

Parent–Child Talk and Children’s Memory for Stressful Events

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SUMMARY

The relationship between parents’ styles of talking about past events with their children and children’s recall of stressful events was explored. In this investigation, 2- to 5-year-old children’s recall of injuries requiring hospital emergency room treatment was assessed within a few days of the injury and again 2 years later, along with the way their parents reminisced with them about the event. Correlational analyses showed that age and parental reminiscing style were consistently related to child memory; regression analyses showed that although age was most important, parents who were more elaborative had children who recalled more during their initial interview about the harder-to-remember hospital event. Thus, an elaborative parental style may help children’s recall of even highly salient and stressful events. Copyright © 2006 John Wiley & Sons, Ltd.

Events that involve children in forensic situations typically are quite stressful. Because children appear so frequently as eyewitnesses in courtrooms, there has been considerable research in recent years on the reliability of children’s memory for stressful events (Ceci & Bruck, 1995). However, considerable individual variation has also been apparent in this body of research, and a number of investigators have been attempting to elucidate the various factors that contribute to this variation. Potential factors that have been explored include attachment (Alexander, Quas, & Goodman, 2002; Goodman, Quas, Batterman-Faunce, Riddlesberger, & Kuhn, 1997), temperament (Burgwyn-Bailes, Baker-Ward, Gordon, & Ornstein, 2001; Gordon et al., 1993; Greenhoot, Ornstein, Gordon, & Baker-Ward, 1999; Merritt, Ornstein, & Spicker, 1994) and children’s language abilities (Burgwyn-Bailes et al.; Gordon et al., Greenhoot et al.).

A potential variable that has so far received little attention is the way that parents habitually talk with their children about the past. Considerable research has shown that parents differ in the way they talk with their children about past experiences (Fivush & Fromhoff, 1988; Haden, Haine, & Fivush, 1997; Harley & Reese, 1999; McCabe & Peterson, 1991; Peterson & McCabe, 2004; Reese & Fivush, 1993). Some parents engage in much more of this ‘memory talk’ than others (McCabe & Peterson). Furthermore, the

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structure of these conversational exchanges differs in systematic ways. Some parents talk with their children in elaborative and topic-extending ways (Fivush, 1991; Fivush & Fromhoff; McCabe & Peterson; Peterson & McCabe; Reese & Fivush). Specifically, these parents encourage their children to elaborate on what the parent or the child has said, and encourage conversations to continue rather than curtailing them early. They provide more information in their own turns at talk, and encourage and support their children's contributions. Other parents, in contrast, ask a few formulaic questions about an event and engage in little of this elaborative exchange. These parental differences in reminiscing style have repeatedly been shown to be related to how much information children later provide in their open-ended memory conversations, both when conversing with parents (Haden et al., 1997; Reese & Fivush; Reese, Haden, & Fivush, 1993) and with researchers who provide only neutral prompts in interviewing children about personal experiences (e.g. McCabe & Peterson; Peterson & McCabe, 1994).

However, the increased contribution to memory conversations by children of elaborative parents may reflect only an increased willingness to keep on talking. It is another matter to suggest that memory itself for past events may be better for children whose parents engage in this elaborative style of interaction. Recently, some investigators have suggested that mothers who have an elaborative reminiscing style may actually facilitate their children's developing ability to remember and report on their own personal past (Boland, Haden, & Ornstein, 2003). They have explored how children's memory of nonstressful target events may be influenced by the way that parents talk with them during or after that target event occurred. They have found that mothers who engaged in elaborative talk about specific target experiences had children who recalled more about those experiences later. For example, children recalled more about museum visits (Tessler & Nelson, 1994), videos that they watched (Low & Durkin, 2001) and 'camping trips' in their living rooms (Boland et al.). In these studies, the mother and child talked about the event while it was occurring. But it appears that such talk can also have a facilitative effect on children's memory of a specific event if it takes place after the event is over (Leichtman, Pillemer, Wang, Koreishi & Han, 2000; McGuigan & Salmon, 2004). That is, engaging children in elaborative reminiscing about various events, even when that conversation took place well after those events were over, effectively helped children remember their details.

In summary, the above-mentioned studies showing that mothers who engage in elaborative memory conversations with their children about both everyday and distinctive *nonstressful* events have children who in turn seem to recall more detail about those events. But to our knowledge, there has been little investigation of whether parental reminiscing style affects children's memory for highly *stressful* events.

There are at least two reasons to suspect that memory for stressful and nonstressful events may differ. First, in a recent meta-analytic review of memory for stressful events, Deffenbacher, Bornstein, Penrod, and McGorty (2004) argue that there may be different mechanisms operating when individuals are exposed to highly stressful vs. other sorts of events. Specifically, they theorise that highly stressful events evoke an activation mode of attention control (i.e. a defensive response). In contrast, less-stressful events elicit an arousal mode of attention control (i.e. an orienting response). In their review, they conclude that for adults at least, memory for these two types of events seems to differ. It may well be that the effect of elaborative parent-child conversations differs depending upon the nature of the event. Secondly, considerable research has shown that the event being recalled is an important contributor to how well it is later remembered, and stressful events seem to be particularly well-remembered (Peterson, 2002). As contrasting

examples, preschoolers recalled approximately 20–30% of the features of their living room camping trips when interviewed 1 day or 3 weeks later (Boland et al., 2003; Haden, Ornstein, Eckerman, & Didow, 2001; Ornstein, Haden, & Hedrick, 2004), whereas children recalled three-quarters of the features of facial surgery events required because of lacerations when interviewed a year later (Burgwyn-Bailes et al., 2001). Likewise, preschoolers who broke bones or needed sutures for lacerations recalled 70% of the components of their injury when interviewed after a delay that spanned 2 years (Peterson, 1999) and almost as many after a delay of 5 years (Peterson & Whalen, 2001). Investigators who have studied children's memory for highly stressful experiences that include painful medical procedures such as voiding cystourethrograms (VCUGs—Goodman, Quas, Batterman-Faunce, Riddlesberger, & Kuhn, 1994; Merritt et al., 1994) and natural disasters such as hurricanes (Bahrck, Parker, Fivush, & Levitt, 1998; Fivush, Sales, Goldberg, Bahrck, & Parker, 2004), have repeatedly shown that children have extensive memory for these highly salient events. Thus, these events may be so highly memorable in and of themselves that parental reminiscing style plays little additional role. For both of the above reasons, it is possible that the findings of research exploring relations between memory and parental reminiscing style for nonstressful events may not necessarily generalise to stressful events.

Here, we explore whether parents' styles of talking to their children about past experiences is related to their children's recall of a stressful event. A beginning was made by Goodman et al. (1994), who found that those parents reporting a lack of parent-child communication when their children underwent a VCUG procedure had children who made more memory errors when recalling it. Thus, it is possible that the way parents habitually talk with their children, that is, the degree of elaboration that takes place in their memory conversations, may affect how well children recall even such highly memorable events as stressful ones.

THE CURRENT STUDY

Children who had injuries requiring hospital emergency room treatment were recruited from the emergency room. Because most research investigating the relationships between parental reminiscing style and children's memory have focused on preschoolers, we recruited children between 2 and 5 years of age. In home visits, both child memory and the way that parents talked about past events were assessed. Parents were asked to discuss with their child not only the injury and hospital experience but also an emotionally positive event. In a previously published study on part of this data set (Sales, Fivush, & Peterson, 2003), we found that parents were generally more elaborative when discussing a negative experience (an injury and subsequent hospital treatment) compared to a positive event (like a trip or party) with their child. However, importantly, parents showed a remarkably consistent individual style across the two types of events. Parents who were more elaborative when discussing the negative event were also more elaborative when discussing the positive event compared to less elaborative parents. However, the conversations about negative events were longer. In that investigation, the effect of parental elaboration on children's independent memory for the target events was not assessed; in this study, we extend previous findings to examine whether level of parental elaboration is related to children's independent recall of stressful events, both concurrently

and over time. (The positive comparison events from the earlier paper by Sales et al. are not included here.)

Although previous research has shown that the style of parental memory talk seems to influence children's recall of neutral and positive experiences, no prior research has investigated whether it also influences children's recall of highly salient personally stressful events. However, it is reasonable to hypothesise that a parental style of engaging in memory-talk that is elaborative will aid their children's subsequent recall of even such salient events as ones that are highly stressful.

The target events are the two major components of a child's experience of injury, namely the injury event and the subsequent hospital treatment event. Thus, the target events include both ones that occurred inside and outside of a medical setting, and these two events differ on a number of dimensions. The injury is a unique event whereas these children have typically been to this ER a number of times for a range of reasons (Peterson & Bell, 1996). Thus, various components of the hospital event are less likely to be unique, and consequently, may be less memorable (Howe, 1997). Furthermore, the sequence of hospital events is probably less likely to be perceived by a child as well-ordered causally and temporally, which may also impair recall (Peterson, 2002). In addition, the two events probably differ in reportability, that is, in how much they are likely to be discussed. When we talked to parents about how much these events had been discussed, parents claimed that although the details surrounding their child's injury were frequently talked about, much less of the hospital event was discussed (with the exception of the major treatment, i.e. getting a cast or sutures). Finally, children have repeatedly been found to have poorer recall of the hospital event than the injury event (Peterson, 1999; Peterson & Bell; Peterson & Whalen, 2001). For all these reasons, we hypothesise that parental reminiscing will be more helpful for recall of the hospital event than for the injury event.

In this study, like in previous assessments of children's recall of injuries and emergency room treatment, we explore children's recall through the use of two measures: the completeness of children's recall of the components of a prototypical experience and their accuracy (Peterson, 1999; Peterson & Bell, 1996; Peterson & Whalen, 2001). We also use an additional measure, one that has been used by a number of other researchers investigating children's recall of naturally occurring events including highly stressful ones such as a destructive hurricane (Bahrack et al., 1998; Fivush et al., 2004). Those investigators have tabulated the number of unique units of information that children provided in their memory interviews. In order to facilitate comparisons between our findings and those of studies using this different measure of recall, we include this way of assessing memory as well as measures of completeness and accuracy.

METHOD

Participants

Children were recruited from the emergency room of the only children's hospital in Newfoundland, Canada. They included 63 children, 36 boys and 27 girls, including ten 2-year olds ($M = 30.6$ months, seven boys and three girls), eleven 3-year olds ($M = 39.9$ months, five boys and six girls), eighteen 4-year olds ($M = 53.0$ months; eleven boys and seven girls) and twenty-four 5-year olds ($M = 65.4$ months, thirteen boys and eleven girls).

(Twenty-eight other children were recruited but had incomplete data.) All children within a 100-mile radius are taken exclusively to this emergency room for treatment, and thus the children (almost all White) represent a cross-section of the community in terms of socio-economic status. They had experienced trauma injuries that were treated in an outpatient manner, including lacerations requiring suturing, bone fractures, second-degree burns, dog bites and fingers crushed in doors or car windows. At the 2-year follow-up, 36 children remained in the sample, including five 2-year olds (three boys and two girls), five 3-year olds (one boy and four girls), nine 4-year olds (three boys and six girls) and seventeen 5-year olds (ten boys and seven girls). (The reported ages are the age at time of recruitment). Analyses compared the children who remained in the sample 2 years later vs. those who did not on the variables discussed below, and there were no differences between these samples. For simplicity, children will always be referred to by the age they were at the time of initial recruitment rather than the age they were at the 2-year follow-up.

Procedure

The families were approached in the emergency room where the study was explained and initial permission given. Approximately 80% of families agreed to participate. Families were then telephoned at home to set up a home visit within 2 weeks. Children were interviewed about what they recalled of their injury and hospital treatment, and then their parents were interviewed about these events. Permission was also obtained to interview other witnesses (such as relatives, babysitters and teachers) if needed in order to provide a complete record of the events. These adult reports from parents and, if necessary, other witnesses provided the standard against which we evaluated the accuracy and completeness of the children's information. Children were also administered the Peabody Picture Vocabulary Test—Revised (Dunn & Dunn, 1981) to assess language ability.

The families were visited a second time approximately a week later, at which time parents were given a tape recorder and asked to talk with their children in as natural a manner as possible about the target events. During this interaction, the researcher was out of sight in another room, and there were no time restrictions on the interview. (Although parents were not instructed about the order in which they should talk about the injury and treatment events with their children, they always talked about the injury first.) In seven families (two 3-year olds, four 4-year olds and one 5-year old), the father conversed about the target events with their child; in the remaining 54 families, the conversations were between mother and child. (Parents were also given a child temperament scale, a distress scale and a family information form to fill out, but these will not be discussed further.)

Two years later, families were contacted and we obtained consent again for a follow-up visit. Parents were asked not to discuss the target events with their child prior to the arrival of the interviewer because we were interested in what the children themselves remembered. Children were interviewed again about their recall of their injury and hospital treatment, using the same interview protocol as before.

The format of each interview was the same, and it began with free recall. For the initial interview, children were asked 'Tell me about when you hurt yourself. What happened?' 'Tell me about when you went to the hospital. What happened?' At the 2-year visit, children were reminded about their injury when they had been taken to the hospital a long time ago, and asked the same free recall questions. Next, children were given probes using *wh*-questions ('Where were you when it happened? Who was with you? What did you do when you first got hurt?') If children provided information about a specific element in free

recall they were not subsequently asked about it in probed recall. Every effort was made to minimise the number of yes/no questions, and when they were used, children were asked to elaborate their answer. Responses that consisted of a simple yes or no, without further elaboration, were ignored. (See the appendix for interview details and examples.) In situations in which the child responded nonverbally to a question (e.g. 'How many stitches did you get?' and the child held up three fingers), the interviewer stated the child's response for the tape recorder ('You are holding up three fingers') and this was counted as the child's providing a content response. The interviews were audio-recorded and transcribed verbatim; all scoring was done from the transcripts.

Scoring of recall data

Three types of scoring procedures were used: (a) amount of information, (b) memory completeness and (c) accuracy. Scoring procedures for each are as follows.

Amount of information

Each unique unit of information introduced by the child was counted. The total number of unique units of information was tabulated, which included details pertaining to person (e.g. 'Daddy brought me'), location ('I went to the *hospital*'), activity ('I was *running* up the street'), object ('I had a *hamburger* after) and attribute ('I had a *big* cut'). These were separately counted for the injury and hospital events.

Completeness

The injury and hospital treatment of all children conformed to a prototypical pattern, and the completeness score was directed towards determining how many of these prototype components children actually recalled. Many components of this prototype were applicable to all children and others were relevant to only some of the children. (See appendix for a list and examples of the prototype components.) For example, all children had a location where the injury occurred, had someone to take them to the hospital, etc. On the other hand, not all children broke bones, got sutures or had first aid applied at home prior to their trip to the hospital. Which prototype components were relevant to each child were determined from inspecting the adult witness transcripts. Because of this variation in how many prototype components applied to their individual experiences, different children had different numbers of scorable components that were relevant to them and thus could potentially be present in their recall of each of the two events (injury and hospital treatment). Thus, completeness data were converted to proportions, that is, what proportion of the prototype components relevant to their injury and hospital events did children recall? These proportions were calculated by dividing the number of component items that were correctly recalled by the number of component items that were relevant for that child according to witness report and thus that could potentially have been recalled. Recall of the two events was always scored separately.

Accuracy

For all information provided by children, adult transcripts were searched to determine accuracy. Only information that was explicitly confirmed or contradicted by witness report (94% of what children provided) was included in analyses of accuracy.

Scoring of parent-child conversations

Conversations about the injury and hospital treatment as well as the positive event were broken down into propositional units (defined as an independent clause containing a subject and verb); only those that pertained to the target events were coded into mutually exclusive and exhaustive categories adapted from Fivush and Fromhoff (1988). (Only parental utterances are coded and reported here, and for information on children's responses in these conversations, see Sales et al., 2003.) Parental utterances were coded into the following categories: (a) Memory question elaborations, in which a question tried to elicit new information from the child as well as incorporated new information within the question; (b) Memory question repetitions, in which a question tried to elicit new information from the child but did not itself contain any new information; (c) Yes-no question elaborations, in which the child was required to confirm or negate the new information provided by the parent; (d) Yes-no question repetitions, in which the child was required to confirm or negate previously mentioned information and (e) Evaluations—which were statements that confirmed or negated the child's previous utterance. (A more extensive presentation of these categories, along with relevant examples, is found in Sales et al.) Several other categories were also coded, such as clarification questions, metamemory responses and associated talk, but these were all rare. Subsequently, a composite score was created for each parent: the number of elaborations (including both memory question elaborations and yes-no question elaborations) + the number of evaluations was divided by the number of elaborations + evaluations + repetitions to provide an elaboration ratio.

Reliability

For the children's recall scores, 20% of the transcripts were coded by two independent coders, and they achieved reliabilities of 0.87 for unique units of information, 0.89 for completeness and 0.82 for accuracy (Cohen's kappa). One coder scored the remaining transcripts. For the parent-child conversations, two judges independently coded 35% of the transcripts, and they achieved 0.80 reliability across utterance types (Cohen's kappa). Discrepancies were discussed between coders, and then the remaining transcripts were divided between these two people for scoring.

RESULTS

Three ways of assessing children's memory were used: amount of new (i.e. unique) information provided, completeness of their accounts (*vis à vis* a standardised prototype) and accuracy. Each of these was assessed both shortly after the target events took place as well as 2 years later. There was a decrease in the number of children between initial interviews and the 2-year follow-up; because we are interested in exploring factors that are related to memory at both time points, we will analyse the initial data separately from the 2-year follow-up data. Thus, the analyses on the initial interview data will include all the 63 children, whereas the second set of analyses will include only those 36 children for whom we have both initial and 2-year follow-up data. A series of ANOVAs were calculated to compare the initial recall scores on each of the variables (for the injury and hospital

events separately) of the children who remained in the sample 2 years later and those who did not. None demonstrated a significant difference between the two groups of children.

First, we summarise the data on the child memory measures as well as parental elaboration. Detailed analyses of these data are not presented here for space considerations, and most of it essentially replicates extant work (Peterson, 1999; Peterson & Bell, 1996; Sales et al., 2003), although analytic details are available from the first author. Next, we present the correlations between these memory measures and the parents' reminiscing style when talking with their child about past events, as well as with children's age and PPVT-R scores. Finally, we present regression analyses.

Summary of memory and parent measures

On average, children provided 19.9 unique units of information about their injury and 16.2 unique units about the hospital event in their initial interview; 2 years later, the number of unique units was 26.9 and 19.5 for the injury and hospital events, respectively. In terms of recall completeness, children recalled 68% of the prototype components of their injury and 54% of the components of their hospital treatment during their initial interview. There was little difference 2 years later, with children recalling 69% and 51% of their injury and treatment components, respectively. In terms of how accurate their recall was, it was high during their initial interview (88% and 85% for injury and treatment, respectively). Although 2 years later children were less accurate, the decline was particularly marked for the hospital event (80% for injury and 68% for hospital). Of course, children's recall in all three categories (unique information units, completeness and accuracy) improved with age. For parental elaboration ratios, the mean elaboration ratio was 0.83 overall.

Correlation analysis

The way that parents talked with their children about past events during parent-child co-narration was correlated with the memory measures, as was the children's age in years and language ability. (The elaboration ratio was entered as a continuous variable in all analyses.) As well, the children's recall scores for their initial interview were correlated with their recall 2 years later. These correlations are found in Table 1. Both the children's age and their parents' score on the parental elaboration measure were consistently related to the recall measures. In addition, the children's earlier recall scores were related to their recall 2 years later. On the other hand, the language measure, the PPVT-R, was never significantly related to child memory scores.

Hierarchical regression analyses

A series of hierarchical regression models were built to predict children's amount of information, completeness and accuracy for each event type both at initial recall and 2-year recall. We entered age and parental elaboration in the first step, and the age \times elaboration interaction in the next step since parental elaboration may have a differential effect depending upon the age of the child. These variables were entered as predictors for all regression models with initial recall variables as the dependent variables. In the 2-year recall analyses, we entered the additional variable of children's earlier recall scores first, and then the other variables in the same order as previously. Because the children's language scores were unrelated to memory outcomes, they were not included as a factor in

Table 1. Correlations between children's memory measures and age in years, language (PPVT-R), parental elaboration ratio and recall in the initial interview

Measure	Event	Age	PPVT-R	Elaboration	Initial recall
Initial interview					
Information	Injury	0.59***	0.13	0.34**	—
	Hospital	0.54***	0.10	0.41***	—
Completeness	Injury	0.70***	0.11	0.32**	—
	Hospital	0.59***	0.11	0.43***	—
Accuracy	Injury	0.21	-0.03	0.04	—
	Hospital	0.43***	0.02	0.43***	—
2 Year follow-up					
Information	Injury	0.57***	-0.12	0.34*	0.66***
	Hospital	0.54***	0.03	0.32*	0.66***
Completeness	Injury	0.48**	-0.10	0.38*	0.50**
	Hospital	0.52***	-0.06	0.45**	0.53***
Accuracy	Injury	0.16	-0.12	0.13	0.16
	Hospital	0.38*	-0.17	0.43**	0.50**

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

the regressions. The significant predictors for all hierarchical regression models for the initial interview appear in Table 2.¹

Initial interview

Amount of information. For the number of unique units of information provided about the injury, the regression model was significant, $R^2 = 0.35$, $F(1,61) = 33.04$, $p < 0.001$. Age ($p < 0.001$) was the only significant contributor to this model. (See Table 2 for details on the regression analyses.) The model for the number of unique units of information provided about the hospital event was also significant, $R^2 = 0.35$, $F(2,60) = 15.93$, $p < 0.001$. Both age ($p < 0.001$) and parental elaboration ($p = 0.023$) contributed significantly to this model. To illustrate the relationship between memory scores and parental elaboration, all parents whose elaboration ratio fell above the median were classified as 'high elaborative parents' while those parents whose elaboration ratio fell below the median were classified as 'low elaborative parents'. The mean memory measures for children of high vs. low elaborative parents are displayed in Table 3. Children of parents with high elaboration ratios recalled more unique units of information about their hospital experience than did children of low-elaborative parents.

Completeness of recall. For the injury event, the model was significant, $R^2 = 0.49$, $F(1,61) = 59.43$, $p < 0.001$, with age the only significant predictor ($p < 0.001$). For the hospital event, the model was significant, $R^2 = 0.45$, $F(3,59) = 15.86$, $p < 0.001$, and age ($p < 0.001$), parental elaborations ($p = 0.015$) and the age \times elaboration ratio ($p = 0.040$) were all significant predictors. To illustrate the age \times elaboration interaction, the parents of

¹When the regression analyses were run non-hierarchically, such that the model determined the order of importance of the variables, it is notable that the age \times elaboration ratio was the only significant predictor for regressions on the amount of unique information provided about both injury ($p < 0.001$) and hospital treatment ($p < 0.001$) as well as the completeness of both injury ($p < 0.001$) and hospital ($p < 0.001$) recall during the initial interview. The predictors remained unchanged for the accuracy of hospital recall (i.e. elaboration ratio, age and the age \times elaboration interaction all contributed significantly, in that order).

Table 2. Significant predictors in the hierarchical regression analyses on initial interview recall scores

Event	Model	Variable	R ²	R ² change	β	t	p
Amount of information							
Injury	1	Age	0.351	0.351	0.593	5.75	<0.001
	2	Elaboration	0.369	0.018	0.143	1.31	ns
	3	Age × elaboration	0.370	0.001	0.043	0.13	ns
Hospital	1	Age	0.288	0.288	0.537	4.97	<0.001
	2	Elaboration	0.347	0.059	0.259	2.99	0.023
	3	Age × elaboration	0.353	0.006	0.246	0.72	ns
Completeness							
Injury	1	Age	0.493	0.493	0.702	7.71	<0.001
	2	Elaboration	0.505	0.012	0.113	1.16	ns
	3	Age × elaboration	0.522	0.017	-0.426	-1.46	ns
Hospital	1	Age	0.343	0.343	0.585	5.64	<0.001
	2	Elaboration	0.405	0.062	0.267	2.51	0.015
	3	Age × elaboration	0.446	0.041	-0.658	-2.10	0.040
Accuracy							
Injury	1	Age	0.047	0.047	0.218	1.74	ns
	2	Elaboration	0.058	0.011	-0.112	-0.84	ns
	3	Age × elaboration	0.078	0.020	0.454	1.12	ns
Hospital	1	Elaboration	0.224	0.224	0.473	4.19	<0.001
	2	Age	0.305	0.081	0.303	3.19	0.011
	3	Age × elaboration	0.339	0.034	-0.601	-1.75	0.075

Table 3. Means for children of low vs. high elaborators for the recall variables for which parental elaboration was a significant predictor (initial interview)

Type of data	Event	Low elaboration (SD)	High elaboration (SD)
Information	Injury	15.9 UUI (7.9)	22.3 UUI (9.3)
	Hospital*	9.9 UUI (7.2)	21.0 UUI (12.6)
Completeness	Injury	61.7% (21.6)	72.6% (15.4)
	Hospital*	42.5% (26.7)	60.8% (19.1)
Accuracy	Injury	89.6% (9.8)	91.1% (9.3)
	Hospital**	80.4% (27.2)	90.2% (11.6)

UUI = Unique units of information.
 p* < 0.05; *p* < 0.001.

children at each yearly age interval were divided (by means of a median split) into high vs. low elaborators. The mean hospital completeness scores of their children are shown in Figure 1. Although 4-year-old children’s recall completeness did not differ depending on how elaborative their parents were, parental elaboration did make a difference at all other ages. That is, 2-, 3- and 5-year olds who had high-elaborative parents produced more complete reports about their hospital experience.

Accuracy of recall. The model for the accuracy of children’s immediate recall of their injury was not significant. However, the model for the accuracy of recall of their hospital treatment was significant, $R^2 = 0.34$, $F(3, 59) = 10.08$, $p < 0.001$. Parental elaboration

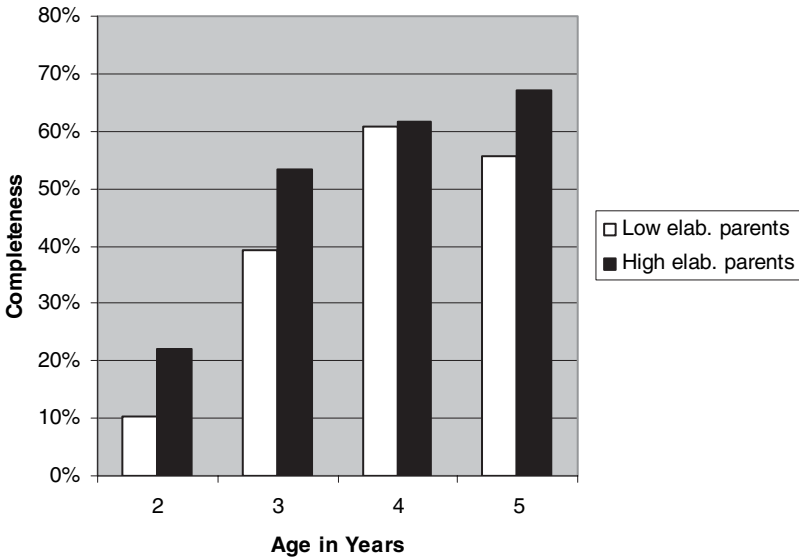


Figure 1. Completeness of hospital recall for children of high vs. low elaborative parents for different age groups (initial interview)

($p < 0.001$) was the most important contributor, followed by age ($p = 0.011$). As well, the age \times elaboration interaction approached significance ($p = 0.075$). Again, a median split is used to divide the parents of children in each age group into high vs. low elaborators, and the interaction is depicted in Figure 2. Elaborative parents seem to especially facilitate the accuracy of the youngest children.

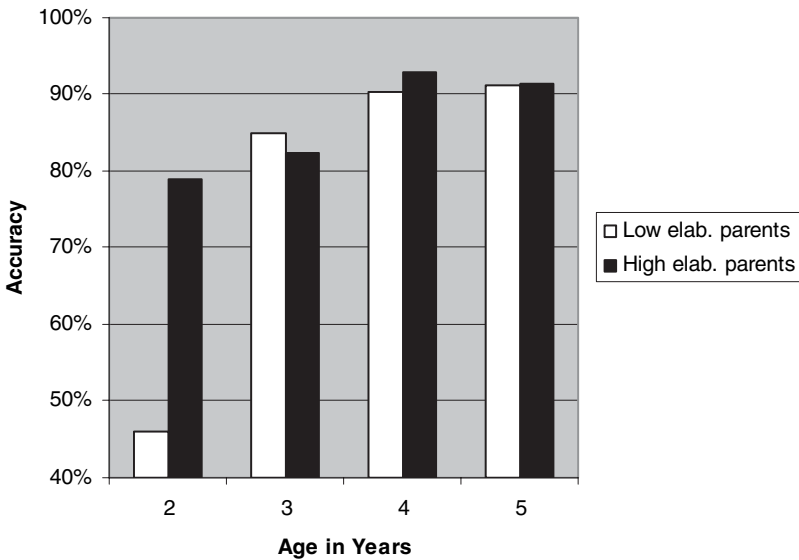


Figure 2. Accuracy of hospital recall for children of high vs. low elaborative parents for different age groups (initial interview)

Table 4. Significant predictors in the hierarchical regression analyses on 2-year interview recall scores

Event	Model	Variable	R^2	R^2 change	β	t	p
Amount of information							
Injury	1	Initial recall	0.384	0.384	0.620	4.60	<0.001
	2	Age	0.438	0.055	0.298	1.79	ns
	3	Elaboration	0.450	0.011	0.114	0.81	ns
	4	Age \times elaboration	0.451	0.001	0.129	0.28	ns
Hospital	1	Initial recall	0.435	0.435	0.659	5.11	<0.001
	2	Age	0.486	0.051	0.265	1.80	ns
	3	Elaboration	0.486	0.000	0.027	0.19	ns
	4	Age \times elaboration	0.491	0.005	0.247	0.56	ns
Completeness							
Injury	1	Initial recall	0.239	0.239	0.489	3.26	0.002
	2	Age	0.276	0.037	0.272	1.29	ns
	3	Elaboration	0.313	0.037	0.218	1.32	ns
	4	Age \times elaboration	0.313	0.000	0.051	0.10	ns
Hospital	1	Initial recall	0.265	0.265	0.515	3.50	0.001
	2	Age	0.341	0.076	0.335	1.95	0.060
	3	Elaboration	0.403	0.062	0.284	1.83	0.077
	4	Age \times elaboration	0.406	0.003	-0.213	-0.39	ns
Accuracy							
Injury	1	Initial recall	0.021	0.021	0.146	0.86	ns
	2	Age	0.048	0.027	0.163	0.96	ns
	3	Elaboration	0.067	0.019	0.149	0.80	ns
	4	Age \times elaboration	0.073	0.006	-0.295	-0.45	ns
Hospital	1	Initial recall	0.269	0.269	0.518	3.54	0.001
	2	Age	0.325	0.056	0.248	1.66	ns
	3	Elaboration	0.344	0.019	0.169	0.98	ns
	4	Age \times elaboration	0.388	0.044	-0.798	-1.48	ns

Note: Initial recall represents the corresponding initial score for the type of regression conducted at the 2-year follow-up. For example, amount of information in initial recall for the injury event was entered as a predictor variable in the regression analysis for the 2-year follow-up for the amount of information about the injury event.

Two-year follow-up interview

Amount of information. For the number of unique units of information provided about the injury, the regression model was significant, $R^2 = 0.38$, $F(1,34) = 21.20$, $p < 0.001$. Children's recall during the initial interview ($p < 0.001$) was the only significant contributor to this model. (See Table 4 for details on the regression analyses on the 2-year follow-up data.) The model for the number of unique units of information provided for the hospital event was also significant, $R^2 = 0.44$, $F(1,34) = 26.17$, $p < 0.001$. Again, only the children's initial recall ($p < 0.001$) contributed significantly to this model.

Completeness of recall. For the injury event, the model was significant, $R^2 = 0.24$, $F(1,34) = 10.66$, $p = 0.002$. Recall during the initial interview was the only significant predictor ($p = 0.002$). For the hospital event, the model was also significant, $R^2 = 0.40$, $F(3,32) = 7.20$, $p < 0.001$. Although the most important predictor was children's initial recall ($p < 0.001$), both age ($p = 0.060$) and parental elaboration ($p = 0.077$) approached significance. To illustrate the role of parental elaboration, the mean completeness scores of children whose parents fell into the high vs. low elaboration ratio groups were 58.7% complete ($SD = 14.0$) vs. 44.7% complete ($SD = 21.1$), respectively. Thus, children of

parents with higher elaboration ratios tended to be more complete in their hospital recall, even 2 years later.

Accuracy of recall. The model for the accuracy of children's 2-year recall of their injury was not significant. However, the model for the accuracy of their hospital recall was significant, $R^2 = 0.27$, $F(1,34) = 12.50$, $p = 0.001$. Only children's prior recall ($p = 0.001$) contributed significantly.

Summary

For the initial interview, as one would expect, age predicted all three measures of recall adequacy about both injury and hospital treatment, with the exception of the accuracy of children's recall about the injury. However, parental elaborative style also played a role for children's recall of the hospital event since it significantly contributed to all three measures of recall for the hospital event. In fact, parental elaboration was the most important predictor for children's accuracy of hospital recall. As well, an age \times elaboration interaction contributed to the completeness and accuracy of children's recall about the hospital event. The interactions showed that elaborative parents especially facilitated the recall accuracy of younger children and completeness for all but 4-year olds. For children's recall 2 years later, the only significant predictor for most measures was children's prior recall on each measure. However, both age and parental elaboration approached significance as additional contributors towards the completeness of children's recall of their hospital treatment, over and above their initial recall scores 2 years previously.

DISCUSSION

This study explored the potential role of parental reminiscing style, that is, how elaborative parent-child conversations were, on children's recall of complex stressful events. We found that parents who had a more elaborative style had children who demonstrated better memory about their hospital treatment. Specifically, during their initial interview these children recalled more unique units of information about the hospital event, and recall of their hospital experience was also more complete and more accurate. Age \times elaboration interactions suggested that having elaborative parents was helpful in terms of recall completeness except for 4-year olds, for whom there was no difference depending upon parental elaboration. In contrast, it was the youngest children who were helped by having elaborative parents when it came to recall accuracy about the hospital event.

Why might a topic-extending, elaborative parental style of reminiscing facilitate children's memory? First, as documented by McCabe and Peterson (1991), such parents more frequently carry on memory conversations in everyday life. In their study, they gave parents tape recorders and asked them to record instances of talk about past events, and some parents frequently engaged in such talk. Other parents, in contrast, claimed that they seldom talked to their children this way, and had difficulty providing recordings because it was so atypical in their parent-child interactions. Snow and Dickinson (1990), in their recordings of dinnertime conversations, also found these differences in propensity to discuss past events. As well, the memory conversations of parents with an elaborative, topic-extending style are more extensive than those of non-elaborative parents (Fivush & Fromhoff, 1988; Haden et al., 1997; Harley & Reese, 1999; McCabe & Peterson; Reese &

Fivush, 1993). These parents ask more questions that require memory responses, and flesh out the details with contributions from their own memory. In other words, children are given more opportunity to rehearse more aspects of the experiences and are reminded about various components of it, and such reinstatement has frequently been shown to assist long-term retention (Peterson & Schneider, 1997). As well, such conversations seem to provide a scaffold that guides children in terms of what sorts of information they should remember and report about an event (Peterson & McCabe, 2004). In the present study, we were unable to assess how frequently parents talked with their children about these target events but we could assess how elaboratively they did so when given a tape recorder and asked to discuss them. And elaborated parent–child memory conversations were related to better child recall of the harder-to-remember hospital event.

Parental elaborative style played little role in children's 2-year recollections over and above the variance accounted for by their previous recall; instead, parental elaborative style may help the child create a more elaborated representation initially, which is reflected by their better recall during their first interview. This more elaborated representation is then better recalled over time. Such an explanation would account for why parental elaborative style is correlated with better recall in both children's initial and 2-year interview, but drops out of the regression analyses at 2 years (with the exception of hospital recall completeness) since the variance related to prior recollection has already been removed.

As hypothesised, parental elaboration was especially related to children's initial recall of their hospital treatment. That is, parental elaboration significantly contributed to all three measures of child memory about the hospital. This is the event for which children have repeatedly been shown to have poorer memory (Peterson, 1999; Peterson & Bell, 1996; Peterson & Whalen, 2001), and probably for a number of reasons. For one thing, in the discussions we had with parents about how much the target experiences had been discussed between their occurrence and our visit, parents said that the child's injury was talked about a lot—to relatives, friends and neighbours in front of the child, as well as with the child. Lessons were drawn about safety and what a child did wrong that led to injury, and what a child might have done differently. In other words, this aspect of the child's experience was frequently rehearsed by everyone, and an elaborative style may have had little added value. Or, it could be that when an event has been discussed with many different partners, the role of any one person's style in children's memory is dampened. In contrast, there was much less talk about the details of what happened in the hospital. Other reasons for children's poorer memory for the hospital event have been proposed (Peterson; Peterson & Bell): it may be that the hospital event is seen by children as less coherently organised in terms of causal and temporal linkages among components, or the injury events were more unique because the children often visited the same emergency room for a host of other medical reasons. And it may be the case that elaborative discussion matters more when children's recall is limited or the organisation of the event is less coherent.

Of course, given the correlational nature of this research, we cannot establish causal relations between parental elaborative style and children's recall. It is just as plausible to argue that children who recall more information elicit a more elaborative style from their parents during the initial interview. However, there are at least two reasons to argue that the relation is from parental style to child recall rather than the reverse. First, previous longitudinal research which has controlled for parental reminiscing style and child recall at multiple points across the preschool years has shown that earlier parental reminiscing style uniquely predicts concurrent and subsequent child recall, but that child recall does not uniquely predict either parental reminiscing style or subsequent child recall (Harley & Reese,

1999; Reese et al., 1993). Moreover, it has been shown that teaching parents to engage in elaborative conversations with their children changes how those children talk about events when questioned about them later (Boland et al., 2003; Peterson, Jesso, & McCabe, 1999); children of parents who have been taught techniques of elaborative reminiscing style later provide more information in memory conversations. Together, these lines of research converge on the conclusion that it is parental reminiscing style that influences child recall, rather than child recall eliciting parental reminiscing style. Thus, we argue that our findings in this study suggest that parental reminiscing style helps children to form a more elaborated and coherent representation of the stressful events initially, and it is this more elaborated and coherent representation that allows for more enduring recall over time.

There are a number of limitations to this study. We acknowledge that the standard controls that exist in laboratory research are not present here in that each child experienced an event that differed in some specifics from those experienced by other children, and thus we have to rely on the accounts of adult eyewitnesses about what happened. Furthermore, these events are so highly salient and fraught with emotion that they were undoubtedly discussed by the families a number of times after they occurred. On the other hand, the child's degree of emotional distress was higher than one can subject children to in most controlled laboratory settings (with the exception of studies involving the VCUG diagnostic test). In future research, it would be informative to know more about parent-child talk vis-à-vis stressful events, both in terms of how frequently as well as how elaboratively the target events are talked about in everyday interactions.

In summary, an elaborative parental style seemed to help children's recall of a highly salient and stressful event. It has already been shown to help children recall more of the details of everyday sorts of experiences (Boland et al., 2003; Haden et al., 2001; Leichtman et al., 2000; Low & Durkin, 2001), and the present study suggests that parental reminiscing style may also help children recall highly stressful and personally salient events. This may be particularly true for experiences that are more challenging to remember. In short, elaborative parent-child conversations may facilitate children's memory for a range of types of events.

ACKNOWLEDGEMENTS

Preparation of this article was primarily supported by Grant 513-02 from the Natural Sciences and Engineering Research Council of Canada to C. Peterson. Additional funding came from the Memorial University Undergraduate Career Experience Program, the Student Work and Service Program, Summer Career Placement Program and the Summer NSERC Undergraduate Fellowship program. We extend our thanks to the Janeway Hospital and their Emergency Room staff, and to all the recruiters, interviewers, transcribers and data analysers who participated. And most of all we thank the parents and children who allowed us into their homes and cooperated so helpfully.

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APPENDIX
PROTOTYPE OF INJURY AND HOSPITAL TREATMENT WITH EXAMPLES OF ITEMS

Item	Questions	Example
The injury	When did it happen? What time of day?	'Right after lunch'
Time of day	Where were you?	'In my backyard'
Place	Who was with you? Who else was around?	'Mom and my brother Joe'
Other people	What were you doing right before you got hurt?	'I was running'
Actions prior to injury	What happened when you got hurt?	'I got a big cut on my leg'
The injury	How did it happen?	'I was tripped'
How it occurred	Who did it/pushed you/etc.?	'By my brother'
A causal person?	What things were there/made the cut/etc.	'I hit a piece of the porch that was sticking up'
Objects involved	Did you cry? How much?	'I had to just scream'
Cry	Was there blood? How much?	'It was bleeding all down my leg'
Blood	Who was the first person who came to help you?	'Mommy heard me cry'
Who first responded	Where did you go before you went to the hospital?	'She took me into the kitchen'
Where went before hospital	Did they do anything to help your cut/broken arm/etc.?	'She wiped my knee'
Actions to treat injury	What did they use to help you?	'And put a cloth on my knee to soak up blood'
Objects of home treatment	Was anyone else there? Looking? Helping? Who?	'My brother was watching'
Bystanders, other helpers	Where did you go to get help from a doctor?	'Then I went to the hospital'
Went to hospital	Who took you to the hospital?	'Mom drove me there'
Person taking to hospital	Who else went along?	'My brother had to come too'
Other people along	When did you go there? What time of day?	'We got to the hospital half an hour later'
Time of hospital trip	The hospital treatment	'A nurse checked me in'
Registration	What was the first thing you did when you got to the hospital?	'I got my blood pressure taken'
Vitals measured	How long did you have to wait?	'I had to wait a long time'
Waiting period	What did you do while waiting?	'I watched the TV'
Actions while waiting	When you saw the doctor, what did he/she do?	'Finally somebody looked at my cut'
Initial exam		

Hospital personnel	Was the doctor a boy or girl? Any other doctors/nurses?	'It was a girl doctor'
X-rays	Did you get an X-ray?	'I got X-rays cuz they thought it was still in my knee'
Cast	(Did you get a cast?)	(not relevant)
Needles	Did you get needles? How many?	'I got four needles to put my knee asleep'
Stitches	Did you get stitches? How many?	'And then I got 14 stitches'
Bandage	Did you get a bandage? Where?	'I got a big bandage all down my leg'
Procedural details	What else did the doctor do?	'The doctor washed out my cut first'
Other treatment objects	What else did the doctor use to help you?	'With soap'
Cry	Did you cry? How much?	'That made me cry'
Popsicle	What kind of treat did you get when you were leaving?	'The nurse gave me a yellowpopsicle'
Family in treatment room	Who was with you when you were seeing the doctor?	'My Mom was in there with me'