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Do Early Interviews Affect Children's Long-Term Event Recall?

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SUMMARY

The present study examined the effects of the timing of an initial interview on children's recall of an event over delays of 1 and 2 years. Fifty-five children who had originally participated in a novel event when they were between 5- and 6-years old and had been interviewed about it following either short (1 week or less) or long (1 or 6 month) delays were re-interviewed 1 and 2 years after the original experience. An additional 20 children not interviewed prior to the 1-year interview were included as a no-prior-interview control group. Long delays to the initial interview led to better open-ended recall at the 1-year delay than short delays to initial interview or no prior interview. However, initial interviews that followed short delays had a greater impact on children's responses to specific questions. The results suggest that prior interview history is an important consideration when examining the effects of long delays on children's event reports, and that the effects of the timing of an initial interview depend on the nature of the information recalled. Copyright © 2004 John Wiley & Sons, Ltd.

Research on children's event memory has, traditionally, been concerned with children's reports following relatively short delays, such as days or weeks (Fivush & Hamond, 1990; Fivush, Hamond, Harsch, Singer, & Wolf, 1991; Flin, Boon, Knox, & Bull, 1992; Goodman & Reed, 1986; Ornstein, Gordon, & Larus, 1992; Pipe & Wilson, 1994; Poole & White, 1991; Rudy & Goodman, 1991). Recently, however, attention has turned to questions about what happens to children's memories of events over much longer delays (Fivush & Schwarzmueller, 1998; Gross & Hayne, 1999; Hudson & Fivush, 1991; Pipe, Gee, Wilson, & Egerton, 1999; Peterson, Moores, & White, 2001; Poole & White, 1993; Priestley, Roberts, & Pipe, 1999; Salmon & Pipe, 2000). For example, in one of the earliest such studies, Hudson and Fivush (1991) examined children's memory for a museum visit immediately, 6 weeks, 1 year and 6 years after the visit. Children were able to provide accurate details about the visit even after the 6-year delay, although they required very specific cues to do so. On the other hand, Peterson and colleagues have recently reported

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that children's recall of a highly salient event, an accidental injury and subsequent medical treatment, underwent very little change over periods of 2 years (Peterson, 1999) and even 5 years (Peterson & Whalen, 2001).

Research of this nature is increasingly important as it is often used to draw conclusions about the ability of children to provide reliable testimony in legal contexts. In such real life contexts, children are rarely interviewed immediately after witnessing or experiencing an event. Indeed, the delay between a child's experience and a formal interview about it may be as long as several months or years (Flin, 1993; Goodman et al., 1992; B. Lash, unpublished work, 1995). Furthermore, children may be interviewed several times before they are actually required to provide testimony in court (Ceci & Bruck, 1993). How do children's accounts of past experiences change over these very long delays and how are these changes influenced by interview history? The present study addresses these questions and examines, specifically, how the timing of interviews influences children's subsequent event reports.

POSITIVE EFFECTS OF REPEATED INTERVIEWING

At least two theoretical perspectives lead to the prediction of positive effects of repeated interviewing on long-term memory although they differ with regard to the optimal timing of an initial interview in enhancing subsequent recall. According to a consolidation account, an initial interview occurring soon after the event will be more effective in maintaining children's long-term recall than one occurring following a delay (Brainerd & Ornstein, 1991). The initial interview may constitute a partial re-exposure to, or reinstatement of, the original event (Brainerd & Ornstein, 1991; F. Walkenfeld & K. A. Nelson, Poster presented at the meeting of the Society for Research in Child Development, Indianapolis, IN, 1995), thereby maintaining the accessibility of the original memory for subsequent retrieval attempts (Hoving & Choi, 1972; Hoving, Coates, Bertucci, & Riccio, 1972; Howe, Courage, & Bryant-Brown, 1993; Rovee-Collier & Shyi, 1992; Spear, 1978).

Consistent with the view that an initial interview will have a consolidating effect, several studies have reported positive effects of an early initial interview occurring within several days or a week on subsequent recall (e.g. Baker-Ward, Hess, & Flannagan, 1990; Dent & Stephenson, 1979; Fivush & Hamond, 1989; Goodman, Bottoms, Schwartz-Kenney, & Rudy, 1991; Martin & Thomson, 1994; Powell & Thomson, 1997; Tucker, Mertin, & Luszcz, 1990; F. Walkenfeld & K. A. Nelson, Poster presented at the meeting of the Society for Research in Child Development, Indianapolis, IN, 1995; see Fivush & Schwarzmueller, 1995 for review). For example, Tucker et al. (1990) found that 5- and 6-year-old children who were initially interviewed 1 day after a vaccination procedure reported more information at a subsequent 1-week interview than children who were interviewed for the first time after the 1-week delay. Baker-Ward et al. (1990) found that 5- to 8-year-old children who were interviewed about an experience every week for 3 weeks not only reported more information than children interviewed for the first time after 3 weeks, but the level of retention exhibited at the first interview was maintained throughout the 3-week retention interval.

On the other hand, a reactivation account predicts that an initial interview will be maximally effective when it occurs after a long delay, when retrieval is more effortful (e.g. Craik & Lockhart, 1972; Hayne & Rovee-Collier, 1995; Hudson & Sheffield, 1998; Modigliani, 1976). According to Rovee-Collier's time window construct, retrieval of an

event late in the time window of forgetting has a greater facilitative effect on retention than retrieval of an event early in the time window (Hayne, 1990; Rovee-Collier, 1995; Rovee-Collier, Greco-Vigorito, & Hayne, 1993). The hypothesized mechanism here is that a delayed recall attempt reactivates the forgotten or weakened memory, increasing the accessibility for subsequent reporting.

In addition to numerous studies with infants (for review, see Rovee-Collier, 1995), studies with young children provide some support for the prediction that delayed recall opportunities can have powerful effects on subsequent recall of an event. Powell and Thomson (1997) found that when children were interviewed 3 months after an event, children who had previously been interviewed 6 weeks after the event recalled more in both free recall and prompted recall than children who had previously been interviewed 1 week after the event; the difference was not, however, statistically significant. Interestingly, there was a trend for children initially interviewed at the 6-week delay to recall *more* information at the 3-month interview than they had earlier, consistent with hypermnesia, whereas children initially interviewed 1 week after the event recalled *less* information at the second interview, suggesting forgetting. Hudson and Sheffield (1998) similarly demonstrated the facilitative effect of a delayed initial interview on subsequent recall of an event. Children tested 8 weeks after taking part in an event performed more poorly than children tested immediately or 2 weeks after the event, consistent with forgetting over the 8-week period. However, when all children were tested again 16 weeks after the event, the children who had previously been tested at 8 weeks now exhibited greater recall than the children initially tested after the shorter delay. Furthermore, superior recall endured when all of the children were tested 6 months later. Hudson and Sheffield's findings provide support for the notion that delayed recall attempts, although initially more difficult, are more beneficial for subsequent memory performance than are earlier recall attempts.

Although the two theoretical positions, consolidation and reactivation of memories, respectively, make different predictions concerning early versus late recall attempts on subsequent memory, they are not necessarily mutually exclusive. It is possible, for example, that some aspects of memory may be consolidated following an early interview, whereas the same or other aspects of memory may be reactivated following a long delay. Indeed, research by Rovee-Collier (Adler, Wilk, & Rovee-Collier, 2000; Galluccio & Rovee-Collier, 1999) has shown that reminding infants of a training experience prior to a long-term retention test will have both qualitatively and quantitatively different outcomes for memory depending on the timing and the type of reminder.

NEGATIVE EFFECTS OF REPEATED INTERVIEWING

In addition to the positive effects of repeated interviews on children's event recall, several studies have also reported negative effects of repeated interviews. Ceci, Huffman, Smith, and Loftus (1994), for example, repeatedly interviewed children about a series of events once a week for a 12-week period. Simply asking children repeatedly to think about an event that never occurred increased the likelihood that the children would report that event as though it really had happened. In the Ceci et al. study, no overtly misleading information was presented to the children: they were simply asked to think about the events. It is even more likely that children will provide inaccurate reports following repeated presentation of misleading information at long delays. Consistent with this, Bruck, Ceci, Francoeur, and Barr (1995) exposed a group of children to false information

about a physical examination experience, in a series of three interviews, 1 year after the examination. Children who had not been provided with misleading information provided highly accurate accounts of the examination. Those children who had been repeatedly exposed to the misleading information were not only more likely to report that information during the final interview, but were also more likely to go beyond the suggestions, providing inaccurate information about additional activities that had not been suggested during the suggestive interviews. Similarly, Leichtman and Ceci (1995) found that repeated suggestive interviews about an event that occurred at a children's daycare centre caused children to erroneously report misdeeds that had not actually occurred.

With regard to the effects of the timing of misleading information on children's memory reports, the results of prior research are inconsistent. Some studies suggest that when misleading information is presented soon after the event, the two sources of information are more easily confused (Lindsay, 1990; Lindsay, Gonzales, & Eso, 1995). On the other hand, other researchers have argued that misleading information will have a greater effect on memory reports if it is delayed until the original memory has weakened (Loftus, Miller, & Burns, 1978; Newcombe & Siegal, 1997). Finally, some studies have found that the timing of the misleading information had little effect on children's memory reports (Roberts, Lamb, & Sternberg, 1999; Sutherland & Hayne, 2001).

THE PRESENT STUDY

In sum, there are strong theoretical reasons, together with supportive evidence to expect that a child's interview history, including the timing of the prior interviews, will influence their subsequent event memory, perhaps both positively and negatively. In the present study, we examined the effects of the timing of an initial interview on children's subsequent long-term event recall. The initial interviews had been conducted after relatively short delays (i.e. 1 week or less) or after long delays (i.e. 1 or 6 months) as part of an earlier study (Jones & Pipe, 2002) and children were subsequently re-interviewed 1 and 2 years after they had originally experienced the event. In this study, we were therefore able to address questions concerning the effects of interview history on children's accounts over delays comparable to some of the longer (and not atypical) delays over which children are interviewed in the real world. It is possible, for example, that effects observed within shorter time frames of weeks or months dissipate (in the case of consolidation) or are enhanced (in the case of reactivation effects) over these much longer delays. Children's free recall accounts, and responses to specific open-ended and closed questions allowed us to address questions concerning both potential positive benefits on amount recalled, as well as negative effects on accuracy, in particular, and responses to misleading questions.

OVERVIEW

Participants in the present study included 62 children who had participated in a prior study (Jones & Pipe, 2002) and 20 additional children. Children who had participated in the prior study (Jones & Pipe, 2002) were 5 and 6 years of age when they participated in a novel, structured event, 'Visiting the Pirate' and were interviewed about the event either immediately or following a delay of 1 day, 1 week, 1 month, or 6 months (Jones & Pipe,

2002). Jones and Pipe found a statistically significant decrease in the amount of correct information recalled at the 6-month delay compared to earlier interviews, with forgetting functions suggesting that changes occurred most rapidly soon after the event. In the present study, the children were re-interviewed 1 and 2 years after the original event, and the present study focuses on their delayed recall. In particular, we were interested in the influence of an interview occurring soon after the experience (within 1 week) or following longer delays (1 or 6 months) on children's subsequent long-term recall.[1] We also included a group of children who had not previously been interviewed, that is, did not take part in the previous study. These children participated in the event but were interviewed for the first time at the 1-year interview and served as a no-prior-interview control for the purposes of the present study. Thus, children interviewed at the 1-year delay had previously been interviewed either soon after the event, following a delay, or not at all.

All of the children were re-interviewed following a further 1-year delay, that is, 2 years after the event. For children in the control group, this was a second interview, and for all other children, a third interview.

METHOD

Participants

Of the 66 5- to 7-year-old children who participated in the original study (Jones & Pipe, 2002), 62 children (22 boys, 40 girls) were available to be re-interviewed at the 1-year interview (mean age = 7 years, 2 months) and 55 children (21 boys, 34 girls) were available to be re-interviewed at the 2-year interview (mean age = 8 years, 2 months).[2] These children had originally been assigned to one of five initial interview groups: immediate, 1 day, 1 week, 1 month, or 6 months (Jones & Pipe, 2002). In order to increase statistical power at the long delays, we collapsed the five initial interview conditions into two groups as follows. The short-delay-to-initial-interview group comprised children who had initially been interviewed immediately, 1 day, or 1 week after the event (n at 1-year interview = 39; n at 2-year interview = 35). The long-delay-to-initial-interview group comprised children who had previously been interviewed either 1 month or 6 months after the event (1 year: $n = 23$; 2 years: $n = 20$). A third group of 20 children who had not previously been interviewed (i.e. prior to the 1-year delay interview) comprised the no-initial-interview control group. These children were interviewed for the first time after a 1-year delay (10 boys, 10 girls; mean age = 7 years, 3 months). Of these, 15 were available to be re-interviewed at the 2-year delay (eight boys, seven girls; mean age = 8 years, 1 month).

Procedure

Children's prior experience

The event in which children originally participated took place at the child's school, during school time. The event, 'Visiting the Pirate', comprised four scenes, each with a subgoal:

[1]In combining the 1-month and 6-month delays we take a conservative approach to the effects of short vs long delays on children's subsequent recall. When we compared correct information recalled for the 6-month delay to (i) all other delays combined and (ii) delays of 1 week or less, the pattern of results remained the same.

[2]Four children at the 1-year delay and seven children at the 2-year delay were unavailable for interviewing (they had either left the area or did not give consent).

becoming a real pirate, making a pirate map, winning a key, and finding the treasure (see Jones & Pipe, 2002, for a detailed description). Each scene comprised five actions (e.g. hoisting a sail, feeding a parrot). All children had been individually interviewed about their experience with the pirate.

The present study

For the present study, children were individually re-interviewed in exactly the same format as in the original (Jones & Pipe, 2002) study; namely, free recall followed by prompted recall, and a series of neutral, leading, and misleading questions. The interview began with a free recall phase, during which children were invited to tell the interviewer about when they went to visit the pirate. The interviewer began, 'I heard that a long time ago, you went to visit the pirate here at school. Tell me all about what happened when you visited the pirate.' Only general prompts were given to encourage the child to continue (e.g. 'Tell me more', 'What else happened?'). When the child could provide no further information, the interviewer proceeded to the prompted recall phase of the interview. In the prompted recall phase, the child was given four specific prompts, each corresponding to the scenes in the event, for example, 'I heard that the first thing you had to do was become a real pirate. What things did you have to do for that?'

In the final phase of the interview, all children were asked a set of 15 questions, three of which were open-ended questions, were the same for each child, and pertained to the 'who', 'where', and 'when' details of the event. The remaining 12 questions related to specific details (see Appendix A for examples). Four of the questions, referred to as *neutral* questions, were cued recall questions and the child was required to generate a response (e.g. 'What color were the pirate's trousers?'); four of the questions were *leading* recognition questions, for which *yes* was the correct response (e.g. 'Was the pirate wearing blue and white trousers?'); and four of the questions were *misleading* recognition questions, for which *no* was the correct response (e.g. 'Was the pirate wearing red and white trousers?'). Each of the 12 cued-recall questions was posed in a neutral, leading, or misleading form equally often, resulting in six different combinations of recall questions. Children were asked the same version of the recall questions as they had been asked in the initial interview (Jones & Pipe, 2002). At the conclusion of the interview, the interviewer thanked the child and returned him/her to class.

Coding

Interviews were transcribed verbatim from audiotape, and transcripts were coded for correct information (actions and objects) and incorrect information (distortions and intrusions). Children were given credit for correctly describing an action or an object (e.g. 'I *pulled up* the *sail*' would be coded as one correct action 'pulled up' and one correct object 'sail'). A distortion was coded if a child described an identifiable action or object incorrectly (e.g. 'I put up the *flag*' would be coded as one correct action 'put up' and one distorted object 'flag'). Intrusions were coded if a child described an action that did not occur or an object that was not present during the pirate event (e.g. 'we drove the ship to the treasure' or 'he had a parrot on his shoulder'). These errors were combined to provide a measure of total incorrect information.

Finally, children's responses to the neutral, leading, and misleading questions were coded as correct, incorrect, or 'don't know'. For the purposes of this study (and consistent with Jones & Pipe, 2002), 'don't know' responses were not included as correct responses.

Two independent raters coded one-third of the transcripts obtained at each delay. Interrater reliability, scored by [agreements/(agreements + disagreements)], for the 1-year interview was 89% (free recall + prompted recall) and 99% (questions) and for the 2-year interview, 84% (free recall + prompted recall) and 94% (questions). Codes assigned by the primary rater were used for subsequent data analysis.

RESULTS

Although the focus of the present study is the effect of interview history on children's recall and responses to specific questions when interviewed 1 year and 2 years after the event, for descriptive purposes Figure 1 shows children's recall at each initial-interview delay (from Jones & Pipe, 2002). It includes the no-initial-interview control children, who were interviewed for the first time 1 year after they experienced the event for the present study. This group can reasonably be considered an extension of the Jones and Pipe (2002) forgetting function—a 1 year delay-to-initial-interview group. Indeed, recall exhibited by children in that group is consistent with the original forgetting function. Thus, the closed symbols in Figure 1 show a forgetting function for recall over a 1-year delay, when children had not had a prior interview. As described in Jones and Pipe (2002), the decrease in amount recalled is most rapid over shorter delays. The open symbols in Figure 1 show the amount of information recalled in the second interview. For children initially interviewed prior to 1 year (short and long delay to initial interview groups) the repeated interview was 1 year after the event; for children initially interviewed 1 year after the event (the control group), the repeated interview was 2 years after the event. In general, the

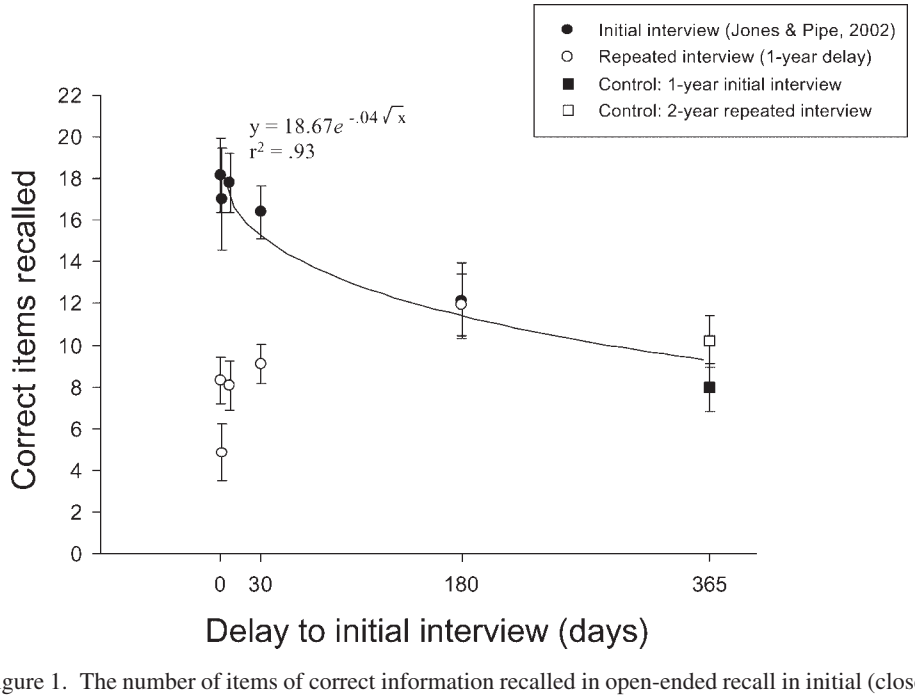

Figure 1. The number of items of correct information recalled in open-ended recall in initial (closed symbols) and repeated (open symbols) interviews, as a function of delay to initial interview

pattern of results at the 1-year follow-up interviews is the inverse of that for initial interviews.

At the 1-year delay the control group had not had a prior interview and was an appropriate 'no-prior interview' control, whereas at the 2-year delay all children had had either one or two prior interviews. For the purposes of analysis, therefore, we compared the amount of correct information and the number of errors recalled by the short-delay-to-initial interview, long-delay-to-initial interview and control groups, separately for the 1- and 2-year delays, respectively.

Correct information in open-ended recall

The amount of information reported correctly in open-ended recall (free and cued recall combined) when children were interviewed 1 year and 2 years after the event is shown in Figure 2. A one-way analysis of variance (ANOVA) indicated a significant effect of initial interview group on the amount of correct information that the children reported *at the 1-year delay*, $F(2, 79) = 4.32$, $p < 0.05$, the effect size was medium to large, $f = 0.32$ (Cohen, 1988). Post-hoc Student-Newman-Keuls (SNK) tests revealed that children reported more correct information when the initial interview occurred after a long delay ($M = 10.70$, $SE = 0.95$) than after a short delay ($M = 7.08$, $SE = 0.74$) or when there had been no initial

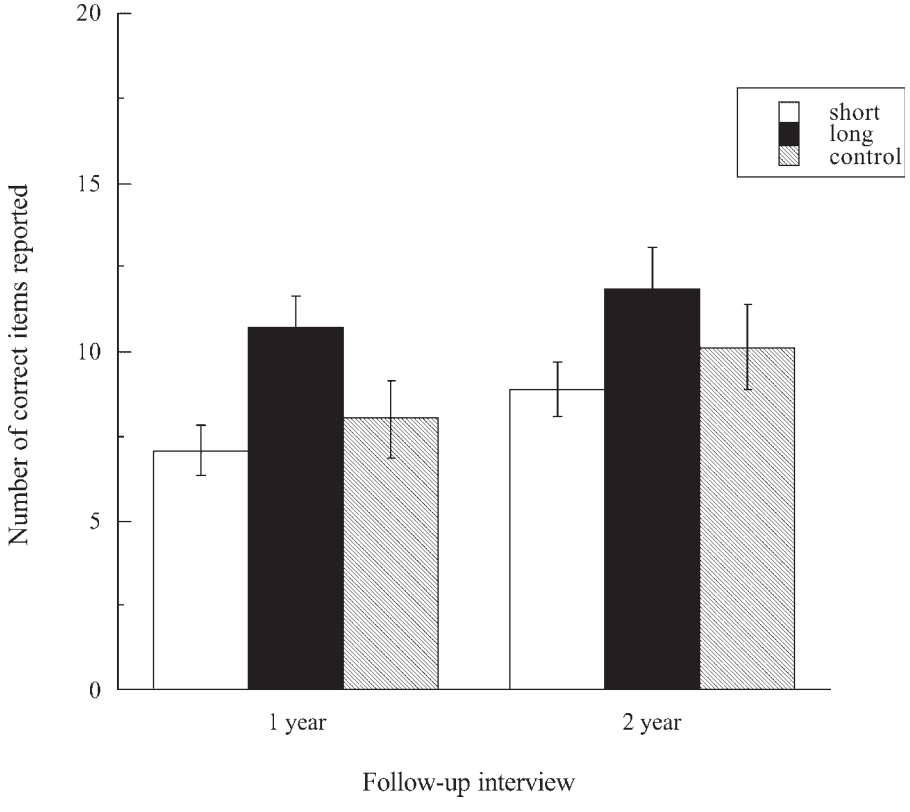

Figure 2. The amount of correct information reported by the short- (open bars) and long- (solid bars) delay-to-initial interview groups and the no-initial-interview group (striped bars) at the 1- and 2-year follow-up interviews

Table 1. Mean numbers of errors (*SD*) at the 1- and 2-year delays for each initial interview group

	Interview delay		
Initial interview condition	Initial[†]	1 Year	2 Year
Short	1.48 (1.25)	3.15 (2.60)	5.06 (5.57)
Long	2.14 (1.94)	2.39 (1.88)	3.10 (2.53)
Control	—	1.95 (2.09)	1.33 (0.98)

[†]From Jones & Pipe, 2002.

interview ($M = 8.00$, $SE = 1.14$). The short-delay-to-initial interview group and control group did not differ significantly. *At the 2-year delay*, children in the control group had had one prior interview (at the 1-year delay) and children in the short- and long-delay-to initial interview groups had each had two prior interviews. The effect of initial interview group was no longer significant, $F(2, 67) = 2.38$, $p > 0.05$, although as Figure 2 shows, the pattern of results was similar to that at the 1-year delay and the effect size was medium, $f = 0.26$.

Errors in open-ended recall

The numbers of errors (distortions and intrusions combined) that children reported when interviewed after *a 1-year delay* are presented in Table 1. The effect of initial interview group was not significant for errors. *At the 2-year delay*, there was a significant effect of initial interview group for errors, $F(2, 67) = 4.39$, $p < 0.05$, $f = 0.35$, (Cohen, 1988). Post-hoc SNK tests showed that children initially interviewed after a short delay reported a significantly greater number of errors ($M = 5.06$, $SE = 0.94$) than children in the no-initial-interview control group ($M = 1.33$, $SE = 0.25$). The number of errors reported in the long-delay-to-initial interview group was intermediate between the two (see Table 1).

To summarize the open-ended recall results, an initial interview occurring after a long delay appeared to have a beneficial effect on children's long-term recall. Children who were initially interviewed following a long delay (1 month and 6 months) reported more information in open-ended recall when interviewed 1 year after the event than those initially interviewed following a short delay or not previously interviewed at all. At the 2-year delay, when all children had now had at least one prior interview, the pattern of results was the same, although the difference in correct recall was not statistically significant. At the 2-year delay, children who had initially been interviewed following a short delay, and then again at the 1-year delay, made significantly more errors than children in the control condition.

Correct responses to specific questions

Responses to the 'who, what and where' questions did not differ as a function of initial interview group at the 1-year delay ($M = 1.64$, $SE = 0.14$; $M = 1.78$, $SE = 0.20$; $M = 2.10$, $SE = 0.20$, for the short, long and control conditions, respectively). At the 2-year delay there was a main effect of initial interview group, $F(2, 65) = 6.88$, $p < 0.05$. Post-hoc SNK tests showed that the control group answered the most questions correctly ($M = 2.18$, $SE = 0.22$), compared to the short ($M = 1.20$, $SE = 0.13$) and long delay groups ($M = 1.20$, $SE = 0.18$) which did not differ. The numbers of correct responses that children made at

the 1- and 2-year follow-up interviews in response to the neutral, leading, and misleading questions are presented in Figure 3.

1-year delay

A 3 (question type) × 3 (initial interview) multivariate analysis of variance (MANOVA) revealed that the number of correct responses to specific questions varied as a function of question type, $F(2, 78) = 21.98$, $p < 0.001$. Paired *t*-tests indicated that children provided a greater number of correct responses to leading questions than to neutral, $t(81) = 6.51$, $p < 0.001$, or misleading questions, $t(81) = 5.47$, $p < 0.001$, which did not differ from each other (see Figure 3). There was also a significant effect of initial interview group, $F(2, 79) = 16.43$, $p < 0.001$. Post-hoc Tukey HSD (Honestly Significant Difference) tests ($p < 0.05$) revealed that children were more likely to provide a correct response when their initial interview occurred after a short delay ($M = 8.00$, $SE = 0.25$) compared to those whose initial interview occurred after a long delay ($M = 6.57$, $SE = 0.34$) and those who did not have an initial interview ($M = 5.60$, $SE = 0.35$; (Tukey = 0.44 and 1.36, respectively), which in turn did not differ from each other. The Question Type X Initial Interview interaction was not significant.

2-year Delay

As at the 1-year delay, the number of correct responses varied as a function of question type, $F(2, 66) = 93.53$, $p < 0.001$. Children provided more correct responses to leading questions than to neutral, $t(69) = 10.77$, $p < 0.001$, or misleading questions, $t(69) = 12.24$, $p < 0.001$. Children also provided significantly more correct responses to neutral than to misleading questions, $t(69) = 10.77$, $p < 0.05$ (see Figure 3). There was, however, no effect of initial interview group and no Question Type X Initial Interview interaction.

Incorrect responses to specific questions

Overall, the number of omission errors that children reported in response to the specific questions was very low (see Table 2). The pattern of commission errors suggested an inverse pattern to that for correct recall, that is, children made fewer errors of commission when they were asked leading questions, and they made more errors of commission when asked misleading questions, compared to neutral or leading questions, and when asked neutral rather than leading questions (see Table 2). Given the low error rates and that commission errors were essentially the inverse of correct responses, they were not submitted to analysis.

Table 2. Mean number of commission errors (*SE*) and omission errors (*SE*) in response to specific questions at the 1- and 2-year follow-up interviews

	Error type					
	Commission errors			Omission errors		
Follow-up interview	Neutral	Leading	Misleading	Neutral	Leading	Misleading
1 Year	1.22 (0.11)	0.77 (0.09)	1.59 (0.12)	0.83 (0.09)	0.29 (0.08)	0.28 (0.07)
2 Year	1.46 (0.13)	0.57 (0.09)	2.56 (0.12)	1.00 (0.12)	0.27 (0.07)	0.46 (0.10)

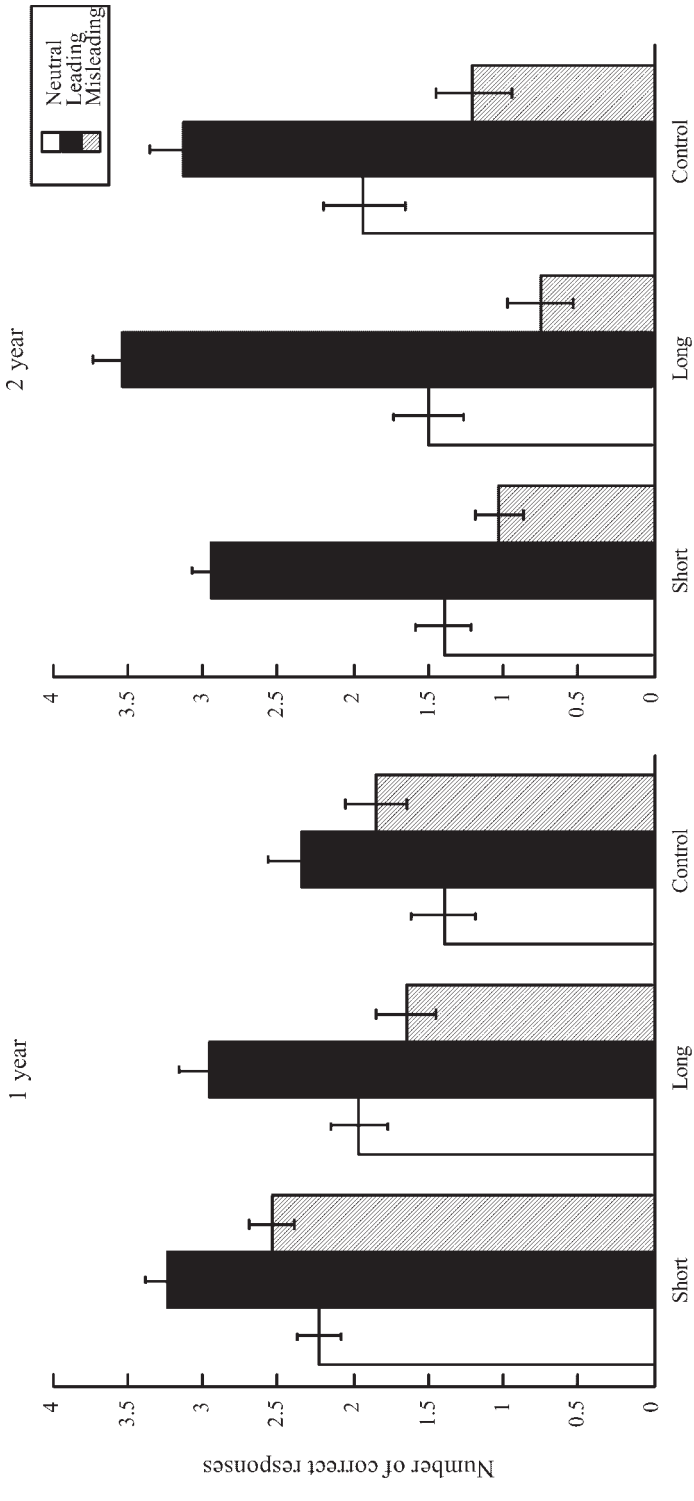

Figure 3. Number of correct responses to specific questions at the 1- and 2-year follow-up interviews

DISCUSSION

The results reported here indicated that an initial interview about an experience can have a positive long-term effect on the amount and accuracy of information that children report in subsequent interviews. However, the effect of the initial interview on subsequent reports depends on the timing of that interview and the memory measures used. Even though there was a decline in the amount of information children reported in initial interviews as a function of increasing delay (Jones & Pipe, 2002), when the children were interviewed 1 year after the event this decrease was not reflected in children's open-ended recall; to the contrary, children initially interviewed following the longer (1 and 6 month) delays recalled more 1 year after the event than did children initially interviewed following the shorter delays of 1 week or less or children not previously interviewed.

These findings for open-ended recall are consistent with an interpretation in terms of memory reactivation being most effective when memories are retrieved after considerable forgetting has occurred (Rovee-Collier, 1995; Rovee-Collier et al., 1993) and with previous findings that an initial interview will have a greater effect when it occurs after a long delay, when retrieval is more effortful (e.g. Craik & Lockhart, 1972; Hudson & Sheffield, 1998; Modigliani, 1976; Rovee-Collier, 1995). Hudson and Sheffield (1998), for example, similarly found that children who initially reenacted an experience after an 8-week delay exhibited superior levels of recall in a subsequent memory test than children who initially reenacted the experience either immediately or after a 2-week delay, despite poorer performance by the 8-week group in the initial reenactment session. More recently, Barr et al. (R. Barr, J. Heravi, & C. Rovee-Collier, paper presented at the meeting of the International Society for Developmental Psychobiology, New Orleans, LA, 2000) showed that repeated testing extended 6-month-old infants' retention of a puppet sequence beyond that which would normally be expected, and that this effect was stronger when the first test occurred after a delay than when it occurred soon after the original demonstration of the sequence. The present studies confirm the trends found by Powell and Thomson (1997) for verbal recall by older children and extend them to considerably longer delays (1 and 2 years) than in previous studies.

The findings reported here are also consistent with studies showing enhanced recall following a brief reminder prior to a delayed interview. For example, Priestley et al. (1999) found that simply taking children back into the context in which an event occurred, where they could see the items and objects that had been used in the event, enhanced their recall when they were interviewed the following day. Presumably, the reminder reactivated the memory making it more accessible for recall the following day. The present results suggest that a retrieval attempt may similarly be successful in enhancing recall over very long delays, consistent with eyewitness studies with adults indicating that repeated recall attempts may lead to hypermnesia, with improved recall over time reflecting greater memory accessibility (e.g. Bluck, Levine, & Laulehre, 1999; Bornstien, Liebel, & Scarberry, 1998; Dunning & Stern, 1992; Scrivner & Safer, 1988; see also Powell & Thomson, 1997).

Although children's open-ended recall provided little support for the consolidation of memory by an early initial interview, children's responses to specific questions were consistent with consolidation-like effects. According to consolidation accounts (e.g. Brainerd & Ornstein, 1991; Fivush & Schwarzmueller, 1995; Tucker et al., 1990; F. Walkenfeld & K. A. Nelson, Poster presented at the meeting of the Society for Research in Child Development, Indianapolis, IN, 1995) early initial interviews maintain memories in an active state, inoculating them from the deleterious effects of forgetting. Studies

providing support for consolidation as the result of an early interview have typically been conducted over relatively short time periods, for example, weeks rather than months or years as in the present study. Timing effects are, of course, likely to depend on the time of assessment as well as of the initial interview; specifically, memories that have been consolidated or reactivated may be subsequently forgotten, and the effects of earlier interviews may thus not be observed.

Timing, however, may not be the only important variable that determines whether, or when, consolidation effects occur. In the present study, children were more accurate in response to questions when they had initially been interviewed following the short rather than the long delay or no prior interview. These findings suggest that recognizing (or retrieving) the information in response to the specific questions consolidated details in memory and offered some protection against forgetting.

Why might we observe different effects of the timing of initial interviews for open-ended recall, where long delays were advantageous, and responses to questions, where short delays produced stronger effects? The answer may lie in the distinction between gist and verbatim memories, and their different time courses of forgetting. The specific questions that children were asked were quite difficult when memory for the detailed information targeted by the specific questions was poor, as was the case in the present study (see also Jones & Pipe, 2002). In the initial interviews, for example, for the neutral questions that required children to provide a response, even at the immediate interview, accuracy was only 67% (Jones & Pipe, 2002). To answer the specific questions, the children were required to recall highly specific, or verbatim information about the event. Such information is likely to be forgotten much more rapidly than gist memory (Brainerd & Reyna, 1998). As a result, although this verbatim information may have been available for consolidation and updating over relatively short delays, over much longer delays of months, the information is likely to have been lost from memory. On the other hand, in the open-ended recall and prompted recall phases of the interview, children needed only to recall gist-like information and the time frame for forgetting of this kind of information is typically much longer than that for verbatim details. Gist information is thus likely to remain available for reactivation, perhaps even updating, over very much longer time periods (Reyna & Brainerd, 1995; Brainerd, Reyna, Howe, & Kingma, 1990). Thus, the timing of an initial interview may have different effects on memory, depending on the nature of the information being recalled.

The present findings add to our understanding of the processes affecting children's long-term memory and, to that extent, they are also relevant to practical questions relating to children's testimony or talk about the past more generally. They indicate that conclusions about the fate of long-term memories in laboratory-based studies (e.g. Pipe et al., 1999; Priestley et al., 1999) or naturally occurring painful or traumatic experiences (e.g. Peterson, 1999; Peterson et al., 2001) should be qualified by consideration of the particular interview histories of the participants. For example, Peterson and colleagues (Peterson & Bell, 1996; Peterson & Whalen, 2001) have examined the effects of long delays on children's memory of an injury and hospital treatment, in the context of repeated interviewing. When children were interviewed 6 months after the injury they reported significantly less information than when they were interviewed soon after the injury (Peterson & Bell, 1996). All children were interviewed 2 years and 5 years after the injury, with some children also having an 'intervening interview' at a 1-year delay (Peterson, 1999; Peterson & Whalen, 2001). When children's recall at these very long delays was compared to recall within a week or two of the event, there was little evidence of forgetting

of the injury event in particular. Peterson and Whalen (2001) offer several explanations for their findings of no change in children's reports over such long time periods, such as possible improvements in narrative skill, rehearsal (as a result of repeated interviews), and discussions within the family, leading to more detailed, albeit second hand, information. The present findings indicate that a single retrieval attempt may have an impact on long-term memory and thus provide supportive evidence for interpretations in terms of rehearsal and retrieval effects, effects which are, of course, likely to be magnified when events are discussed and retrieved on repeated occasions as in the hospital visit studies of Peterson and colleagues.

Applications of findings such as these to real world scenarios in which children are interviewed must, of course, be tentative given the differences in the type of events and the conditions under which children are interviewed in controlled studies compared to in the real world. Nonetheless, two practical points are worth noting. First, the current findings do not challenge the common wisdom that in forensic contexts interviews conducted soon after the event in question are clearly the most valuable. However, they do suggest that if children must give an account following a very long delay, their narrative accounts are not likely to be disadvantaged by the absence of a much earlier interview, although recall of specific details may be. Second, these results add to the small but growing body of evidence suggesting that at least following long delays, there may be benefits to repeated interviews, consistent with the phenomenon of hypermnesia that is well established in laboratory studies, and the potential to reactivate 'forgotten memories' under appropriate conditions of retrieval (Erdelyi, 1996). Such benefits must, of course, be weighed against potential disadvantages of repeated interviews. Further systematic research is needed to clarify the conditions relating to the number, timing, and content of interviews, favouring each.

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APPENDIX A: SPECIFIC QUESTIONS

Neutral, leading, and misleading questions asked during the follow-up interviews. Target information in italics; misleading information in parentheses.

Neutral Questions

1. What color were the pirate's trousers?
2. What time of day did you visit the pirate?
3. What was the pirate wearing on the top half of him?
4. What did you use to make the map?
5. When you looked through the telescope, what did you see?
6. What brightly colored objects did you see on the floor?
7. Did you play with musical instruments?
8. Did you do anything to the bird?
9. What did you have to do to find the treasure?
10. Did you do anything with the sail?
11. What was the pirates hair like?
12. What gift did the pirate give you?

Leading (Misleading) Questions

1. Was the pirate wearing *blue and white* trousers? (*red and white*)
2. Did you visit the pirate in the *morning*? (*afternoon*)
3. Was the pirate wearing a *vest*? (*coat*)
4. Did you use dye to make the map? (*paint*)
5. Did you see *pirates* when you looked through the telescope? (*a whale*)
6. Did you see *gold bars* on the floor? (*jewels*)
7. Did you have to *bang the drum*? (*hit the triangle*)
8. Did you feed the bird? (*pat*)
9. Did you have to find the *key before* you found the *treasure*? (*treasure before* the *key*)
10. Did you have to *hoist* the sail? (pull sail down)
11. Did the pirate have *short* hair? (*long*)
12. Was the gift the pirate gave you a *pen*? (*sticker*)

