be asked in an order that moves from least to most directive. When interviewers ask a person for free recall of an event (e.g., Tell me what happened at the movies?) or ask open-ended questions (e.g., What happened when you went to the movies with Billy?) the person being interviewed needs to retrieve and think about what event

information has to be provided (Saywitz, Goodman, & Lyon, 2002). Open-ended questions do not provide cues to the answers the questioner needs, and consequently, the person being asked must rely on their own experience to answer the questions. In contrast, when interviewers ask direct questions (e.g., What movie did you go see?), the wording of the questions may suggest what it is that the interviewer needs to know (Saywitz et al., 2002). When interviewers ask yes/no questions, all of the information the interviewer needs to know is provided and the person answering simply needs to agree or disagree. If distress renders a person unwilling or unable to discuss an event, the person may provide little free recall or in response to open-ended questions. Hence, the interviewer may need to use more direct prompts and yes/no questions. The present study will examine whether children who are more distressed by an event need to be asked more direct prompts or yes/no questions than children who are less distressed.

In addition to influencing how information about an event can be elicited, it is plausible that distress may influence how coherent children's narratives are. When describing events we tend to use coherence markers like temporal (before, after) and causal (cause) links to orient the listener to how things happened. No research could be found that directly assessed whether distress influences children's ability to provide coherence markers when describing an event. The present study will examine whether children under varying levels of distress use different numbers of coherence markers in their recall.

The following sections will include a discussion of research that has addressed the influence of questioning techniques and the relationship between distress and memory. First, research addressing the influence of distress on

children's willingness to discuss an event will be considered. This will be followed by a discussion of the use of open-ended questions and direct prompts and a discussion of current interview practices. Finally, research that has been designed to examine the relationship between distress and memory will be described. Following the discussion of previous research, hypotheses for the present study will be outlined.

Relating Distress and Reluctance to Disclose

The present willingness to allow children to testify against perpetrators of crime is largely attributable to the modern day recognition of child abuse (Bala, 1999). Children are often the only witnesses of their abuse. Consequently, if child victims do not testify about abuse, perpetrators will be left unpunished. Child victims of abuse may experience a vast array of emotions linked to the abusive situation. The emotions the children experience are closely linked to how they discuss their abuse (Davies, Henderson, & Seymour, 1997). As noted by Davies et al., (1997) a commonly held belief about child sexual abuse is that children who are abused will talk about the abuse soon after it happens. Research fails to support this notion. Davies et al. (1997) note, for example, that when children who are victims of abuse reveal that they have been abused, the disclosure tends to happen over a number of discussions. Children are hesitant at first and only fully describe the abuse after a number of interviews. Children who do not readily talk about an event may not initially respond to open-ended questions or prompting for free-recall.

In addition to research suggesting that children might be hesitant or unable to talk about abuse, research has shown that children may be hesitant or unable to

talk about medical procedures that cause distress. The voiding cystourethrogram (VCUG) is a medical procedure that requires medical personnel to have direct physical contact with a child's genitals in order to insert a catheter through the urethra (Quas et al., 1999). Children experience varying levels of distress in response to the procedure. Quas et al. (1999) found that when children were questioned about the procedure, children who were more distressed provided less information than children who were less distressed. They suggest that this might be because these children were less willing to talk about the procedure rather than that the children had poorer memory of the procedure. Supporting this notion, Quas et al. (1999) describe one child who failed to report information in response to open-ended questions, failed to re-enact the procedure when provided with an anatomically correct doll, but responded correctly when asked a direct prompt about what was done with the tube during the VCUG.

Goodman and colleagues (Goodman, Bottoms, Schwartz-Kenney, & Rudy, 1991) noted similar findings in an assessment of children's memory for venipuncture (getting a shot or a needle). Children in their study who were more distressed by the procedure were less likely to discuss the visit to the clinic where the procedure took place than children who were not distressed. Again it seems that children may be unwilling or unable to discuss distressing events.

The failure to discuss events that induce distress might occur for witnessed events as well. Christianson and Loftus (1991, Experiment 2) showed adult participants slides depicting a woman on a bicycle. Throughout the slide show, all slides but one were identical for two groups of people. In the neutral event condition, people were simply shown a slide of a woman riding a bicycle. In the

distressing event condition (distress was not directly assessed), people were shown a slide of the woman who had been riding the bicycle lying on the ground injured. When asked to talk about what they had seen (free-recall), participants in the distressing event condition failed to report the detail of interest, i.e., the colour of the woman's coat. However, when participants were explicitly asked for the colour of the woman's coat (direct prompt) they were able to respond correctly. By asking direct prompts the researchers demonstrated that people might be able to report more information than they report without being directly prompted. Because distress was not directly assessed in this study we cannot ascertain whether the people who were more distressed by the disturbing slide reacted differently than the people who were less distressed.

The results of these studies suggest that distress may lead children to be unwilling or unable to discuss witnessed or experienced events. Prompting for free recall and open-ended questioning may be insufficient methods for eliciting all information from children that they are able to provide. Thus, specific questioning (direct prompts and yes/no questions) may be needed to obtain relevant information that distressed children could provide.

The use of Specific versus Open-Ended Questions

Regardless of distress, young children often have problems providing information in response to open-ended questions and prompts for free recall (Ceci & Bruck, 1993). Children have been shown to provide lengthier responses to these questions than to direct prompts but fail to supply all the information that they can (Sternberg, Lamb, Esplin, Orbach, & Hershkowitz, 2002). Children provide

information in response to direct prompts that was not provided in response to free recall or to open-ended questions.

Poole and Lindsay (1995), for example, had 3-7-year-old children interact with "Mr. Science" and later describe the event. Children did not fully describe the event when asked to discuss what happened and then asked if they could report other information. Wording of the questions did not matter, nor did the positioning of the questions throughout the interview. When children were directly prompted to provide visual information or auditory information, they then gave additional details.

Likewise, when asking 5-9-year-old children to describe what happened when they witnessed either two technicians setting up a projector or men arguing over a drill, Hutcheson and colleagues noted that children often failed to provide information in response to prompts for free recall and open-ended questions (Hutcheson, Baxter, Telfer, & Warden, 1995). The same children provided the relevant information later in the interview in response to direct prompts.

Research showing that children can provide information in response to specific questions (direct prompts and yes/no questions) that they did not provide in response to open-ended questions may suggest that questioners should rely on children's responses to specific questions. However, this could be dangerous. Research assessing the content of children's answers to specific questions suggests that use of these questions can lead children to make errors of commission (Hutcheson et al., 1995).

Larsson and colleagues (Larsson, Anders Granhag, & Spjut, 2003), for example, found that when asked to describe a film depicting a professional fakir,

children were more likely to provide false information in response to direct prompts than in response to open-ended questions. Similarly, when studying actual forensic interviews with alleged victims of child sexual abuse, Lamb and Fauchier, (2001) found that contradictory details were more likely to be provided in response to direct prompts than in response to open-ended questions.

In an assessment of people's memory for a touching event, Leippe and colleagues also noted problems with direct prompts (Leippe, Manion, Romnczyk, 1991). They found that 5-6-year-old children were more likely to provide inaccurate information about non-location aspects of the event in response to direct prompts than 9-10-year-olds and adults.

Findings suggesting that young children may report incorrect information in response to direct prompts about events like sexual abuse are troubling. Unfortunately, the problems are even more evident when the use of yes/no questions is considered. Peterson and colleagues (Peterson, Dowden, & Tobin, 1999) had children participate in a craft activity and later answer questions about the event. They found that children were more likely to provide incorrect answers to yes/no questions than to answer "I don't know" despite providing this response to wh- questions (when, what, where, why). Even more disconcerting, children were especially likely to provide incorrect answers to questions that required a "no" response, particularly when children were answering 'no' questions about people and the environment.

Peterson and Biggs (1997) found similar results when asking children yes/no questions about their memory for an injury. Two-, three-, and four-year-olds were more likely to be inaccurate when answering yes/no questions than

nine- and thirteen-year-olds. Again this was more evident when the question required a "no" rather than a "yes" response. Such findings suggest that responses given by young children to yes/no questions need to be viewed with scepticism. Yes/no questions should be avoided whenever possible because the accuracy of children's responses is often no greater than chance (Peterson et al., 1999). There is no pattern to children's responses when answering these questions (Brady, Poole, Warren, & Jones, 1999).

Given research suggesting that children who are highly distressed by an incident might be unwilling or unable to talk about that incident, it is important to research how children who are distressed by an event describe it. If these children cannot provide the necessary information without direct prompts, and if direct prompts can lead to errors of commission, we need to develop questioning techniques that help these children provide complete, yet accurate, accounts of events. As it stands now, questioners are often forced to choose between completeness of recall and accuracy of recall (Saywitz et al., 2002).

Police Interviewing Practices

Given the difficult position that questioners are often placed in, it is important to consider how police actually interview child witnesses and victims. Traditional police interviews involve asking witnesses specific questions (direct prompts and yes/no questions) to obtain the information a police officer needs to know (Dykema-Cagle & Gallagher, 1987). Interviewers rarely use open-ended questions. The interviewer wants to know about the scene of the crime, what happened, and what the perpetrator looked like (Fisher, Geiselman, & Raymond, 1987). Questions are asked to obtain this information and do not usually depend

upon or relate to what the witness is saying. Interviewers simply seek the information needed and may fail to recognize that they are asking the person being interviewed to jump back and forth between events that might be seemingly unrelated in that person's mind (Fisher et al., 1987).

Research demonstrating the problem with the use of specific questions has led researchers to develop questioning procedures that encourage questioners to use open-ended questions. The cognitive interview, for example (Fisher et al., 1987), involves researchers developing rapport with witnesses and then asking them to contextually reinstate the event in question. Interviewers first ask the person to provide free recall of the event and then ask open-ended questions. Specific questions are asked last. All questions are asked in an order that coincides with how the witness is describing the event (e.g., if the witness is describing the offender's appearance, questions about the scene are left until later).

Supporting the use of the cognitive interview, research assessing its effectiveness has shown that interviewers who are trained in the technique can elicit more information from a witness without eliciting more incorrect information than interviewers using other interview techniques (Fisher & McCauley, 1995). Furthermore, when college students viewed videotapes depicting interviewers interviewing a 7-year-old child about a game of 'Simon Says,' the cognitive interview was seen as less manipulative than the standard police interview (Fisher, Mello, & McCauley, 1999).

The recognition of the superiority of the cognitive interview in comparison to the standard interview has led police forces in some countries (e.g., England and Wales) to implement training on the cognitive interview in their training

programs (e.g., Kebbell, Milne, & Wagstaff, 1999). Recently, researchers have assessed whether being trained in the use of the cognitive interview has led to an increase in its use. This research has shown that despite being trained in effective interview techniques, many police officers fail to use this training (Aldridge & Cameron, 1999; Kebbell et al., 1999). Studies assessing police interview techniques instead show that interviewers are biased toward specific questions (direct prompts and yes/no questions) rather than open-ended questions (Aldridge & Cameron, 1999). More troubling is the finding that questions used by police officers tend to be leading (the answer required is actually suggested to the child) rather than non-leading (Sternberg et al., 1996). In one study assessing police interview techniques, leading questions made up 53% of questions used. Contrasting this, open-ended questions made up only 6% of questions used (Cederborg, Orbach, Sternberg, & Lamb, 2000). By using leading questions, police officers are likely encouraging incorrect responses to questions that people cannot answer.

When asked about the cognitive interview, police officers often reply that they see it as an effective technique, but too time consuming (Kebbell et al., 1999). Police officers see the cognitive interview as taking up time that might be better used for other tasks like answering calls to other incidents (Longford, 1996, as cited in Kebbell et al., 1999). Such findings are disturbing because police officers may be obtaining incorrect information. If it can be proven in court that the information obtained from a child witness is incorrect, the child will likely be regarded as incompetent.

Research showing that police officers are not using appropriate interview techniques is leading to additional research in a search for interview techniques that police officers can use efficiently. For example, Sternberg and colleagues (e.g., Orbach et al., 2000; Sternberg, Lamb, Esplin, & Baradaran, 1999; Sternberg, Lamb, Esplin, Orbach, & Mitchell, 2001) are studying an interview procedure known as the NICHD protocol interview that maximizes the use of open-ended questions. Interviewers trained in this technique use more open-ended questions before using direct prompts than interviewers using more traditional interview techniques, and consequently, obtain more details from open-ended questions than from other types of questions (Orbach et al., 2000). Options are provided for interviewers at each stage in order to maximize the use of open-ended questions and to prevent interviewers from moving to the use of specific questions (direct prompts and yes/no questions) too quickly. Those being trained to use the interview are required to go through longer and more intensive training than interviewers learning about more traditional interview techniques and the cognitive interview (Orbach et al., 2000). The researchers feel that this additional training may lead officers to be more willing and able to carry out effective techniques.

Research demonstrating that distress can influence how children respond to open-ended questions in an interview about an event may aid researchers in developing appropriate questioning techniques. Questioners need to be aware of any known factors that might influence children's ability to describe an event.

Distress and Recall

Very little research to date has assessed the influence of distress on how children actually discuss an event. Rather, most past research assessing distress and memory has examined the quantity and accuracy of information provided by children experiencing various levels of distress (e.g., Merritt, Ornstein, & Spicker, 1994). The focus of the present study is on the influence of varying levels of distress in response to a single incident on memory for that incident, not on the long-term chronic distress implicated in repression and post-traumatic stress disorder. Hence, only research that has directly assessed the relationship between short-term distress and recall is considered here.

Research assessing the quantity of children's memories has shown contradictory findings. For example, Ochsner and colleagues (Ocshner, Zaragoza, & Mitchell, 1999) found that children who witnessed a theft provided more information about what they had seen than children who had witnessed a neutral event. This research has been taken as support for a positive influence of distress on memory, although it should be noted that distress was not directly assessed. Contrasting this, Merritt et al. (1994) found that when assessing children's memory for VCUGs, children who had experienced the greatest distress in response to the procedure had the poorest memories for the procedure. Peterson and Bell (1996) found that children's memory for an injury experience and the subsequent hospital treatment was not affected by distress. All recent reviews of the literature assessing the influence of distress on memory show these conflicting results with respect to the effect of distress on memory (Fivush, 1998; Howe, 1997; Weede Alexander, Quas, & Goodman, 2002). Depending on the studies

examined, distress may be seen as benefiting recall, worsening recall, or having no effect on recall.

Several possible explanations for the contradictory findings with regard to the relationship between distress and memory have been suggested. Some researchers suggest the problem relates to the varying measures of distress that have been used in different studies. Different researchers have used parental report, experimenter report, doctor or nurse report, and cortisol levels. Very few studies have assessed different distress measures within the same study, but those that have suggest that this might explain the different findings in different studies. Merritt et al. (1994), for example, note that in their study assessing children's recall for a VCUG behavioural distress indicators (as reported by the technologist who administered the VCUG) were associated with memory, while physiological measures (cortisol levels) were not.

When different indicators of distress are used, there are several possible sources of error. Different people have different norms for distress symptoms. Doctors might be comparing one child's reaction to another child's reaction. Parents might be comparing their child's behaviour with the child's behaviour at other times. These may lead to different reports with respect to an individual child's distress. Additionally, it is difficult to understand what people perceive as distressing. In several studies, people inferred level of distress from the type of event experienced. This procedure disregards individual differences in people's reactions to an event. As well, even with personal measures a doctor may think that a child's crying indicates that child's distress, while a parent might know that their child is emotional regularly and crying might not be such a big deal. Because

different distress measures may be quite variable, it is difficult to know whether studies that have used different measures of distress can be compared.

Another possible reason for the differing findings regarding a possible relationship between distress and quantity of recall is the type of information that is being recalled. Several people have noted that central details (details that are part of the action sequence; e.g., remembering that the person held a weapon) are more likely to be recalled than peripheral details (details that are not crucial to the action sequence; e.g., remembering the colour of the shirt of another bystander) when people are talking about a distressing event (e.g., Christianson, 1992). Researchers argue that people who witness a distressing event focus their attention on what is happening and consequently fail to notice peripheral details (e.g., Christianson, 1992). Studies that compare memory for peripheral details are likely to show different results than studies that compare memory for central details.

A final possibility for differing findings regarding the relationship between distress and memory relates to the types of questions that were asked. This possibility is the focus of the present study. Only two other studies could be found that addressed this issue. Fivush and colleagues asked 3-4 year-old children to recall their experience with a hurricane (Bahrick, Parker, Fivush, & Levitt, 1998; Fivush, McDermott Sales, Goldberg, Bahrick, & Parker, 2004). Children were divided into low, moderate, and high distress groups on the basis of severity of the storm experienced. Children in the high distress group had their homes destroyed, those in the moderate distress group had trees in their yards destroyed and flooding in their homes but no destruction of the home itself, and children in the low distress group prepared for the storm but were not affected by it. In an initial

interview with these children, children in the moderate distress group recalled more information throughout the interview than those in low and high distress groups. These children were also more likely to volunteer information through free recall. In contrast, children in the low and high distress groups required direct prompting to provide information about the hurricane. All children were more likely to recall more information about the hurricane and its aftermath than about preparing for the storm. Six years after the event, all children recalled the same amount of information. The researchers concluded from this that children in the high distress group encoded similar information to children in the other groups, but that these children had been less willing or able to retrieve the information at the initial interview.

The children in the studies conducted by Fivush and colleagues experienced an event that was important not just to them but to their families and neighbours as well. Parents in these studies reported talking about what happened on a daily basis for at least two months after the storm occurred (Bahrick et al., 1998). Consequently, children's memories may be memories of discussions with parents. It is thus important to study the influence of distress on how children recall an event for memories that are relevant to them, but not necessarily to others. As well, Fivush and colleagues used the severity of damage to a child's home as an indication of that child's distress. It is important to consider behavioural indicators of distress because inferences about the level of distress from the type of event experienced disregard individual differences in distress for different children who experience the same event.

Recall Differences Across Varying Events

Research has shown that memory differs depending on the event being described. Children better understand events they have background knowledge for and thus remember them better (e.g., children who have played tag before will remember a game of tag better than children who have never played tag before; see Schneider & Pressley, 1997 for a review of the literature). Findings demonstrating different recall ability for varying events have also been noted when assessing children's memory for negative events. Peterson and colleagues note in several studies that have assessed children's memory for an injury and the subsequent hospital treatment that children's memory for the injury experience is better than that for the hospital treatment (Peterson, 1996, 1999, 2002; Peterson & Bell, 1996; Peterson & Whalen 2001). Peterson (1999) identifies several plausible explanations for the findings. Children may see the injury event as more coherent than the hospital treatment. The injury event happens in a successive pattern that allows children to understand each stage as it happens. In contrast, links between events at the hospital may not be as apparent, making it more difficult to describe. Children may have been reminded more about their injury than the hospital treatment. Parents are more likely to talk about what happened when their child got hurt than about how the injury was treated. Finally, the injury may have been more distinctive or salient. Peterson notes that most children in her studies had been to the hospital before.

Fivush and colleagues also observed differing levels of recall for differing events in their studies that assessed children's memories for a hurricane (Bahrick et al., 1998; Fivush et al., 2004). Children recalled more about the hurricane and

its aftermath than about preparing for the storm. Without having experience of a previous hurricane, children would probably not understand the link between the preparation and the storm itself. This might make the preparation for the storm more difficult to remember. In contrast, links between the storm, the damage, and the subsequent cleanup seem to be more readily apparent, possibly making these events easier to remember than the preparation for the storm. As well, parents were more likely to discuss the storm and its aftermath than the preparation for the storm after it happened. Discussions with parents likely made the storm and its aftermath more memorable than the preparation. By examining differences in children's memory for an injury and the subsequent hospital treatment, the present study will provide additional information about whether children recall different events differently.

Distress and Coherence

In addition to questions that need to be asked and the type of event being described, it is important to consider how children talk about an event. Research that has compared children's memories for negative and positive events has shown that children tend to be more coherent when describing negative events than positive events. Ackil, Abbema, and Bauer (2003) for example found that when children were describing their experience with a tornado, they were more likely to provide the context of the event and to use temporal and causal connectors than when they were describing positive events. Fivush and colleagues (Fivush, Hazzard, McDermott Sales, Sarfati, & Brown, 2003) found a similar pattern of greater coherence when children from violent communities described a wide array of negative as opposed to positive events. These researchers question

whether this might be due to the possibility that negative events are naturally more coherent than positive events. By exploring children's coherence when describing their memories for an injury and its subsequent treatment, the present study will examine whether distress influences coherence of negative events.

The Present Study

From the literature just reviewed it is apparent that the relationship between perceived distress and memory is complex. Past research has shown that depending on the studies, assessed distress may be viewed as benefiting, worsening, or having no effect on event recall. Most of these studies have not assessed the influence of question type on recall. Children who experience different levels of distress in response to an event may need to be questioned in different ways. Children who are highly distressed, for example, may need to be asked more direct prompts and more yes/no questions in order to fully describe an event they have witnessed or experienced than children who are less distressed. Given the recent focus on training interviewers to use effective questioning techniques, it is important to know what variables influence how children answer questions. In addition to understanding the types of questions children need to be asked, it is important to determine whether distress influences how coherent children are when describing an event and if the influence of distress differs across events. Children who are incoherent may be seen as less confident in their responses and consequently may be viewed negatively by jurors. The present study will examine these issues.

To assess whether distress influences how children recall an event, children between 2 and 9 years of age were recruited from the emergency room of

a children's hospital. Children and their parents were interviewed at their home within two weeks of their hospital experience. At that interview, parents were asked to rate their child's distress at the time of the injury on a five-point scale. Information provided about the injury and the subsequent hospital treatment was compared for children in low, moderate, and high levels of distress groups to determine whether distress influenced the type of questions required to obtain relevant information from children (did children's responses vary when providing information in response to prompts for free recall, open-ended questions, direct prompts, or yes/no questions?). Low, moderate, and high distress groups were used rather than viewing distress on a continuum because very few children experienced the lowest level of rated distress.

The information provided by children was assessed for a number of characteristics (See Table 1 for a complete explanation). First, the number of components of their experience that children recalled out of the number that could potentially be recalled according to adult witness reports was assessed to determine the completeness of recall. Then, the number of unique units of information (UUI) provided by the children was counted for each question type. This provided an account of the number of pieces of information the child provided. Next, the number of adjectives provided was assessed to determine how descriptive the children were. Then, the number of subject-predicate clauses used was counted to examine children's use of sentences. Finally, the number of temporal and causal links provided was counted. This allowed for an indication of how coherent children were. All characteristics were compared across age, gender, and distress.

The present study was conducted to assess how children recall information. Before determining differences in the questions required in obtaining relevant information from children, it was important to demonstrate that regardless of distress, when children were questioned with all question types they provided similar amounts of information. If children who experienced high distress provided fewer details than children who were not very distressed, this would seem to indicate that children who experienced high levels of distress failed to encode relevant information. By demonstrating that children who experience high levels of distress can recall similar amounts of information as those experiencing low levels of distress, then differences in response to various types of questions are more likely to be attributed to how children are questioned (differences might be due to a retrieval failure). Hence, analyses were first conducted to determine whether distress influenced the completeness of children's recall (i.e., the number of components of an injury experience recalled out of the number that could potentially be recalled according to adult witness reports). After assessing the completeness of children's recall the number of Unique Units of Information, adjectives, subject-predicate clauses, temporal links, and causal links provided by children were assessed for the various question types.

Several hypotheses were developed for the present study:

1. If children were questioned using a wide variety of question types (free recall, open-ended questions, direct prompts, yes/no questions) distress would not influence the completeness of children's recall.

2. Past research has shown that older children tend to provide more information than younger children (e.g., Leippe et al., 1991). Thus, it was hypothesized that older children would provide more unique units of information, more adjectives, more subject-predicate clauses, and more temporal and causal links than younger children.

3. Given past research illustrating a curvilinear relationship between distress and recall (Bahrick et al., 1998) it was hypothesized that there might be a curvilinear trend for distress for all properties assessed with moderately distressed individuals providing more information in response to free recall and open-ended questions than children experiencing low or high distress. Another possibility was that highly distressed children might require more direct prompts and yes/no questions than children who experienced lower levels of distress.

4. Past research could not be found that directly assessed the influence of distress on children's use of coherence markers but it seemed plausible that children who experienced high distress would be less coherent than children who experienced low and moderate distress. It was thought that children who were more distressed would provide fewer coherence markers than children who were less distressed.

5. Given past research demonstrating that children have greater difficulty recalling hospital treatment than an injury (e.g., Peterson, 1999), children were expected to be more coherent and to provide more information when describing the injury than when describing the hospital treatment.

Method

Participants

One hundred and forty-nine children (2-9 years; $M = 4.87$ years, $SD = 2.02$ years) were recruited from the emergency room of a children's hospital. They are part of a larger study about children who experienced a trauma injury (e.g., lacerations, bone fractures) that was treated in an outpatient manner in the emergency room. The children in the present study are a random sample of children that were recruited between November 1992 and December 1999. All children within a 160-kilometre radius are taken to this emergency room for treatment. Most children were Caucasian and they were from mixed socio-economic backgrounds.

At a subsequent interview (see procedure for details), the parents of all recruited children rated their child's distress on a scale of 1-5 in response to the injury. Approximately 80% of parents who were approached agreed to participate in the study. Children were divided into three distress groups, those rated as showing low distress (1 or 2), moderate distress (3), and high distress (5). Children were also divided into three age groups, 2-3 year olds, 4-6 year olds, and 8-9 year olds (see Table 2 for the number of children).

Procedure

Parents and children were recruited in the emergency room and visits were made to their homes by a trained interviewer within two weeks of the injury experience. Children were interviewed about their recall for the injury and the subsequent hospital treatment. Parents were also interviewed to provide their account of the circumstances surrounding the injury and the treatment in order to evaluate the completeness and accuracy of the children's recall. When a parent was not present at the time of the injury, the adult who was present was interviewed about those details. Throughout these interviews, adults who were present at the time of the injury and at the time of the treatment were asked to indicate on a five-point scale, with 1 being not at all distressed and 5 being highly distressed, how they would rate the child's degree of distress.

The interview included asking the child to provide free recall about both the injury and the hospital treatment followed by open-ended questions, direct prompts, and yes/no questions. Questions included asking about the setting of the injury, the people who were present, the injury itself, the wait in the emergency room, and the treatment received. If a child/parent provided information during free recall or in response to open-ended questions that was relevant to a subsequent question in the interview protocol that information was not asked for again through direct prompts or yes/no questions (see Appendix A for a copy of the interview protocol; the interview protocol was approved by the Human Investigations Committee of Memorial University). The interviews were audio-taped and later transcribed. Scoring was completed from these transcripts (see Appendices B and C for scoring procedures). The person scoring the transcripts

was blind with respect to the distress rating and age of the child and transcripts were scored in random order with respect to these variables.

Scoring of Recall Data

The information provided by children was assessed for the quantity and quality of its content. Properties that were assessed include: the completeness of recall (the number of components about the event that children could recall on the basis of the adults descriptions that were recalled; see Peterson & Roberts, 2003 for a more detailed explanation of prototype components), elaborative content of the information (the total amount of unique information provided and the number of adjectives), the number of subject-predicate clauses, how coherent the narrative was (the number of correctly used temporal and causal links), and accuracy. These properties have been assessed in previous studies (e.g., Fivush, 1991; Peterson & Roberts, 2003) and the scoring procedures for the present study were the same as those used in these studies. (See Table 1 for an explanation of the scoring categories.) Properties assessed as an indication of the quality of information provided are all highly correlated. Thus no combined analyses were completed.

Each of the categories was scored separately and divided into responses that were provided in free recall and in response to open-ended questions, direct prompts, or yes/no questions. Free recall is the information volunteered in response to the prompts - tell me what happened at the injury and tell me what happened at the hospital. It was used to determine the information that children readily volunteered. An open-ended question is a question for which there are many possible answers. It was asked in an effort to gain information (e.g., What did you first do at the hospital?). A direct question is a question for which there

are only a limited number of answers and might include either/or questions (e.g., Was the doctor who gave you stitches a boy or a girl?). A yes/no question is a question that requires a yes/no response.

After the amount and type of information provided were assessed, the accuracy of responses was assessed. This was accomplished by comparing children's responses to those given by parents. Children received credit only for those items also given by the parent or adult witness. (It is understood that parents may not be accurate but adults are generally seen as being better able to provide information than children.) Details that were neither confirmed nor rejected by parents or adult witnesses were not scored. The accuracy measures were thus proportions of items accurately recalled by children divided by the total number of items recalled by children. Accuracy of temporal and causal connectors was assessed to determine how well the children with varying levels of distress ordered events. The procedure for determining accuracy was the same as that used for determining accuracy of information provided. An inaccurate temporal or causal connector would refer to a response that suggested incorrect ordering of events (e.g., I fell because Bob pushed me when Bob did not or I cut my knee then I fell when in reality I fell first).

All scoring was completed separately for both the injury and the hospital events. Injury type (fractures, laceration, and other), gender, and age were coded and entered as possible mediating variables in the relationship between distress and how children provided information.

To obtain interrater reliability, two raters scored 25% of the transcripts. Reliability was established separately for each type of information coded.

Measures of percentage agreement between the two scorers ranged from 95% to 98% ($M = 96.33\%$).

Results

Completeness of Recall

Children's recall of the injury and the subsequent hospital treatment was assessed to determine whether there were differences in the completeness of event report. Stepwise regressions were conducted with age, gender, and distress as independent variables and completeness as the dependent variable. These analyses revealed that distress did not influence the completeness of children's recall of the injury, standardized $\beta = 0.04$, $t = .53$, $p > .05$, or the completeness of children's recall of the hospital treatment, standardized $\beta = -0.08$, $t = -.98$, $p > .05$. Regardless of level of distress experienced, all children provided a similar proportion of prototype details about the injury ($M = .54$, $SD = .22$) and about the hospital treatment ($M = .72$, $SD = .18$). There was an age effect for both the completeness of children's recall about the injury, standardized $\beta = 0.59$, $t = 8.76$, $p < .05$ and the completeness of children's recall about the hospital treatment, standardized $\beta = 0.48$, $t = 6.69$, $p < .05$. Children's reports of both the injury and the hospital treatment were more complete for the older children than for the younger children.

Recall of the Properties of Information

After assessing the completeness of children's recall, several properties of the information provided were examined. Children's recall was first assessed to determine how elaborative children who experienced different levels of distress were. Two measures of elaboration were assessed. First the number of unique

units of information (UUI) was assessed - this provided a measure of how many different details children provided; then the number of adjectives provided by children was assessed - this provided a measure of how descriptively children talked about the injury. Next, the number of subject-predicate clauses used was examined. This gave an indication of the number of sentences children provided. Finally, the number of temporal and causal links provided was assessed as an indication of how coherent children were. These properties were assessed for all question types for both the injury and the subsequent hospital treatment.

Table 3 shows the number of Unique Units of Information, adjectives, subject-predicate clauses, temporal links, and causal links provided as a function of age. Because the total number of details that children can provide about an injury experience and the subsequent hospital treatment varies depending on each child's experience most statistical analyses were completed using proportions of recall.

Prior research has shown that the relationship between distress and recall ability might be curvilinear (e.g., Bahrick et al., 1998). Bahrick and colleagues noted a quadratic relationship between distress and how information was provided (Bahrick et al., 1998; Fivush et al., 2004). To determine if there was a curvilinear relationship between distress and number of Unique Units of Information provided, the number of adjectives provided, the number of subject-predicate clauses provided, or the number of temporal or causal connectors provided at each stage of questioning in the present study, curve estimates were conducted. The varying categories of information were entered as dependent variables and distress was entered as an independent variable. Neither analyses of information provided

about the injury, nor the subsequent hospital treatment revealed a curvilinear trend between distress and the number of Unique Units of Information provided, the number of adjectives provided, the number of subject-predicate clauses provided, or the number of temporal or causal links provided at each stage of questioning.

Next, responses were divided into question type. Table 4 presents the proportion of information provided in response to each question type. Questions were asked in successive order, first free recall, followed by open-ended questions, direct prompts, and finally yes/no questions. Children were not asked about all details with all question types. Instead, a given type of question was used only to probe a detail if that detail had not been provided using the previous question type. Consequently, the responses to various question types are not independent. Some children may have provided all information in response to open-ended questions and thus might have needed fewer direct prompts and yes/no questions than others. To control for this, statistical analyses were not conducted using the number of details provided for each question type; rather, the proportion of information remaining to be recalled at each stage of questioning was used (See appendix C for a description of how proportions were calculated).

A series of stepwise regression analyses were conducted for each category of information (given there was no curvilinear trend it was appropriate to conduct linear regression analyses). There were no main effects or two-way interactions for injury-type. Hence, it will not be further considered. Gender, age, and level of distress as well as their two-way and three-way interactions were entered as independent variables and the proportion of information provided in free-recall, proportion remaining to be recalled that was provided in response to open-ended

questions, proportion remaining to be recalled that was provided in response to direct prompts, and proportion left to provide in response to yes/no questions were entered as dependent variables. This allowed for an assessment of the contribution of the independent variables to the variance in the dependent variables. Because children only provide yes or no responses to yes/no questions there was no analyses of adjectives, temporal links, and causal links provided in response to this question type.

Unique units of information. Table 5 shows the proportion of Unique Units of Information provided in response to each question type. When assessing recall of the injury, neither gender, age, nor level of distress, influenced the Unique Units of Information provided in response to free recall, and the proportion of Unique Units of Information remaining to be recalled that was provided in response to open-ended questions. There was an effect of age for both the proportion of Unique Units of Information remaining to be recalled that was provided in response to direct prompts, (F (1, 147) = 11.54, $p < .05$) and the proportion of Unique Units of Information left to provide in response to yes/no questions (F (1, 147) = 14.05, $p < .05$). Age accounted for 7.3% of the variance in proportion of Unique Units of Information remaining to be recalled that was provided in response to direct prompts and 8.7% of the variance in proportion of Unique Units of Information left to provide in response to yes/no questions. Older children provided a greater proportion of Unique Units of Information that remained to be provided in response to direct prompts, while younger children provided a greater proportion of information in response to yes/no questions.

An assessment of the hospital recall revealed an age effect for the proportion of Unique Units of Information provided in free recall (F (1, 147) = 13.17, $p < .05$) with age accounting for 8.2% of the variance, the proportion of Unique Units of Information remaining to be recalled that was provided in response to open-ended questions (F (1, 147) = 6.73, $p < .05$) with age accounting for 4.4% of the variance, the proportion of Unique Units of Information remaining to be recalled that was provided in response to direct prompts (F (1, 147) = 23.71, $p < .05$) with age accounting for 13.9% of the variance, and the proportion of Unique Units of Information left to provide in response to yes/no questions (F (1, 147) = 37.04, $p < .05$) with age accounting for 20.1% of the variance. Older children provided a greater proportion of Unique Units of Information in free recall and in response to both open-ended questions and direct prompts than younger children while younger children provided a greater proportion of Unique Units of Information in response to yes/no questions than older children.

Adjectives. Table 6 shows the proportion of adjectives provided in response to each question type. Regression analyses assessing the adjectives provided when describing the injury revealed an effect of age for the proportion of adjectives remaining to be reported that were provided in response to open-ended questions, F (1, 147) = 12.25, $p < .05$, with age accounting for 7.7% of the variance. Older children were more likely to provide information in response to open-ended questions than younger children. There was no effect of age, distress, or gender on the proportion of adjectives reported in free recall or in response to direct prompts.

Analyses of the adjectives provided when recalling the hospital revealed an age x distress interaction for the proportion of adjectives provided in free recall, $F(1, 147) = 10.23, p < .05$, accounting for 6.5% of the variance. The effects of age were qualified by level of distress the children experienced. There was no difference in the proportion of adjectives volunteered in free recall by 2-3 year-olds who experienced low, moderate, or high distress. The 4-6 year-olds who experienced high distress ($M = 0.14$, $SD = 0.18$) and the 4-6 year-olds who experienced moderate distress ($M = 0.10$, $SD = 0.15$) volunteered more adjectives in free recall, than the 4-6-year-olds who experienced low distress ($M = 0.04$, $SD = 0.05$). The 8-9 year-olds who experienced moderate ($M = 0.21$, $SD = 0.21$) and high distress ($M = 0.20$, $SD = 0.20$) volunteered a greater proportion of adjectives in free recall than the 8-9 year-olds who experienced low distress ($M = 0.10$, $SD = 0.06$). There was an age x gender effect for the proportion of information remaining to be reported that was provided in response to open-ended questions, $F(1, 147) = 15.53, p < .05$, accounting for 9.6% of the variance. The effects of age were qualified by gender. There was no difference between 2-3 year-old males and females but 4-6-year-old and 8-9 year-old females provided a greater proportion of remaining adjectives in response to open-ended questions than 4-6 year-old and 8-9 year-old males. There was also an age x gender effect for the proportion of information remaining to be reported in response to direct prompts, $F(1, 147) = 11.24, p < .05$, accounting for 7.1% of the variance. Again, the effects of age were qualified by gender. There was no difference between 2-3 year-old males and females but 4-6 year-old and 8-9 year-old males provided a greater

proportion of adjectives in response to direct prompts than 4-6 year-old and 8-9 year-old females.

To summarize, when providing adjectives about the hospital in free recall the children in the two older groups who expressed moderate or high distress provided more adjectives in free recall than the same age children who experienced low distress. Interestingly, females in the two older groups provided more adjectives in response to open-ended questions when compared to their male counterparts while the males in the two older groups provided more adjectives in response to direct prompts when compared to their female counterparts.

Subject-predicate clauses. Table 7 shows the proportion of subject-predicate clauses provided in response to each question type. An assessment of the number of subject-predicate clauses provided for the injury showed no effects of gender, age, or distress on either the proportion of subject-predicate clauses provided in free recall or the proportion of remaining subject-predicate clauses provided to open-ended questions. There was an effect of age for both the proportion of subject-predicate clauses remaining to be reported that were provided in response to direct prompts, (F (1, 147) = 29.94, $p < .05$) and the proportion of subject-predicate clauses left to provide in response to yes/no questions (F (1, 147) = 15.49, $p < .05$). Age accounted for 16.4% of the variance in proportion of subject-predicate clauses remaining to be reported that were provided in response to direct prompts and 9.5% of the variance in proportion of subject-predicate clauses left to provide in response to yes/no questions. Older children provided a greater proportion of subject-predicate clauses that remained

to be provided in response to direct prompts while younger children provided a greater proportion of subject-predicate clauses in response to yes/no questions.

Similar to findings with the injury recall, analyses of the hospital recall showed that gender, age, level of distress, and their interactions did not influence the proportion of subject-predicate clauses provided in free-recall. There was an age x gender effect for the proportion of remaining subject-predicate clauses provided to open-ended questions, $F(1, 147) = 11.33$, $p < .05$, accounting for 7.2% of the variance. The effects of age were qualified by gender. There was no difference between 2-3 year-old males and females but 4-6 year-old and 8-9 year-old females provide a greater proportion of remaining subject-predicate clauses in response to open-ended questions than 4-6 year-old and 8-9 year-old males. There was an effect of age for both the proportion of subject-predicate clauses remaining to be reported that were provided in response to direct prompts, ($F(1, 147) = 47.34$, $p < .05$) and the proportion of subject-predicate clauses left to provide in response to yes/no questions ($F(1, 147) = 32.12$, $p < .05$). Age accounted for 24.4% of the variance in proportion of subject-predicate clauses remaining to be reported that were provided in response to direct prompts and 17.9% of the variance in proportion of subject-predicate clauses left to provide in response to yes/no questions. Older children provided a greater proportion of subject-predicate clauses that remained to be provided in response to direct prompts while younger children provided a greater proportion of subject-predicate clauses in response to yes/no questions.

To summarize, when assessing children's recall of the hospital it was found that females in the two older groups provided more subject predicate

clauses in response to open-ended questions than their male counterparts. Older children tended to provide more subject predicate clauses in response to direct prompts when compared to younger children and younger children tended to provide more subject predicate clauses in response to yes/no questions when compared to older children.

Temporal links. Coherence was assessed next by assessing the number of temporal links (See Table 8) and the number of causal links provided (See Table 9). Regression analyses assessing the temporal links provided about the injury showed no effects of age, gender, or distress on the proportion of temporal links provided in free recall, the proportion of temporal links remaining to be recalled that were provided in response to open-ended questions, or the proportion of temporal links remaining to be recalled that were provided in response to direct prompts.

When hospital recall was assessed there was an effect of age on the proportion of temporal links provided in free recall, $F(1, 147) = 9.89, p < .05$ accounting for 6.3% of the variance in proportion of temporal links provided in free recall and an effect of distress on the proportion of temporal links provided in free recall, $F(1, 147) = 7.79, p < .05$ accounting for 3.3% of the variance in proportion of temporal links provided in free-recall. Older children provided more temporal links in free recall than younger children and children who experienced low distress provided more temporal links in free recall ($M = 0.38$, $SD = 0.39$) than children who experienced moderate ($M = 0.18$, $SD = 0.31$) or high distress ($M = 0.17$, $SD = 0.24$). There was an age x gender effect for the proportion of temporal links remaining to be recalled that were provided in response to open-

ended questions, F (1, 147) = 12.51, $p < .05$ accounting for 7.8% of the variance. The effects of age were qualified by gender. There was no difference between 2-3 year-old and 8-9 year-old males and females but 4-6 year-old females ($M = 0.66$, $SD = 0.41$) provided a greater proportion of remaining temporal links in response to open-ended questions than 4-6 year-old males ($M = 0.42$, $SD = 0.46$). There was an age effect for the proportion of temporal links remaining to be recalled that were provided in response to direct prompts, F (1, 147) = 15.51, $p < .05$ accounting for 9.5% of the variance. Older children provided a greater proportion of temporal links in response to direct prompts than younger children.

To summarize, when assessing the temporal links provided by the children when describing their hospital treatment an assessment of the free recall showed that older children provided more temporal links than older children and children who experienced low distress provided more temporal links than children who experienced moderate or high distress. An assessment of the children's responses to open-ended questions revealed that 4-6 year old females provided more temporal links than their male counterparts. Finally, an assessment of children's responses to direct prompts revealed that older children provided more temporal links in response to direct prompts than younger children.

Causal links. Regression analyses assessing the causal links provided in injury recall revealed an age effect for proportion of causal links provided in free recall, F (1, 147) = 4.46, $p < .05$ with age accounting for 2.9% of the variance in the proportion of causal links provided in free recall. Older children provided more causal links in free recall than younger children. There was an age x gender effect for the proportion of causal links remaining to be provided that was

provided in response to open-ended questions. The effects of age were qualified by gender. There was no difference in the proportion of remaining causal links provided in response to open-ended questions for 2-3 year old males and females but 4-6 year-old ($M = 0.43$, $SD = 0.44$) and 8-9 year-old ($M = 0.56$, $SD = 0.50$) females provided a greater proportion of causal links in response to open-ended questions than 4-6 year-old ($M = 0.26$, $SD = 0.39$) and 8-9 year-old ($M = 0.29$, $SD = 0.45$) males. There was an age x distress effect for the proportion of remaining causal links provided in response to direct prompts, $F(1, 147) = 10.34$, $p < .05$ accounting for 6.6% of the variance. The effects of age were qualified by level of distress experienced. There was no difference in the proportion of causal links remaining provided in response to direct prompts for the 2-3 year-olds or the 4-6 year olds. The 8-9 year olds experiencing moderate distress ($M = 0.05$, $SD = 0.14$) provided fewer remaining causal links than those experiencing low distress ($M = 0.17$, $SD = 0.24$) and they in turn provided fewer remaining causal links than those experiencing high distress ($M = 0.36$, $SD = 0.49$). Thus for the oldest children, those who were most distressed were most likely to causally link events when responding to direct prompts, while moderately distressed children were least likely to do so.

Regression analyses assessing the causal links provided in hospital recall revealed an age effect for proportion of causal links provided in free recall, $F(1, 147) = 14.30$, $p < .05$ with age accounting for 8.9% of the variance. Older children provided more causal links in free recall than younger children. There was an age x gender effect for the proportion of causal links remaining to be provided that was provided in response to open-ended questions, $F(1, 147) = 8.64$, $p < .05$

accounting for 5.6% of the variance. The effects of age were qualified by gender. There was no difference in the proportion of remaining causal links provided in response to open-ended questions for 2-3 year old or 8-9 year-old children but 4-6 year-old females ($M = 0.36$, $SD = 0.43$) provided a greater proportion of causal links in response to open ended questions than 4-6 year-old males ($M = 0.23$, $SD = 0.42$). There was an age x gender effect for the proportion of remaining causal links provided to direct prompts, $F(1, 147) = 24.88$, $p < .05$ accounting for 14.5% of the variance. The effects of age were qualified by gender. There was no difference in the proportion of causal links remaining provided in response to direct prompts for the 2-3 year-olds or the 4-6 year olds. However, the 8-9 year olds females ($M = 0.39$, $SD = 0.46$) provided more remaining causal links than the 8-9 year-old males ($M = 0.33$, $SD = 0.44$).

To summarize when assessing the causal links provided by children when describing their injury older children provided more causal links in free recall than younger children. Females in the two older groups provided more causal links in response to open-ended questions than their male counterparts. And when providing causal links in response to direct prompts the 8-9 year olds who experienced moderate distress provided fewer causal links than those experiencing low distress and they in turn provided fewer causal links than those experiencing high distress. When assessing the causal links provided by children when describing the hospital again older children provided more causal links in free recall than younger children. The 4-6 year old females were more likely to provide causal links in response to open-ended questions than their male counterparts and

the 8-9 year old females provided more causal links in response to direct prompts than their male counterparts.

Comparing Injury and Hospital Recall

Next comparisons of information provided about the hospital and the injury were conducted. Paired t-tests were completed to determine whether children provided different amounts of each category of information when describing the injury compared to the hospital (See Table 3). The analyses revealed that children provided more Unique Units of Information about the injury ($M = 46.6$, $SD = 21.65$) than about the hospital ($M = 42.03$, $SD = 20.91$, $t\ (148) = 3.20$, $p < .05$) and more subject-predicate clauses about the injury ($M = 48.66$, $SD = 24.32$) than about the hospital ($M = 41.89$, $SD = 23.15$, $t\ (148) = 4.24$, $p < .05$). Interestingly, children reported more adjectives about the injury ($M = 14.13$, $SD = 10.53$) than about the hospital ($M = 11.99$, $SD = 9.05$, $t\ (148) = 2.84$, $p < .05$). There was no difference between the number of temporal links or causal links provided about the injury and the number of temporal links or causal links provided about the hospital treatment.

Accuracy

Finally, children's recall was assessed to determine the accuracy of the reported information. Table 10 shows the accuracy of information provided. Accuracy was only assessed for free recall and then for all other question types combined. Stepwise regression analyses were conducted with gender, age, distress, and their two-way and three-way interactions as independent variables and accuracy of information provided in response to free recall and accuracy of information provided in response to questioning as the dependent variables.

Assessments of the accuracy of information provided about the injury revealed an age effect for both accuracy of free recall, F (1, 147) = 6.215, $p < .05$ and accuracy of information provided in response to the other question types, F (1, 147) = 23.83, $p < .05$. Older children were more accurate than younger children for both free recall and for information provided in response to questioning.

Assessments of the accuracy of information provided about the hospital revealed an age effect for both accuracy of free recall, F (1, 147) = 15.20, $p < .05$ and accuracy of information provided in response to the other questions, F (1, 147) = 22.26, $p < .05$. Older children were more accurate than younger children for both free recall and for information provided in response to direct questioning.

Discussion

The results of the present study showed several interesting findings with respect to the influence of age, gender, and distress on children's recall. Regardless of the level of distress experienced, there was no difference in the completeness of children's recall (i.e., the number of relevant components of their experience that children could provide that was provided). There were, however, effects of age, gender, and distress on the other variables of interest. Not surprisingly, age played a major role in the differences in children's recall. Older children tended to provide more information than younger children, especially in free recall, in response to open-ended questions, and in response to direct prompts. In contrast, younger children were more likely than older children to provide information in response to yes/no questions. Age also interacted with both gender and distress. Several age x gender interactions revealed that males (particularly the 4-6-year-olds and the 8-9-year-olds) provided less information than females in

response to open-ended questions. There were also several age x distress interactions. When providing information about the injury in response to direct prompts, the 8-9-year-old children who experienced moderate distress provided more causal links than the children who experienced low distress and they in turn provided more causal links than children who experienced high distress. When providing information about the hospital the 4-6-year-olds who were highly distressed provided more adjectives in free recall than those who experienced low distress. Similarly, the 8-9-year-olds that were moderately distressed or highly distressed provided more adjectives about the hospital in free-recall than those who experienced low distress. Finally, there was a main effect of distress with children who experienced low distress providing more temporal links about the hospital than children who experienced moderate and high distress.

Completeness of Children's Recall

As hypothesized, distress did not influence the completeness of children's recall. In the present study if children did not provide event information in response to free recall, they were asked open-ended questions, followed by direct prompts and yes/no questions. By asking this wide range of questions, children were given many opportunities to provide relevant information. Previous studies suggesting that distress influences the amount of information that children provide may reflect the questioning techniques those researchers used when questioning children (e.g., Merritt et al., 1994; Ochsner et al., 1999). For the purposes of the present study, it was important to ask all questions and to ask them in a least to most directive order. Future studies should be designed to examine whether all question types need to be asked to obtain complete recall, to assess whether the

order of the question types matters, and whether there is a mediating role of distress on the number and type of questions that need to be asked.

Age of the Child

The age of the children affected children's recall of the injury and the hospital treatment both alone and in conjunction with distress and gender. With respect to distress it was the older children (the 8-9 year-olds for the injury and the 4-6 year-olds and the 8-9 year-olds for the hospital) who appeared to demonstrate different responses to different question types when experiencing varying levels of distress. The only other studies to assess children's ability to respond to different question types when experiencing different levels of distress assessed children who were all 3-4 years-old at the time of the event so age effects could not be determined (Bahrick et al., 1998; Fivush et al., 2004). Thus, additional research is needed to determine whether distress influences all children or whether there is an age effect.

In the present study younger children provided less information in response to free recall than older children. As hypothesized, younger children required more specific questions to elicit the information than older children. Older children were more likely to rely on direct prompts to provide additional information and younger children were more likely to require yes/no questions. These findings are not surprising given previous research demonstrating similar findings with respect to the abilities of younger versus older children to describe an event (e.g., Ceci & Bruck, 1993; Hutcheson et al., 1995; Poole & Lindsay, 1995; Sternberg et al., 2002). Interestingly, 4-6 year-old and 8-9 year-old female children were more likely to provide information in response to open-ended

questions than their male counterparts. To date, no other research has reported similar age x gender effects.

Distress Experienced by the Child

The results of the present study suggest that distress has a small, but important, influence on the type of questions that children need to be asked in order to be able to fully describe an event they have experienced. Parent reports indicated that different children experienced low, moderate, or high distress in response to their injury. Comparisons of the responses provided by children experiencing the varying levels of distress indicated that there was no simple relationship between the severity of rated distress and the responses provided. In contrast to previous studies (Bahrick et al., 1998; Fivush et al., 2004), no curvilinear trend was found between distress and children's recall nor was there a simple linear relationship with recall decreasing as level of distress increased. This might be explained by procedural differences in the assessment of distress. In the present study distress was assessed using behavioural measures whereas in both the Bahrick et al. (1998) and Fivush et al. (2004) studies distress was inferred from the type of event experienced. The influence of distress in the present study did appear to be qualified by the type of event and the property of information being examined.

Type of event. As hypothesized the influence of distress was different depending on whether children were describing their injury or their hospital treatment. A direct comparison of information provided about the hospital and that provided about the injury revealed that children provided more Unique Units of Information and subject-predicate clauses about the injury than about the hospital.

In contrast, children provided more adjectives about the hospital than about the injury. There was no difference in the number of temporal links or causal links provided about the injury and the hospital treatment. Past research assessing children's recall of an injury and the subsequent hospital treatment has shown that children tend to recall more about the injury than about the hospital treatment (Peterson, 1996, 1999, 2002; Peterson & Bell, 1996; Peterson & Whalen 2001). Thus, the finding that children provided more Unique Units of Information and subject-predicate clauses was not surprising. It is interesting though that there were no differences in the number of temporal links and causal links provided about the hospital compared to the injury. It has been suggested that a possible reason for the difference in the amount children recall about the injury and the hospital treatment is that the hospital event is less coherent and thus would be more difficult for a child to describe (Peterson, 1999). The children in the present study provided similar numbers of temporal links and causal links for the injury and the hospital treatment. These findings suggest that children may have a better understanding of the hospital treatment than originally assumed.

Interesting patterns emerged when comparing children's recall of the injury to their recall of the subsequent hospital treatment. When describing the injury, distress influenced children's responses to direct prompts. The older children experiencing moderate distress provided fewer coherence markers than those experiencing low distress and they in turn provided fewer coherence markers than those experiencing high distress. When children were describing the hospital treatment, distress influenced their free recall. The children who experienced moderate or high levels of distress provided fewer coherence markers

in free recall than children who experienced low distress. For the recall of the hospital there was a difference in the number of coherence markers children volunteered but not in their use of direct prompting. For the recall of the injury there was a difference in the number of coherence markers children provided in response to direct prompts but no difference in their free recall. Thus, children's ability to respond to the different question types seemed to vary depending on the event being described. Children's event recall of both the injury and the hospital was moderated by the severity of distress the children experienced.

When Bahrick et al. (1998) assessed the recall of children experiencing varying levels of distress in response to a hurricane they found that children who experienced moderate distress were more likely to volunteer information in free recall, while the children who experienced low or high distress needed more direct prompting. When comparing children's memory for the preparation, the storm, and its aftermath they found they found the same u-shaped pattern with moderately distressed children volunteering more information in free recall but children who experienced low and high distress needed more direct prompting across events. They concluded that the influence of distress was greatest for the most distressing aspect, the storm. In the present study, the injury experience and the hospital treatment could both be seen as distressing events. The injury experience itself is understandably distressing to some children and necessary procedures used with children at the hospital often make that distressing at well. It is interesting to see that the effect is in free recall for one event and direct prompting for the other. That distress influences the information provided in response to direct prompts when describing the injury but information provided in

response to free recall when describing the hospital treatment seems to suggest that there may be a different underlying reason for the influence of distress when children are asked to describe different distressing events.

Another interesting finding with respect to injury recall versus hospital recall was the direction of the relationship. When recalling the injury children who experienced high distress provided more coherence markers and adjectives than children who experienced low distress. In contrast, when recalling the hospital the children who experienced low distress provided more coherence markers than children who experienced high distress. The injury experience is the more salient of the two events. It is possible that distress did not influence recall for this event to the same extent that it influenced hospital recall. This too, seems to suggest that there may be a different underlying reason for the influence of distress when children are asked to describe different distressing events. This is a possibility that needs to be further explored.

Information required. In contrast to the hypothesis that distress would influence children's recall for all properties assessed, the influence of distress found in the present study seemed to be more apparent for certain types of information. Distress did not influence the number of unique details that children provided about their injury or their hospital treatment. Likewise, distress did not influence the number of subject-predicate clauses that children provided or their use of adjectives. Distress did however influence children's use of temporal and causal links.

Previous research could not be found that directly assessed the influence of distress on children's use of temporal and causal links. Temporal and causal links

are indicators of how coherent children are when describing events. When children were describing the injury, distress influenced the proportion of causal links provided in response to direct prompting. Older children who experienced moderate distress provided fewer causal links than those who experienced low distress and they in turn provided fewer causal links than those who experienced high distress. When describing their hospital treatment, children of all ages who experienced low distress provided more temporal links than children who experienced moderate and high distress. Thus, the children who experienced moderate distress provided more coherent descriptions of both the injury and the hospital treatment as evidenced by their greater use of temporal and causal links, partially supporting the hypothesis that children who experience higher levels of distress will be less coherent.

Previous research assessing children's memory for negative events has found that children tend to be more coherent when they describe negative events compared to positive events (Ackil et al., 2003; Fivush et al., 2003). The present study seems to suggest that children's ability to coherently describe a negative event might be moderated by the level of distress children experience, and that children experiencing moderate distress will provide the most coherent information in response to direct prompts.

Implications of Findings

The finding of age effects for children's event recall is not surprising. As shown in past studies older children provided more information than younger

children and younger children needed to be asked yes/no questions to provide all relevant information.

There were several interesting findings with respect to the level of distress experienced. Distress did not influence the completeness of children's recall. This may indicate that if children are questioned using a wide variety of questions the effects of distress can be negated.

Distress did influence children's use of coherence markers. It is important to consider the implications of the influence of distress on the responses that children provided. When recalling the injury children who experienced low and high distress seemed to require more direct prompting than children who experienced moderate distress in order to provide relevant coherence markers. The finding that children who experienced high distress in response to the injury might need more direct questions might suggest that these children are more reluctant or less able to talk about their injury. Thus, interviewers interviewing children who experienced high distress in response to an incident might need to use more direct questioning to obtain the necessary information. This is disconcerting given previous research that has shown that children make more commission errors when answering direct prompts (Hutcheson et al., 1995; Lamb & Fauchier, 2001; Larsson et al., 2003; Leippe et al., 1991) but it may be a reality.

The finding that children who experienced low or high distress provided fewer coherence markers is troubling. Jurors expect witnesses to be confident in their responses. If children do not provide coherent descriptions of an event they may be regarded as incompetent witnesses. The differences in coherence markers used by children who experienced various levels of distress were more apparent

when responses to direct prompts were considered. This seems to be yet another reason why interviewers should be discouraged from using direct prompts unless absolutely necessary. As it stands now these are the questions that are most likely to be used by interviewers (Aldridge & Cameron, 1999; Cederborg et al., 2000; Dykema Cagle & Gallagher, 1987; Fisher et al., 1987; Kebbell et al., 1999; Sternberg et al., 1996).

In the present study although there were few effects of distress, those that were found were with the older, not the younger children. Research assessing the capabilities of children as witnesses tends to focus on the problems with preschoolers being able to describe an event (e.g., Bahrick et al., 1998; Peterson et al., 1999). If distress influences the reports of older children more negatively then additional research needs to be conducted with children at this age to determine how to interview these children in a way that lessens these effects.

The present study is not without problems. There are several problems with the distress ratings that were used. The children in the study experienced two distressing events – the injury and the subsequent hospital treatment. The adults who rated the children's distress were asked to limit their rating to the injury. Given that the events occurred in close succession it is likely that some parents confused the distress experienced at the injury and at the hospital. The distress experienced at the time of the injury may have been similar to that experienced at the hospital or the distress experienced in response to these two events might have been quite different. Similarly, it is difficult to know how different people perceive distress. Different parents may have rated distress differently so that ratings provided by the various parents are not measuring the same thing. Parents

reported the child's distress at the subsequent interview, which occurred up to two weeks later. It is possible that the parents had forgotten just how distressed their child was at that time. Other problems with the study include the close time frame between the injury and the interview – when people witness a crime there may be a greater lapse of time between the event and the interview; and the restrictive ordering of the questions – although the ordering of the questions was essential for the purposes of this study it is possible that different orders for open-ended, yes/no questions, and direct prompts may be more effective. Additional research needs to be conducted to determine whether the results hold for different distress measures, to see if the influence of distress holds across other distressing events and across children of all ages, to determine whether the effects of distress would be different for children who are initially interviewed after a greater passage of time, and to see if the effects of question type hold when questions are asked in a different order.

Child witnesses and victims need to provide the maximum amount of information they are able to provide. The present study illustrates that distress influences the effectiveness of different types of questions for some types of information. It is important that questioners be aware of these influences in order to adequately interview children. Depending on the age of the child and the level of distress experienced by the child in response to trauma, questioners may need to consider using different types of questions to elicit relevant information. No analyses in this study revealed an effect of distress on the information provided by children in response to open-ended questions. If children have fewer problems answering open-ended questions, then it is important that interviewers be trained

to use them adequately. By training interviewers to maximize information obtained in response to open-ended questions interviewers may be able to reduce the effects of distress.

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Table 1

Definitions of Scoring Categories

Completeness	The proportion of fundamental components (provided by adults) children could potentially recall that actually were recalled.
Elaboration	
Unique Units of Information	Details are counted that were not previously mentioned in the narrative.
People	Unique units that refer to people (e.g., *Billy* did it).
Activity	Unique units that refer to activities (e.g., we were *playing* Frisbee).
Object	Unique units that refer to objects (e.g., he gave me a *lollipop*).
Attribute	Unique units that refer to attributes (e.g., my hand hurt *really bad).* Differs from the descriptor category in that specific descriptors are only included once.
Time	Unique units that refer to time (e.g., it was on a *Saturday afternoon*).

Emotion	Unique units that refer to emotions (e.g., I was really *scared*).
Cognition	Unique units that refer to cognitions (e.g., I *thought* I broke my hand).
Number of Descriptors	A count of the number of adjectives (e.g., *three* stitches).
Subject-Predicate Clauses	Clauses with both a subject and a predicate.
Coherence	
Temporal	Words that illustrate a passage of time (e.g., *first, next, then, before*).
Causal/Conditional	Words that illustrate a causal or conditional relationship (e.g., *because, so, if*).
Accuracy	The proportion of items children recalled that were confirmed by parents.

Note. The categories of unique units of information are provided to give an indication of exactly how the unique unites of information were scored. For all analyses data were collapsed across categories.

Table 2

Number of Participants as a Function of Age, Gender, and Distress

Gender	Age (years)	Level of Distress			
		Low	Moderate	High	Total
Males	2-3	2	9	10	21
	4-6	10	12	24	42
	8-9	3	3	6	12
Females	2-3	2	8	8	18
	4-6	3	19	18	40
	8-9	4	5	3	12

Table 3

Frequency of Elaboration and Coherence Markers for both the Injury and the Hospital

		Elaboration and Coherence Markers			
Age (years)	UUI M (SD)	Adjectives M (SD)	Clauses M (SD)	Temporals M (SD)	Causals M (SD)
			Injury		
2-3	28.05 (14.94)	4.92 (5.11)	32.08 (17.32)	0.87 (1.49)	0.28 (0.65)
4-6	51.84 (20.27)	14.76 (9.52)	54.47 (25.26)	4.77 (5.96)	1.47 (1.94)
8-9	57.96 (17.54)	13.54 (5.79)	54.79 (18.38)	7.50 (6.33)	2.42 (3.37)
Total	46.60 (21.65)	11.99 (9.05)	48.66 (24.37)	4.19 (5.66)	1.31 (2.13)
			Hospital		
2-3	24.18 (15.92)	6.95 (7.14)	23.79 (16.20)	0.56 (0.99)	0.15 (0.54)
4-6	46.94 (18.28)	16.53 (10.35)	47.97 (22.39)	5.13 (6.63)	1.37 (1.97)
8-9	53.42 (19.86)	17.21 (10.71)	49.50 (20.19)	8.67 (5.88)	1.79 (2.00)
Total	42.03 (20.91)	14.13 (10.53)	41.89 (23.15)	4.50 (6.17)	1.12 (1.81)

Note. M = mean; SD = standard deviation

Table 4

Proportion of Information Reported in Response to Each Question Type by 2-3, 4-6, and 8-9-year-olds

	Type of Question			
Age (years)	Free-Recall M (SD)	Open-Ended M (SD)	Direct Prompt M (SD)	Yes/No M (SD)
		Injury		
2-3	.26 (.17)	.35 (.15)	.16 (.13)	.24 (.13)
4-6	.24 (.13)	.36 (.14)	.22 (.10)	.17 (.08)
8-9	.35 (.14)	.32 (.13)	.18 (.10)	.15 (.09)
		Hospital		
2-3	.13 (.12)	.30 (.15)	.19 (.13)	.39 (.22)
4-6	.18 (.14)	.38 (.16)	.24 (.12)	.20 (.11)
8-9	.25 (.15)	.33 (.16)	.24 (.14)	.18 (.11)

Table 5

Proportion of Unique Units of Information Remaining to be Recalled that are Recalled for each Question Type

	Proportion Remaining to be Recalled			
Age (years)	Free-Recall M (SD)	Open-ended M (SD)	Direct Prompt M (SD)	Yes/No M (SD)
		Injury		
2-3	.26 (.17)	.48 (.20)	.38 (.25)[a]	.24 (.13)[a]
4-6	.24 (.13)	.47 (.15)	.56 (.20)	.17 (.09)
8-9	.35 (.14)	.49 (.16)	.65 (.22)	.15 (.09)
R^2	--	--	0.07	0.09
		Hospital		
2-3	.13 (.12)[a]	.34 (.17)[a]	.35 (.23)[a]	.39 (.22)[a]
4-6	.18 (.14)	.47 (.17)	.55 (.18)	.20 (.11)
8-9	.25 (.15)	.44 (.21)	.59 (.18)	.24 (.17)
R^2	0.08	0.04	0.14	0.20

Note. Dashes indicate that the R^2 for age was not significant.

Significant effect of age [a] $p < .05$

Table 6

Proportion of Adjectives Remaining to be Reported that are Reported for each Question Type

	Proportion Remaining to be Reported		
Age (years)	Free-Recall M (SD)	Open-ended M (SD)	Direct Prompt M (SD)
		Injury	
2-3	.19 (.31)	.33 (.36)[a]	.30 (.33)
4-6	.15 (.16)	.48 (.26)	.45 (.25)
8-9	.21 (.17)	.58 (.24)	.33 (.18)
R^2	--	0.07	--
		Hospital	
2-3	.07 (.14)[ad]	.25 (.28)[ag]	.58 (.35)[ag]
4-6	.11 (.16)	.37 (.26)	.57 (.26)
8-9	.18 (.18)	.39 (.27)	.45 (.24)
R^2	--	--	--

Note. Dashes indicate that the R^2 for age was not significant.

Significant effect of age [a] $p < .05$

Significant effect of age x distress [ad] $p < .05$ (See Text)

Significant effect of age x gender [ag] $p < .05$ (See Text)

Table 7

Proportion of Subject-Predicate Clauses Remaining to be Reported that are Reported for each Question Type

	Proportion Remaining to be Reported			
Age (years)	Free-Recall M (SD)	Open-ended M (SD)	Direct Prompt M (SD)	Yes/No M (SD)
		Injury		
2-3	.22 (.13)	.47 (.15)	.37 (.22) [a]	.25 (.10) [a]
4-6	.18 (.10)	.45 (.13)	.57 (.17)	.19 (.09)
8-9	.25 (.12)	.44 (.16)	.60 (.17)	.17 (.09)
R^2	--	--	0.16	0.10
		Hospital		
2-3	.14 (.13)	.33 (.19) [ag]	.33 (.18) [a]	.38 (.20) [a]
4-6	.16 (.11)	.43 (.18)	.55 (.16)	.22 (.11)
8-9	.20 (.14)	.41 (.20)	.61 (.18)	.18 (.11)
R^2	--	--	0.24	0.18

Note. Dashes indicate that the R^2 for age was not significant.

Significant effect of age [a] $p < .05$

Significant effect of age x gender [ag] $p < .05$ (See Text)

Table 8

Proportion of Temporal Links Remaining to be Recalled that are Recalled for each Question Type

	Proportion Remaining to be Recalled		
Age (years)	Free-Recall M (SD)	Open-ended M (SD)	Direct Prompt M (SD)
		Injury	
2-3	.80 (.27)	.88 (.21)	.11 (.29)
4-6	.51 (.30)	.88 (.20)	.13 (.26)
8-9	.50 (.24)	.81 (.25)	.14 (.19)
R^2	--	--	--
		Hospital	
2-3	.09 (.26) [a]	.24 (.43) [ag]	.09 (.05) [a]
4-6	.22 (.31)	.53 (.45)	.15 (.28)
8-9	.33 (.29)	.56 (.40)	.25 (.31)
R^2	0.06	--	0.10

Note. Dashes indicate that the R^2 for age was not significant.

Significant effect of age [a] $p < .05$

Significant effect of age x gender [ag] $p < .05$ (See Text)

Table 9

Proportion of Causal Links Remaining to be Recalled that are Recalled for each Question Type

	Proportion Remaining to be Recalled		
Age (years)	Free-Recall M (SD)	Open-ended M (SD)	Direct Prompt M (SD)
		Injury	
2-3	.03 (.18) [a]	.14 (.34) [ag]	.01 (.08) [ad]
4-6	.06 (.20)	.34 (.41)	.18 (.32)
8-9	.16 (.26)	.42 (.48)	.20 (.35)
R^2	0.03	--	--
		Hospital	
2-3	.03 (.16) [a]	.02 (.16) [ag]	.05 (.22) [ag]
4-6	.15 (.30)	.29 (.43)	.13 (.28)
8-9	.32 (.42)	.26 (.41)	.11 (.26)
R^2	0.09	--	--

Note. Dashes indicate that the R^2 for age was not significant.

Significant effect of age [a] $p < .05$

Significant effect of age x distress [ad] $p < .05$ (See Text)

Significant effect of age x gender [ag] $p < .05$ (See Text)

Table 10

Proportion Accuracy of Information Recalled about the Injury and the Hospital

	Type of Questioning	
Age (years)	Free Recall M (SD)	All Other Questions M (SD)
	Injury	
2-3	.87 (.28)[a]	.82 (.18) [a]
4-6	.97 (.13)	.91 (.10)
8-9	1.00 (0)	.96 (.20)
	Hospital	
2-3	.56 (.50) [a]	.77 (.33) [a]
4-6	.80 (.40)	.92 (.12)
8-9	.96 (.20)	.99 (.04)

Significant effect of age [a] $p < .05$

Appendix A

Contents of the Child Interview

Free Recall

- Tell me what you know about what happened when you hurt yourself?
- What else do you remember?
- Tell me what you know about what happened when you went to the hospital?
- What else do you remember?

Questioning

I am going to ask you some question to make sure that I understand what happened.

- What were you doing before it happened? (Open-Ended)
    - Were you playing, running, etc.? (If either/or – Direct Prompt; if just one of these is indicated - Yes/No)
- How did it happen? (Open-Ended)
- Who was with you? (Open-Ended)
    - Who is that? (Open-Ended)
- Where were you when it happened? (Open-Ended)
    - Were you inside or outside? (Direct Prompt)
- What time of day was it when you hurt yourself? (Direct Prompt)
    - Was it light or dark out? (Direct Prompt)
    - Was it suppertime, lunchtime, or breakfast time? (If either/or – Direct Prompt; if just one of these is indicated - Yes/No)
- What did you do as soon as it happened? (Open-Ended)

    - Who was the first person you saw after it happened? (Open-Ended)
    - Did you go to find them or did they come to you? (Yes/No)
    - Where were they? (Open-Ended)
    - What did they do as soon as they saw you? (Open-Ended)
        - How did they treat your injury? (Open-Ended)
        - What did they use? (Depends on previous response)
        - What colour was it (cloth, bandage, etc.)? (Direct Prompt)
- How much did it hurt? (Direct Prompt)
    - Did it hurt a lot or a little? (Direct Prompt)
- How much did you cry? (Direct Prompt)
    - Did you cry a lot or a little? (Direct Prompt)
- Where did you go before you went to the hospital? (Open-Ended)
    - What happened there? (Open-Ended)
    - Who was there? (Open-Ended)
- How long did you wait before you went to the hospital? (Direct Prompt)
- How did you get to the hospital? (Direct Prompt)
- Who came with you to the hospital? (Open-Ended)
- What happened when you first got to the hospital? (Open-Ended)
- Before you saw the doctor, what did the nurse do? (Open-Ended)
    - Was the nurse male or female? (Direct Prompt)
- What did you do while you were waiting to see the doctor? (Open-Ended)
    - What did you read, watch, play with, etc.? (Direct Prompt)
    - Who did you do that with? (Direct Prompt)
- How long did you have to wait to see the doctor? (Direct Prompt)

- Was it a long time or short time? (Direct Prompt)

- When you saw the doctor was it a male or a female? (Direct Prompt)
  - What did he/she do? (Open-Ended)
  - What else did he/she do? (Open-Ended)
  - Who was in the room with you when you were with the doctor? (Open-Ended)
- Did you have to get a needle? (Yes/No)
  - Tell me where on your body you got it? (Direct Prompt)
  - How many needles did you get? (Direct Prompt)
  - Who gave you the needle? (Direct Prompt)
  - Was it a male or female? (Direct Prompt)
  - Was it the same person as before? (Yes/No)

For a broken bone:

- Tell me what happened when you got your x-rays taken. (Open-Ended)
  - Who gave you your x-rays? (Open-Ended)
  - Was it a male or a female? (Direct Prompt)
  - Was it the same person as before? (Yes/No)
  - How many x-rays did they take? (Direct Prompt)
  - Who was in the room with you? (Open-Ended)
  - What happened after you got your x-rays taken? (Open-Ended)
- Did you have to get a cast put on? (Open-Ended)
  - Who put the cast on? (Open-Ended)
  - Was it a male or a female? (Direct Prompt)
  - Was it the same person as before? (Yes/No)

- How did he/she put the cast on? (Open-Ended)
- Who was with you? (Open-Ended)

For lacerations:

- Did you have to get stitches? (Yes/No)
  - Who gave you the stitches? (Open-Ended)
  - Was it a male or a female? (Direct Prompt)
  - Was it the same person as before? (Yes/No)
  - How did he/she put the stitches in? (Open-Ended)
  - How many stitches did you get? (Direct Prompt)
  - Did you get a bandage? (Yes/No)
  - What did the bandage look like? (Direct Prompt)
  - What colour was it? (Direct Prompt)
  - Who was in the room with you? (Open-Ended)
- Did the doctors give you anything special before you left the hospital? (Yes/No)
  - What colour was it? (Direct Prompt)

Note: The question types that are provided in brackets are simply meant to be a guideline for what type of question the question indicated might be. Whether a given question was thought of as open-ended, a direct prompt, or a yes/no question depended on the exact wording of the interviewer in a particular interview and the previous responses provided by the child being interviewed.

Appendix B

Scoring Sheet for Unique Units of Information

Unique Units of Information	Direct Prompt	Open-Ended	Spontaneously Volunteered	Yes/No	Free-Recall
People					
Objects					
Activity					
Attribute					
Location					
Time					
Emotion					
Cognition					

Scoring Sheet for Elaboration and Coherence

	Direct Prompt	Open-Ended	Spontaneously Volunteered	Yes/No	Free-Recall
Clauses					
Temporals					
Causals					

Appendix C

Descriptions for Calculating Proportions

Proportion of Information Provided in Free Recall

(Information provided in response to free-recall) / Total amount of information provided)

Proportion of Information Left to Provide Provided in Response to Open-Ended Questions

Information provided in response to open-ended questions / (Total amount of information - Information provided in free-recall)

Proportion of Information Left to Provide Provided in Response to Direct Prompts

Information provided in response to direct prompts / (Total amount of information - Information provided in free recall - Information provided in response to direct prompts)

Proportion of Information that was left to provide to Yes/No Questions

(Total Information - Information provided in free recall - Information provided in response to open-ended questions - Information provided in response to direct prompts) / Total information provided

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