The Time to Talk: The Influence of the Timing of Adult–Child Talk on Children’s Event Memory

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To investigate the influence of the nature and timing of adult–child talk on event recall, this study engaged 63 three-year-olds and 65 five-year-olds in a staged event and interviewed them 2 weeks later. Children were assigned to 1 of 4 conditions: elaborative pre-, during-, and post-talk, and empty talk (during the event). Children in the elaborative, relative to the empty, talk conditions made fewer errors. Furthermore, post-talk had the greatest influence on correct recall, although for the 5-year-olds, during-talk was also facilitative. Recall was enhanced to a greater extent by the child’s contribution to the talk, relative to that of the adult. The findings contribute to an understanding of the mechanisms by which adult–child conversations influence recall.

How young children and parents discuss events in their lives has a significant impact on the way children represent their experiences in memory (Nelson, 1996; Reese, Haden, & Fivush, 1993). This conclusion is drawn from a prolific body of research on parents’ naturally occurring conversations with their children about events in the past and, to a lesser extent, in the present. Surprisingly, however, we know little about the differential impact on children’s memory of adult–child talk before, during, or after an experience. Yet understanding the influence of the timing of such conversations could clarify the mechanisms underlying their effect on recall. In the current experiment we addressed this limitation in the literature by investigating the impact of adult–child talk before, during, and after a staged event on 3- and 5-year-old children’s recall.

Research investigating the impact of adult–child talk derives largely from the social interaction perspective according to which parent–child discussion has a critical role in organizing children’s personal memories (Fivush, Pipe, Murachver, & Reese, 1997; Nelson, 1993; Reese, 2002). In conversation with their parents, children learn to represent their experiences in an organized narrative form, enabling them to be communicated more readily to others. This permits rehearsal of the memories and enhances the likelihood that they will be maintained in autobiographical memory (Nelson & Fivush, 2000). Thus, the development of autobiographical memory requires the “elaborative construction of remembered events in linguistic form” (Nelson, 1996, p. 172).

Consistent with this position, findings show that parents differ in the way they talk about past events with their young children, and different parental styles are associated with differences in children’s independent recall. High-elaborative parents provide a great deal of narrative structure and conform and extend their child’s contributions to the discussion, whereas low-elaborative parents provide less structure and tend to repeat their own questions. Children of high-elaborative parents recall more information about past events, initially when reminiscing with their parent and thereafter, when independently recounting past experiences (Barley & Reese, 1999; Hudson, 1990a; Peterson, Jeso, & McCabe, 1999; Reese et al., 1993; see Reese, 2002, for review). Moreover, the specific content of adult–child discussion about a past event can influence which aspects are recalled by the child (Cassidy & DeLoache, 1995; Leichtman, Pillmer, Wang, Korbi, & Harn, 2000). For example, Leichtman et al. (2000) found that maternal conversational style predicted the information provided by children during a mother–child interview about a nonserved event; when the children were again interviewed by a researcher, however, the greatest proportion of objects reported had been previously mentioned by the child to the mother. In other words, the mother’s
questioning style and the answers elicited from the child determined the child's recall. That talk during an event influences children's recall was demonstrated by Tessier and Nelson (1994), who found that mother-child conversation during a museum visit influenced the content and completeness of 3-year-old children's memory reports; no child reported any aspect of the visit that had not been jointly discussed. More recently, Haden, Ornstein, Eckerman, and Didow (2001) staged three events in the homes of children aged 30, 36, and 42 months and recorded mother-child conversations as the events took place. Children demonstrated superior recall of the activities discussed by the mother and the child compared with those talked about only by the mother or not discussed. Finally, Bolond, Haden, and Ornstein (2003) instructed mothers in the use of elaborative conversational techniques with their preschoolers during a staged event. Children of trained mothers reported more descriptive details about the event after 1-day and 3-week delays, suggesting a causal relationship between the style of maternal talk and children's recall.

Relatively little research has investigated the influence of adult-child talk before the event on children's recall. It is surprising given that parents talk with their children about upcoming events at least as often as they discuss ongoing experiences and more frequently than they discuss past events (Friedman, 2000; Hudson, 2002; Nelson, 1986). Sutherland, Pipe, Schick, Murray, and Gobbo (2003) found that the recall of 5- to 7-year-old children provided with specific information (discussion with an illustrated book) about an upcoming staged event was superior to that of children who participated in a general discussion about related or unrelated topics. Additionally, naturalistic studies using retrospective parent reports have shown that preparatory discussion about an upcoming medical procedure is positively associated with children's recall (Goodman, Quas, Batterner-Fuence, Riddlesberger, & Kuhn, 1994, 1997). More generally, that prior knowledge of various kinds can markedly influence children's event memory is a well-established finding (e.g., Greenhoot, 2000; Leichtman and Ceci, 1995; Ornstein et al., 1998; but see DeMarie-Drohan, 1991). There is, however, a need to investigate experimentally the influence on children's recall of specific pre-event talk alone—without, for example, visual support provided by pictures or video (e.g., Baker-Ward, Born, & Parrish, 1994; Sutherland et al., 2003).

Overall, these studies show that talk before, during, or after an event can enhance children's recall. What mechanisms might underlie the influence of

adult-child talk, and how might the influence of talk be moderated by talk? At its most straightforward, talk about an event may facilitate the child's verbal encoding and reporting by providing labels for and descriptions of the experience (Fivush et al., 1997). This view is supported by laboratory findings that verbal labels enhance young children's verbal recall (Baker-Ward, Ornstein, & Holden, 1984; Weisberg & Paris, 1986). Furthermore, adult-child talk may help children understand an event by highlighting its causal and temporal structure and by guiding the child's attention to its salient aspects (Boland et al., 2003; Fivush et al., 1997; Nelson, 1996). In this sense, adult discussion serves as a form of exogenous knowledge (Haden et al., 2001) and may bring to encoding and retrieval the advantages provided by an established knowledge base (e.g., Bransford & Johnson, 1972; Chi, 1978; Greenhoot, 2000). To the extent that the verbal labeling of the event and drawing attention to its structure occurs most immediately is the event unfolds, talk at this time may have a particularly beneficial effect on children's understanding and recall. In other words, talk during the event may establish a rich, integrated, and accurate representation that is encoded verbally and can be reported in conversation (Bauer & Weisshaar, 1997; Boland et al., 2003; Fivush et al., 1997; Haden et al., 2001; Tessier & Nelson, 1994).

Nonetheless, a potential advantage of pre- and post-event talk is that both provide the child with two spaced exposures to the experience (the event and the talk); in contrast, talk during the event entails providing all information in one massed exposure. A robust finding in memory research is that performance improves as a function of the spacing between repetitions, a pattern found for infants, children, and adults (Babcock, 2000). Proposed mechanisms underlying the spacing effect include increased opportunities for encoding variable information across different presentations and the longer processing time available when exposure to material is spaced versus massed (Brea and Modigliani, 1987; Rovee-Collier, 1995; Tappino, 2013; see Dempster, 1996, for review). Although two spaced exposures may be advantageous, adult-child talk before and after the event may nonetheless not influence children's recall equally. Talk before an event may be less beneficial to memory because reasoning about the future poses greater cognitive challenges for young children than reasoning about the past, particularly in relation to events for which the child has no generic script (e.g., Friedman, 2000; Hudson, 2002; Hudson, Sons, & Shapiro, 1997). For example, children between 4 and 7 years old can sequence daily activities more
accurately "for the known past compared to the unknown future" (Benson, 1997, p. 68). Additionally, because a greater advantage to the quality of children's event representations is conferred by direct experience rather than by information conveyed vicariously, talk before the experience may result in an impoverished representation that is not well integrated with information from the event (Mur- archer, Pipe, Gordon, & Owens, 1996). In contrast, talk after the event occurs in the context of a relatively strong and organized representation established previously through direct experience. Potentially providing a better basis for the talk to be integrated with the existing memory (e.g., Bellezza, Winkler, & Ančraski, 1973; Young & Bellezza, 1982). Talk after the event may therefore be effective as a means of reinstating and preserving the event memory (Howe, Courage, & Bryant-Brown, 1993). Indeed, according to Nelson (1993, 1996) post-event reinstatement by means of parent—child conversational is the critical process by which personal memories are maintained. These considerations suggest that talk during and after an event will have a greater impact than talk before the event, but that talk after the event will be particularly beneficial to recall. The research reviewed earlier also alluded to the influence on recall of the child's contribution to the conversation, in concert with scaffolding provided by parents (Haden et al., 2001; Leichtman et al., 2000). Findings suggest that children do not simply import parental conversational content into their own accounts but rather shape what they subsequently report. That the child's own contribution may be especially memorable is consistent with findings that self-generated information is better remembered than material that is read or heard (e.g., McNamara & Healy, 1995; Salmeca & Graf, 1978). Furthermore, there may be an interaction between the influence of the child's contribution and the timing of the talk. Specifically, to the extent that post-event talk requires the generation of information from episodic memory, the child's conversational input at this time may be most beneficial to recall. A further aim of our study, therefore, was to investigate the influence on children's recall of their own contribution to the conversation relative to that of their adult partner. In this experiment, we compared the influence on children's recall, of the nature (empty or elaborative) and timing (before, during, or after) of adult—child talk. We used a staged event, and the adult—child talk followed a standard script that determined the extent of discussion, which aspects of the event were discussed, and by whom. In other words, we manipulated the nature and amount of adult—child talk, resulting in a guided discussion between the researcher and the child. Although a high degree of experimental control inevitably sacrificed the richness and complexity of naturally occurring parent—child conversations, our aim was to extend existing research in several ways. In experimentally manipulating the adult and child talk, we were in a stronger position to make causal statements about the influence of talk on children's recall and about the relative influence of the child and adult contributions. More research on the association between talk and children's memory has been correlational (e.g., Hamond & Fivush, 1991; Reese et al., 1995; but see Boland et al., 2003; Peterson et al., 1999) or has examined the relation between talk and memory by seeking parent reports (Baker-Ward et al., 1994; Goodman et al., 1994; Hamond & Fivush, 1991; MacDonald & Hayne, 1996). Moreover, as several earlier investigations have permitted parents and children to select the aspects of the event that are discussed, they have not eliminated the possibility that what is being discussed is more distinctive, and therefore more memorable, than aspects of the event that are not the focus of discussion (e.g., Howe, 1997). To examine these issues, we engaged 3— and 5—year-old children in a novel, staged event—a visit to the pretend zoo—and interviewed them 2 weeks later. Within age groups, the children were assigned to one of four conditions. One condition involved empty talk, in which the event was accompanied by general, noninformative language (following Pipe, 1996). In contrast to the limited information conveyed in empty talk, the other three conditions involved elaborative talk, in which the experimenter narrated all aspects of the event by describing and labeling the objects, actions, and goals. The timing of elaborative talk was varied in relation to the event. Specifically, talk was experienced either before (pre-talk), during (during-talk), or after (post-talk) the event. Additionally, for predetermined aspects of the event, the child was asked to contribute to the talk. We investigated three overarching questions. First, we asked whether elaborative talk enhanced children's recall of the event relative to empty talk. We anticipated that, regardless of its timing, elaborative talk would be more facilitative than empty talk. Second, we investigated whether the timing of the elaborative talk influenced children's recall. We expected that, in spite of developmental differences in the amount of information recalled, pre-event talk would be associated with the least benefit to recall whereas post-event talk would be maximally effective. It was also possible that talk during or after the event might influence different aspects of recall;
during-event talk might primarily affect children's understanding of the experience, reflected in more accurate reporting of its goals and activity sequence, whereas post-event talk might influence the strength of the representation, reflected in more information and fewer errors. Third, we investigated the relative influence of the child's and adult's contributions to the discussion. We expected that aspects of the event discussed by the child would be more likely to be recalled than those verbalized only by the adult and, furthermore, that this advantage would be particularly evident for post-event talk.

Method

Participants

Participants were sixty-three 3- to 4-year-old and sixty-five 5- to 6-year-old children. The 3- to 4-year-old children (34 females and 29 males; range = 38 to 58 months; M = 48.5 months, SD = 5.42) were recruited from four preschools, and the 5- to 6-year-old children (37 females and 28 males; range = 60 to 72 months; M = 67.2, SD = 4.08) were recruited from four nongovernment schools in Sydney, Australia. The great majority of children were Caucasian and of middle socioeconomic status. Written parental consent was obtained before children's participation.

Materials

Event. The event—a visit to the zoo—was structured according to six core activities associated with an overarching goal. Props created the event context and consisted of four movable animals: giraffe, lion, koala, and monkey. Each animal measured approximately 1.5 m × 0.75 m and was made with felt, fur, and stuffing, and was backed onto a wooden board. Twenty-six smaller props (e.g., shirt, thermometer) were also used (see Table 1).

Memory interviews. Thirty-six colored and laminated photographs measuring 15 cm × 10 cm were used to assess children's nonverbal recognition and sequencing memory. Six photographs were of props representing the six activities of the event (becoming the zookeeper; visiting the giraffe, lion, koala, and monkey; and finding the baby elephant), 15 were of props associated with the second through fifth activities, and 15 were of distractor props (e.g., toothbrush, tablet, wrapping paper).

Language development. The Peabody Picture Vocabulary Test—Third Edition (PPVT—III, Dunn & Dunn, 1997) and the Expressive Vocabulary Test (EV; Williams, 1997) assessed children's receptive and expressive language skills. Both tests are untimed and administered individually. The 204-item PPVT—III assesses single-word listening comprehension ability. Each item consists of four illustrations and requires the child to select the picture that best represents the meaning of a stimulus word. The EVT measures expressive vocabulary and word-retrieval ability. The test has 190 items; the first 38 require the child to label a part of a picture and the remaining 152 require him or her to provide a synonym for a stimulus word or words present in a picture. Both tests yield a raw score and a standard score (M = 100, SD = 15).

Procedure

Balanced across gender and school, children within each age group were assigned randomly to one of four conditions: (a) empty talk, (b) pre-talk, (c) during-talk, and (d) post-talk.

<table>
<thead>
<tr>
<th>Activity Activity goal</th>
<th>Actions and objects</th>
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<tbody>
<tr>
<td>Becoming the zookeeper</td>
<td>Putting on the zookeeper hat and shirt.</td>
</tr>
<tr>
<td>Talking up the giraffe</td>
<td>Blowing bubbles.</td>
</tr>
<tr>
<td>Feeding the lion</td>
<td>Putting the vitamin in the water bottle and shaking.</td>
</tr>
<tr>
<td>Looking after the sick koala</td>
<td>Putting the meat chips, carrots, and beans in the bowl.</td>
</tr>
<tr>
<td>Making a present for the monkey</td>
<td>Putting the pencil on the picture of the sun.</td>
</tr>
<tr>
<td>Finding the baby elephant</td>
<td>Taking the picture in the box.</td>
</tr>
</tbody>
</table>

Table 1

Event Structure

1. Becoming the zookeeper
2. Talking up the giraffe
3. Feeding the lion
4. Looking after the sick koala
5. Making a present for the monkey
6. Finding the baby elephant

Taking the napkin around his neck.
Doing the dinner dance.
Putting the medicine into the cup.
Wiping his nose with the tissue.
Rolling it in a box.
Putting the picture in the box.
Event. Each child was escorted to a classroom by a guide who explained that they were "going to visit a pretend zoo." The child was introduced to a female researcher who guided him or her through the event. The event was novel and ambiguous such that the activities were not obviously related to children's general knowledge of a zoo. Each of the six activities was comprised of four, five, or six actions associated with the overall goal of that activity. The props corresponding to each activity were arranged at six discrete stations. Children were not permitted to play with the props or to perform actions on them other than those in the script. The structure, objects, and actions of the event are shown in Table 1. The event lasted approximately 12 min.

Talk. Table 2 shows the timing of each type of the adult-child talk for children in the four conditions. The interval between the event and interview, as opposed to the interval between the elaborative pre-event or post-event talk and the interview, was constant. The Appendix provides an example of empty talk and elaborative pre-event, during-event, and post-event talk (adult only). To put the child at ease, time was spent with the child talking about neutral topics (e.g., favorite activities, friends) before the talk session.

For children in the empty talk, pre-talk, and post-talk conditions, the event was accompanied by empty talk. Following Pipe (1996), empty talk involved minimal labeling and description of the actions, objects, and goals of the event, for example: "Now I would like you to do this." "Can you put this in here?"

For children in the during-talk condition, the event was accompanied by elaborative talk, for example: "Now I would like you to put the red ribbon on the giraffe's tail." For half of the activities in the event, the talk was jointly constructed by the researcher and the child (adult-child talk) and for half of the activities the talk was provided solely by the researcher (adult-only talk). For half of the children, the first three activities were accompanied by adult-child talk and the last three activities were accompanied by adult-only talk. The order was reversed for the remaining half. During the adult-child talk, children were prompted to label actions and objects, for example: "What animal is this?" If the child provided incomplete or incorrect labels or descriptions, he or she was corrected and prompted to verbalize the correct response.

For children in the pre-talk condition, talk took place 2 to 3 days before the event, for example: "You will get to put the red ribbon on the giraffe's tail." For the during-talk condition, talk about half of the activities involved both the adult and the child (adult-child talk), whereas the remaining half was narrated by the adult only (adult-only talk). For half of the children, discussion of the first three activities involved adult-child talk and the last three activities involved adult-only talk. The order was reversed for the remaining half. Because the props from the event were not present, children in the pre-talk condition were unable to generate labels, and their participation in the adult-child talk was restricted to repeating the verbal labels after they had been provided by the adult, for example: "Tell me what animal we will first visit at the pretend zoo." After the researcher had provided the first part of the narrative, if the child provided incomplete or incorrect labels or descriptions, he or she was corrected and prompted to verbalize the correct response.

For children in the post-talk condition, talk took place 1 to 3 days after the event. The content of the talk was the same as for the other conditions except that the talk referred to the post, for example: "Do you remember how you put the red ribbon on the giraffe's tail?" As for the during- and pre-talk conditions, for half of the children discussion of the first three activities involved the adult and the child (adult-child talk) whereas the last three activities were narrated by the adult (adult-only talk). The order was reversed for the remaining half of the children. During the adult-child talk, the child was prompted to recall the actions and objects, for example: "Tell me what animal we visited next at the pretend zoo." As for the pre- and during-talk con-

<table>
<thead>
<tr>
<th>Condition</th>
<th>2 to 3 days before event</th>
<th>Event</th>
<th>1 to 3 days after event</th>
<th>2 weeks after event</th>
</tr>
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<tbody>
<tr>
<td>Empty talk</td>
<td>Empty talk</td>
<td>Empty talk</td>
<td>Empty talk</td>
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<tr>
<td>Pre-talk</td>
<td>Elaborative talk</td>
<td>Elaborative talk</td>
<td>Elaborative talk</td>
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<tr>
<td>During-talk</td>
<td>Empty talk</td>
<td>Empty talk</td>
<td>Empty talk</td>
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<tr>
<td>Post-talk</td>
<td>Empty talk</td>
<td>Empty talk</td>
<td>Empty talk</td>
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Table 2 Timing of Talk (Elaborate or Empty) Across Conditions
ditations, if the child provided incomplete or incorrect labels or descriptions, he or she was corrected and prompted to verbalize the correct response.

Memory interview. The children were interviewed individually by a second female researcher using a structured protocol 12 to 18 days (M = 14.5, SD = 1.29) after the event. The memory interview comprised a verbal phase (free, then prompted recall) and a nonverbal phase (photograph recognition, photograph sequencing). A nonverbal phase was included because young children typically have more information in memory than is reported verbally, and their knowledge can be demonstrated if nonverbal means are available (e.g., salmon, Bidrose, & Pipe, 1990). Moreover, we wished to investigate whether talk influenced children's verbal recall only or also influenced their nonverbal recall. The interview began with a general open-ended prompt: "I'd like you to tell me everything that happened when you went to visit the zoo" (free recall). The interviewer gave five general prompts ("What else happened?" "Tell me more about that.") to maximize children's recall. Prompted recall began when the child appeared unable to provide more information. Children were provided with six verbal prompts corresponding to the six activities in the event, for example: "I heard that when children visit the pretend zoo, they visit the giraffe. Tell me what happened when you visited the giraffe at the pretend zoo." Prompts were given in one of two predetermined random orders counterbalanced across conditions. Neither order corresponded to the order of activities in the event.

When the child appeared unable to provide more information, the nonverbal phase commenced. There were two components: photograph sequencing (two parts) and photograph recognition. For the first part of photograph sequencing, the child was presented with six photographs of props depicting the six core activities of the event in a random display (i.e., the zookeeper, giraffe, lion, koala, monkey, and baby elephant) and was asked to show the researcher: "Which one of these things did you do first?" "Which one did you do next?" until the child had indicated the order in which all of the activities occurred. For photograph recognition, the child was presented with four sets of photographs corresponding to the second through fifth activities (visiting the giraffe, lion, koala, and monkey). Each set contained a photograph of each prop used in that activity and photographs of thematically similar distracter props matched in number to the props in the activity. The number of photos in each set varied from 6 to 10, depending on the number of props associated with that activity. Because few props were used when the child "became the zookeeper" and "found the baby elephant" (first and sixth activities), these activities were not included in photograph recognition. The child was told: "These are some of the things that children sometimes do when they visit the giraffe/lion/koala/monkey. You didn't do all of them; you only did some of them when you went to visit the giraffe/lion/koala/monkey. Show me which ones you did." The child then pointed to the photographs of the props used. If the child did not correctly recognize the props, the researcher presented the correct set of photographs and stated: "Well, actually these are the things that you did when you visited the giraffe/lion/koala/monkey." As the second part of photograph sequencing, the child was asked to sequence the correct set of photographs for each activity: "Show me which of these things you did first at the giraffe/lion/koala/monkey." Thus, for each of the four sets of photographs (visiting the giraffe, lion, koala, and monkey), the child completed photograph recognition and photograph sequencing before moving on to the next set of photographs. Interviews were audiotaped and lasted 10 to 15 minutes.

Language assessment. After the memory interview, the PPVT-III and the EVT were administered.

Coding. Elaborative talk. Transcripts of talk during the event were coded according to whether the verbal label of the action or object was generated by the child or repeated by the child following the adult's verbalization. It was not necessary to code actions and objects verbalized by the adult as all actions and objects not verbalized by the child had been verbalized by the adult.

Memory interview. All verbal information was coded as recalled during free or prompted recall; for prompted recall, however only information that had not been reported previously in free recall was coded. Verbal information was coded as correct information, errors, and event goals. Children were credited with 1 item of correct information for action, objects, and descriptors that were part of the event (e.g., "stick," "ribbon," "red"). Children were credited with an error for distortions and intrusions. Distortions were actions or objects that had been part of the event but were incorrectly described or placed in the incorrect activity; for example, "sticking the ribbon on the monkey" was 1 error, as the ribbon was stuck on the giraffe. Intrusions constituted actions or objects that had not been part of the event;
for example, "buying a ticket" was coded as 2 errors, as neither the action nor the object was part of the event. Children were credited with 1 of 6 possible event goals when they reported an overarching goal of one of the scenes, for example: "I found the baby elephant." Additionally, we coded the sequencing of children's free recall reports. Following Wigener, Quillian, and Houston (1996), 1 correct score was given if the object or action reported had occurred in the event after the object or action recalled just previously (e.g., children reported visiting the lion and then visiting the monkey). One error score was given if the object or action occurred in the event before the object of action recalled just previously (e.g., children reported visiting the monkey and then visiting the lion). The accuracy of sequencing was calculated as correct scores/ (correct scores + error scores).

Nonverbal memory. For the sequencing of photo- graphed props, 1 correct sequencing score was awarded when a photographed prop was placed after a photographed prop that had been presented earlier in the event. Children's score from the first part of photograph sequencing (the six photographs corresponding to the six core activities) was summed together with their score from the second part of photograph sequencing (the four sets of photographed props). The accuracy of photography sequence was calculated as the number of correctly sequenced photographs/10 (maximum possible score). Recognition of photographed props was calculated as the number of photographed props correctly recognized out of 15 event props and 15 distractor props. The maximum possible score obtainable for photograph recognition was 15.

Reliability
Approximately one fourth (35 of 127) of the transcripts were coded independently by a researcher who was not informed of the child's talk condition. An equal number of transcripts was selected at random from each condition across both age groups. Reliability, calculated as agreements/agreements + disagreements was 91% (range = 85% to 98%).

Results
Within age groups (3 or 5 years) there were no significant differences between conditions in age (months; both $F_1 < 1.33$, both $p >.05$), receptive language (both $F_2 < 1.17$, both $p > .05$), and expressive language (both $F_2 < 1.87$, both $p > .05$). For both the 3- and 5-year-old children, the standardized scores for the PPVT-III (receptive language) and the EVT (expressive language) were within the average range ($PPVT = 107.54$, $SD = 7.70$; $EVT = 107.23$, $SD = 8.63$). There was, however, a significant difference between conditions in the delay (in days) between the event and interview. Figure 3) $124 = 15.22$, $p <.001$. The delay between the event and interview was shorter for children in the pre-talk condition ($M = 13.34$, $SD = 8.75$) than in the empty talk ($M = 14.73$, $SD = 1.31$), during-talk ($M = 14.63$, $SD = 9.42$) and post-talk conditions ($M = 15.13$, $SD = 1.28$), which did not differ. To establish whether the information reported in verbal and nonverbal recall varied systematically with differences in delay, correlational analyses were conducted between the event-to-interview delay and all measures of verbal and nonverbal recall. There were no significant correlations ($r = -.03$ to $.14$, all $p >.05$). This suggests that differences between conditions in the delay between the event and the interview did not contribute to the pattern of results.

We examined first the effects of age (3 or 5 years) and talk (empty talk, pre-talk, during-talk, post-talk) on verbal and nonverbal recall. Thereafter, we investigated the impact on verbal recall of the child’s participation in the task. Alpha level of $p < .05$ was used for all analyses.

Verbal Recall
Analyses were conducted on free and total (free and prompted, combined) recall. Analyses for free recall are only reported when the findings differed from those obtained for total recall. Correct information. To establish the children’s absolute level of correct recall, we calculated the mean number of actions and objects recalled of the total that could be recalled. Of a possible 26 actions and 30 objects, 3-year-old children recalled a mean number of 7 actions and 10 objects, and 5-year-old children recalled a mean number of 10 actions and 14 objects. These findings suggest that the children were by no means recalling all or even most event information. Correct information in total recall was calculated as the number of actions, objects, and descriptors correctly reported verbally, summed across free and prompted recall. Correct information was submitted to a 2 x 4 analysis of variance (ANOVA) with age (3 and 5 years) and condition (empty talk, pre-talk, during-talk, or post-talk) as between-participants factors. Figure 1 shows correct information in total recall by age and condition.

There was a significant main effect of age, $F_1$ $(120) = 23.94$, $p < .001$. 5-year-old children ($M = 25.42$, $SD = 11.22$) repeated more correct information than
3-year-old children ($M = 18.79$, $SD = 7.26$). There were also a significant main effect of condition, $F(3, 120) = 19.58$, $p < .001$. Scheffé post hoc tests showed that children in the post-talk condition ($M = 29.90$, $SD = 11.33$) reported more correct information than those in the pre-talk ($M = 21.75$, $SD = 7.47$) and during-talk ($M = 22.21$, $SD = 8.91$) conditions, who did not differ, and children in all elaborative talk conditions (pre-, during-, and post-talk) reported more correct information than those in the empty talk condition ($M = 14.57$, $SD = 6.05$). These main effects were modified by a significant interaction between age and condition, $F(3, 120) = 4.72$, $p < .05$. Follow-up analyses showed that, for the 5-year-olds, children in the post- and during-talk conditions reported more correct information than those in the empty talk condition, and that children in the post-talk condition reported more correct information than those in the pre- and during-talk conditions, who did not differ, $F(3, 61) = 17.47$, $p < .001$. For the 3-year-olds, children in the post-talk condition reported more correct information than those in the empty talk condition, $F(3, 59) = 4.23$, $p < .05$ (Figure 1).

When correct information in free recall was analyzed separately, there was a significant main effect of condition, $F(3, 120) = 19.49$, $p < .001$, modified by a significant interaction between age and condition, $F(3, 120) = 9.20$, $p < .001$. Follow-up analyses showed that for the 3-year-olds, children in the post-talk condition ($M = 25.06$, $SD = 8.07$) reported considerably more correct information than those in the pre-talk ($M = 10.87$, $SD = 5.01$), during-talk ($M = 12.06$, $SD = 8.44$), and empty talk conditions ($M = 7.25$, $SD = 3.75$), who did not differ, $F(3, 61) = 21.84$, $p < .001$. For the 3-year-old children, there were no significant differences in the corrected information reported in the empty talk ($M = 6.71$, $SD = 3.85$), pre-talk ($M = 10.38$, $SD = 5.43$), and during-talk ($M = 9.47$, $SD = 2.80$), and post-talk conditions ($M = 11.13$, $SD = 7.45$), $F(3, 59) = 2.36$, $p > .05$.

Event goals. For number of event goals reported, there was a significant main effect of condition, $F(3, 120) = 11.83$, $p < .001$. Scheffé post hoc tests showed that children in the during-talk ($M = 2.69$, $SD = 1.22$) and post-talk ($M = 2.29$, $SD = 1.10$) conditions reported a similar number of event goals and more than children in the empty talk condition ($M = 1.24$, $SD = 0.90$). Children in the during-talk condition also reported significantly more event goals than those in the pre-talk condition ($M = 1.90$, $SD = 0.77$). Neither the main effect of age, $F(1, 120) = 1.45$, $p > .10$, nor the interaction between age and condition, was significant, $F(3, 120) = 0.31$, $p > .10$.

Sequence of free recall. The accuracy of the sequence of information reported in free recall was also submitted to a 2 x 4 ANOVA, with age (3 and 5 years) and condition (empty talk, pre-talk, during-talk, post-talk) as between-participants factors. Three 3- and 5-year-olds and three 5-year-olds were omitted as they failed to recall more than one item of correct information in free recall. There were no significant differences in the accuracy of sequencing by the 3-year-olds ($M = 24$, $SD = 31$) and 5-year-olds ($M = 23$, $SD = 24$), $F(1, 110) = 12$, $p > .10$. There was also no significant difference in the accuracy of sequencing by children in the empty talk ($M = 27$, $SD = 31$), pre-talk ($M = 21$, $SD = 29$), during-talk ($M = 27$, $SD = 23$), and post-talk conditions ($M = 25$), $F(3, 114) = 0.24$, $p > .10$, and no significant interaction between age and condition, $F(3, 114) = 0.81$, $p > .10$. It is likely that this pattern of results reflects the small number of items reported in free recall, which constrained the variability in the measure of sequencing accuracy (proportion correct).

Errors. Across ages and conditions, the total number of errors (calculated as the number of distortions and intrusions summed across free and prompted recall) was very low ($M = 1.05$, $SD = 1.32$):

- Mean distortions = 0.53, $SD = 1.15$;
- Mean intrusions = 0.22, $SD = 0.46$. Neither the main effect of age, $F(1, 120) = 1.98$, $p > .10$, nor the interaction between age and condition, $F(1, 120) = 1.21$, $p > .10$, was significant. There was a significant main effect of
condition, F(3, 120) = 10.28, p < .001. Scheffe post hoc
tests showed that children in the pre-talk (M = 41, SD = 9.5) during-talk (M = 84, SD = 1.11) and post-
talk conditions (M = 94, SD = 1.18) made a similar
number of errors and significantly fewer than those
in the empty talk condition (M = 1.97, SD = 1.59).

In summary, elaborative (relative to empty talk) talk at
any time (before, during, or after the event) reduced
the total errors made by children of both ages.
Findings with respect to correct recall were complex,
influenced by the timing of the talk, the age of the
child, and the measure of recall. Specifically, for
children of both ages, post-event talk facilitated total
recall relative to empty talk. Additionally, children in
the during-talk and post-talk conditions reported
more event goals than those in the empty talk con-
dition. For the 5-year-old children, relative to empty
talk, post-event talk also enhanced free recall, and
talk during the event facilitated total recall.

Nonverbal Recall

Photograph recognition. The number of photo-
graphed props correctly recognized (from a display
of 30 photographs, of which half were of props from
the event and half were of distractor props) was
submitted to a 2 x 4 ANOVA, with age (3 and 5
years) and condition (empty talk, pre-talk, during-
talk, or post-talk) as between-participants factors. There
was a significant main effect of age, F(1, 120) = 6.73, p < .05; 5-year-old children (M = 13.06, SD = 1.41) correctly recognized more photographed
props than 3-year-old children (M = 12.31, SD = 1.81). There was also a significant main effect of
condition, F(3, 120) = 5.20, p < .05. Scheffe post hoc
tests showed that children in the post-talk condition
(M = 13.2, SD = 1.26) correctly recognized more
photographed props than did those in the empty talk
condition (M = 12.03, SD = 1.90), p < .05. The inter-
action between age and condition was not sig-
nificant, F(3, 120) = .32, p >.10.

Photograph sequencing. The accuracy of photo-
graph sequencing was submitted to parallel analyses
as for photograph recognition. There was a sig-
nificant main effect of age, F(1, 120) = 20.18, p < .001;
5-year-old children (M = 67, SD = 11) sequenced the
photographs more accurately than did 3-year-old
children (M = 59, SD = 10). There was also a sig-
nificant interaction between age and condition, F(3, 120) = 4.08, p < .01, although the main effect of con-
dition did not significant, F(3, 120) = 1.35, p >.10. Follow-up analyses showed that, for the 5-year-olds,
children in the post-talk condition (M = 74, SD = 10) were more accurate in their photograph

sequencing than those in the empty talk condition
(M = 61, SD = 09), F(3, 61) = 5.15, p < .05, whereas
there were no significant differences between pre-
conditions for the 3-year-old children (Ms = 58 to .60, F(3, 59) = 48, p >.1).

In summary, for both age groups, children in the
post-talk condition correctly recognized more pho-
tographed props than those in the empty talk con-
dition, whereas the 5-year-olds, but not the 3-year-
olds, in the post-talk condition demonstrated more
accurate photograph sequencing than children in the
empty talk condition.

Influence of Child and Adult Verbalization on Recall

To investigate the relative influence of child and
adult verbalizations during the elaborative talk on
children's recall, it was necessary, first, to distinguish
between child generation of an item and child repeti-
tion of an item after it had been verbalized by the
adult; both constituted a form of verbalization.
Because we were interested in the effect of recall of
the child's active contribution to the discussion (i.e.,
the child's generation of an item) and because the
number of items repeated (rather than generated) by
the child was small (M = 3.92, SD = 2.81), our ana-
lyses focused on the influence of recall of children's
generation relative to adult's verbalization of items
during the talk. We excluded children from the pre-
talk condition from the analyses because these chil-
dren had not yet experienced the event and were
therefore unable to generate items. There were no
significant differences between the number of items
generated by children in the during-talk (M = 14.67,
SD = 4.38) and post-talk conditions (M = 16.46, SD =
4.92), F(1, 59) = 2.24, p >.10, or between the number
of items verbalized by the adult in the during-talk
(M = 55.12, SD = 4.94) and post-talk conditions
(M = 53.22, SD = 4.97), F(1, 61) = 2.35, p >.10.

To investigate the relative influence of child gen-
eration and adult verbalization of items during the
talk on children's recall, we compared the number of
items generated by the child that were subsequently
recalled and the number of items verbalized by the
adult that were subsequently recalled. The propor-
tion of items generated by the child (child-generated
items) that were recalled by the child during the
interview was calculated as the number of child-
generated items recalled by the child/total number
of child-generated items. Also, the proportion of
ditems verbalized by the adult (adult-verbalized
items) that were recalled by the child during the
interview was calculated as the number of adult-
verbalized items recalled by the child/total number
of adult-verbalized items. These proportions were submitted to a 2 x 2 mixed model ANOVA, with age (3 and 5 years) and condition (during-talk, post-talk) as between-participants factors, and verbalization (child-generated, adult-verbalized) as the within-participant factor. Figure 2 shows the mean proportion of items generated by the child and subsequently recalled by the child, and the mean proportion of items verbalized by the adult and subsequently recalled by the child in the during-talk and post-talk conditions. The first set of findings from this analysis reflects the effects of age and condition reported previously. There was a significant main effect of condition, F(1, 56) = 12.28, p < .001. Children in the post-talk condition recalled a greater proportion of verbalized items (child generated or adult verbalized; M = 42, SD = 0.11) than children in the during-talk condition (M = 31, SD = 0.11). There was also a significant main effect of age, F(1, 56) = 13.98, p < .001, and a significant interaction between age and condition, F(1, 56) = 4.89, p < .05. Follow-up analyses showed that for the 3-year-old children, the mean proportion of items verbalized (child generated or adult verbalized) and subsequently recalled was greater for children in the post-talk (M = 50, SD = .16) than in the during-talk condition (M = 34, SD = 1.0), F(1, 28) = 5.59, p < .05, whereas for the 5-year-old children, there was no difference between these two conditions (during-talk: M = 29, SD = .16; post-talk: M = 32, SD = .16), F(1, 28) = 5.4, p > .05. Across ages, the impact of child generation relative to adult verbalization on recall was greater for children in the post-talk condition than for children in the during-talk condition (Figure 2). Because children recalled a greater proportion of child-generated than adult-verbalized items, it was also important to establish whether adult-only talk enhanced children's recall relative to empty talk; in other words, it may be that adult narration had no greater impact on children's recall than empty talk. It was not possible to conduct within-participant analysis to investigate this question, as for children in the elaborative talk condition all activities were narrated (i.e., were accompanied by elaborative adult—child or adult-only talk). Therefore, we compared the total recall of children in the pre-, during-, and post-talk conditions for the three activities that were accompanied by adult-only talk with the total recall of children in the empty talk condition for the same three activities. As for each child, adult-only talk could accompany either the first or last three activities, two separate comparisons were conducted, one for each set of activities. Thus, two 2 x 4 ANOVAs were conducted, with age (3 and 5 years) and condition (empty talk, pre-talk, during-talk, post-talk) as the between-participants factors.

Table 3 shows the total correct information reported for activities accompanied by adult-only talk relative to empty talk. These were significant main effects of condition for recall of the first three, F(3, 70) = 6.26, p < .001, and last three activities, F(3, 70) = 21.21, p < .001. Scheffe post hoc tests showed that for the first three activities, children in the pre-talk and post-talk conditions reported more correct information than did children in the empty talk condition. There was no difference in the correct information reported by children in the during-talk and empty talk conditions for the first three activities (see Table 3). With respect to the last three activities, the main effect of condition was modified by a significant interaction between age and condition, F(3, 70) = 3.13, p < .05. Follow-up analyses showed that 5-year-old children in the during-talk and post-talk conditions, but not the pre-talk condition, reported more correct information than did children in the empty talk condition, F(3, 36) = 18.72, p < .001.
Three-year-old children in the post-talk condition reported more correct information than did those in the empty talk condition, but there was no difference in the correct information reported by children in the pre-talk and during-talk conditions relative to the empty talk condition. These findings suggest that, overall, the children recalled more correct items that had been verbalized by the adult than had been accompanied by empty talk (see Table 3).

In summary, children were more likely to recall an item for which they, rather than the adult, had generated a verbal label. Moreover, the impact of child generation relative to adult verbalization was greater for children in the post-talk condition than for children in the during-talk condition. Nonetheless, adult verbalization enhanced children’s recall relative to empty talk.

Impact of Receptive and Expressive Language on Recall

We investigated the associations between children’s standardized scores on the HVFT–III (receptive vocabulary) and EVT (expressive vocabulary) and verbal and nonverbal recall by conducting correlations within each age group (see Table 4). Expressive and receptive vocabulary scores were not available for one 5-year-old child. For the 3-year-old children, receptive vocabulary scores were significantly correlated with the correct information reported in free recall. Furthermore, expressive vocabulary scores were associated with the accuracy of nonverbal sequencing. For the 5-year-olds, expressive vocabulary scores were significantly associated with the correct information reported in free and total recall. Expressive and receptive vocabulary scores were also associated with the accuracy of nonverbal sequencing. Finally, for the older children, there were significant associations between the verbal and nonverbal measures of recall.

**Discussion**

We investigated the impact of adult–child talk—its elaborativeness and timing—on 3- and 5-year-old children’s recall of an event, a “visit to the zoo.” By staging the event and manipulating those aspects talked about by the adult and the child, we extended findings showing that the style and content of parent–child conversations about the past and the present influence young children’s recall (e.g., Haden et al., 2001; Senee et al., 1993). We addressed three questions. First, relative to empty or noninformative talk, does elaborative talk improve children’s recall of the event? Second, does the timing of the talk, before, during, or after the event, differentially influence children’s recall? And finally, what is the relative influence on children’s recall of the adult and child contributions to the discussion?

We found that elaborative talk enhanced children’s recall relative to empty talk. The most consistent effect of elaborative talk, regardless of its timing, was to reduce errors, although, overall, errors were few. In contrast, the influence of elaborative talk on children’s reporting of correct information was influenced markedly by its timing and the age of the child. Talk after the event had the greatest influence on correct recall, and its benefits were evident for children of both age groups. Specifically, 5-year-old children who engaged in post-event talk reported more correct information overall than was reported
by children in all other conditions. Furthermore, 5-year-old children in the post-talk condition, compared with those in the pre- or during-talk conditions, reported twice as much correct information in free recall, suggesting that their event representation was stronger and more accessible to minimal cuing. Moreover, it was only in the post-talk condition that 3-year-old children reported more correct information than was reported in the empty talk condition. The effects of elaborative talk were not restricted to children in the post-talk condition. Talk during the event also enhanced the 5-year-olds' correct recall relative to empty talk, and for children of both ages, talk during the event elicited a similar number of the goals as did talk after the event. In contrast, talk before the event had the weakest effect on recall; indeed, for children in both age groups, its significant effects were limited to the reduction of errors relative to empty talk.

Several mechanisms have been proposed to explain the beneficial influence of adult–child conversation on children’s recall. For example, talk may enhance verbal encoding by providing labels for aspects of the event and may highlight its organizational structure, rendering the experience more comprehensible and therefore more readily retrievable (e.g., Fivush et al., 1997; Nelson, 1996). Our findings with respect to errors suggest that talk may also create boundaries around children’s representation of the experience, reducing the likelihood that they will distort aspects of the event or introduce information from other events.

What might account for the differential effects of timing found in the current study, beyond the general effects of elaborative talk? Several explanations are possible. The memorial advantage of post-event talk may be due to the shorter delay between the last exposure to the event (via the talk) and the interview (12 vs. 14 days). We consider this improbable, however. Research examining forgetting in young children has found that the rates are relatively low 1 and 3 weeks after an event, reflected in measures of the completeness and accuracy of recall (Baker-Ward, Gordon, Orinstein, & Larus, 1995; Gordon & Follmer, 1994; Jones & Pipe, 2002; Orinstein, Gordon, & Larus, 1992). These findings suggest that children’s recall at 12 days is unlikely to differ from that at 14 days from the last exposure to the event.

It is also possible that the findings are, at least in part, attributable to social factors. Relative to children in the pre-talk and during-talk conditions, children in the post-talk condition may have encoded more information during the talk session because their greater familiarity with the experimenter increased their engagement in the session and attentiveness to the talk. Because the experimenter paid attention to developing rapport with the child before that talk session began, we consider this explanation unlikely to account for the marked differences between conditions.

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5-year-old children (N = 64)

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That the children who took part in post-event talk experienced the event on two spaced occasions (the event and the talk) is another potential reason for their superior correct recall relative to the children for whom the talk occurred during the event. Two spaced exposures, even in different modalities, may have provided an additional opportunity for the children to encode information, rendering their subsequent memory reports richer and more complete than those of the children who experienced the event only once (Balacki, 2000; Dempster, 1996; McFarland, Rhodes, & Frey, 1979). This explanation by itself is not sufficient, however, because the children for whom talk was before the event also had two encoding opportunities (the talk and the event) but did not show a similar enhancement of their correct recall.

Indeed, our findings suggest that for adult-child talk to be maximally effective, the children should have had the opportunity to develop a relatively organized and coherent event representation, which is more likely to be achieved through direct rather than vicarious experience of the event (Baker-Ward, Hess, & Finnegan, 1990; Gobbo, Meza, & Fipes, 2002; Murachver et al., 1996; Rudy & Goodman, 1991). The initial representation formed by pre-event talk may have been too poorly encoded to be integrated with the representation from the event itself (Bedossa et al., 1975; Young & Belletta, 1982; see also Sutherland et al., 2003). Several factors may have contributed to the establishment of a weaker representation formed by the pre-event talk, including the purely semantic nature of the representation (see Johnson, 1985; Saltz & Denson-Nolan, 1981) and the greater difficulty experienced by young children in reasoning about the abstract and unknown future than about the past (Benson, 1997). In contrast, because of its accessibility via multiple retrieval cues (visual, narrative, and kinesthetic), the event representation derived from experience may be more readily integrated with and strengthened by subsequent partial re-exposures—in this instance, via the talk (Howe et al., 1993; Hudson, 1990b; Nelson, 1993, 1996). Our findings indicate, therefore, that when children experience two exposures to an event, one directly (the event) and the other vicariously (talk about the event), subsequent recall is enhanced to a greater extent if the vicarious follows the direct exposure. That the recall of children in the duration-talk condition was superior to that of children in the pre-talk condition indicates that two exposures to an experience do not necessarily enhance recall relative to one. The opportunity to develop a single and integrated event representation as an event unfolds is also beneficial, having its major influence here on children's reporting of the overarching goals—and presumably their understanding—of the event (see also Boland et al., 2003).

With respect to the relative influence on children's recall of the child's and adult's contributions to the discussion, we found that children of both age groups reaped a significantly greater proportion of the items that they had generated during the talk than those that had been narrated by their conversational partner. This pattern is consistent with findings that self-generated material is better remembered by adults and children than material that is read or heard (the generation effect; e.g., Calvert, 1991; McFarland, Duncan, & Bruno, 1983; McNamara & Healy, 1995; Slassnica & Graf, 1978). In real-world contexts also, self-generated misinformation is more likely to be incorporated into children's accounts than is misinformation generated by the interviewer (see Holliday, Reya, & Hayes, 2002). The mnemonic advantage provided by the child's generating the item, relative to the adult's verbalization, was particularly marked for children in the post-talk condition. That is, generating (rehearsing) the absent item from episodic memory during the post-event discussion significantly increased the likelihood that the child would report it during the interview. In addition to the general benefits of generating information, the child's retrieval of information during the discussion may have facilitated recall by promoting more complete encoding or by providing practice for the retrieval task required in the interview, or both (McNamara & Healy, 1995; Schmidt & Bjork, 1992).

There are at least two implications of our finding of the greater influence on recall of the child's than the adult's contribution to the discussion. First, it provides an additional explanation for the greater effect on memory of post-event talk relative to talk at other times. That is, unlike talk before or during the event, talk after an event gives the child a unique opportunity to retrieve information about the experience, and this in turn increases the memorability of that information (e.g., Hudson, 1990b; Leichtman et al., 2000). To a greater extent than talk at other times, therefore, adult-child talk after an event provides the opportunity for vicarious distributed encoding via a double exposure to the event and retrieval practice, to the extent that the child actively contributes to the discussion. These processes create the optimal conditions for learning (Dempster, 1996). Considered together, our findings highlight that differences in the timing of talk are necessarily associated with differences in the nature of adult—
child conversation; the cognitive repercussions of these differences in turn differentially influence children's recall. A second implication of superior recall of child-generated information is to underscore the significant hemispheric influence of the child's active participation in the conversation. Research investigating naturally occurring parent-child conversations about the past demonstrates the bidirectional nature of even very early memory conversations, in a context of considerable scaffolding from parents (Fivush, Hamond, Hirsch, & Singer, 1991). Before the development of language, children's attentiveness during past-event conversations mediates the effect of maternal style on memory (Roesch, 2002). Other research has also shown that children are more likely to recall aspects of the event that they had mentioned during the discussion rather than those that were mentioned by the adult alone (Haden et al., 2003; Leichtman et al., 2000; Tesler & Nelson, 1994). In these earlier studies, however, the focus of the discussion was not experimentally manipulated, and it was possible that the parents and children were discussing the more distinctive—and therefore more memorable—aspects of the experience (e.g., Howe, 1997). Our findings extend recent theoretical perspectives in showing that children themselves play a critical role in shaping their own memories (e.g., Roesch, 2002).

Our findings raise the possibility that pre-event talk has a greater memorial impact if the child can generate information about the upcoming event. This may occur, for example, where the events are familiar and the child can draw on an established knowledge base, perhaps in response to particular kinds of adult prompts (e.g., “what” questions). A useful focus of further research, with considerable applied relevance, will be to extend the conditions under which talk before an experience maximally influences recall (e.g., Sutherland et al., 2003).

By including 3- and 5-year-old children, we were able to assess developmental differences in the effect of talk on memory. Children of both ages benefited from adult-child talk and showed similar patterns with respect to timing, but overt talk had a greater impact on recall for the older children. Our findings of the relatively small influence of talk during the event on the correct recall of the 3-year-old children stand in contrast to those reported by other researchers (Boland et al., 2003; Haden et al., 2001; Tesler & Nelson, 1994). This highlights a limitation of the current study; the degree of experimental control inevitably forfeited the complexity and richness of naturally occurring parent-child talk. When parents can follow the child's focus of interest and highlight connections between the experience and other aspects of the child's life, the influence of during-event talk on children's encoding of the event may well be greater.

Developmental differences in the influence of talk on children's recall are not surprising, however, given the improvements in encoding and retrieval that occur across early childhood (Schneider & Bjorklund, 1998). Our findings raise the possibility that language skill is a contributing factor. Specifically, for the 3-year-old children, we found significant correlations between expressive and receptive language and total correct recall, whereas for 5-year-old children, the relationship held only for expressive language. In other words, the effect of language ability on recall may be more pervasive for younger children, constraining their encoding and subsequent retrieval of verbal information. By age 5 or 6, it may be children's ability to express rather than comprehend information that is more influential (see Salmon Konolato, & Geltzman, 2003). Although findings have been mixed (e.g., Brown & Pipe, 2003; Gordon et al., 1993; Greenhoot, Ornstein, Gordon, & Baker-Ward, 1999), other studies have also highlighted the association between language ability and verbal recall (e.g., Boland et al., 2003; Burgwyn-Bailes, Baker-Ward, Gordon, & Ornstein, 2001). Further research is required to disentangle developmental changes in the influence of language ability on recall.

Finally, we investigated the influence of adult-child talk on children's nonverbal recall, assessed by means of prop recognition and sequencing. Theoretically, the extent to which talk is associated with greater organization of the entire event representation or its verbal aspects only is important (e.g., Fivush et al., 1997; Nelson, 1996). Although there was a suggestion in our data that talk after the event was associated with superior performance on nonverbal measures, the findings are limited by the fact that nonverbal recall was assessed after, and possibly influenced by, verbal recall. A study where nonverbal recall is assessed before verbal recall would help clarify this issue. Interestingly, there may be circumstances under which talk impairs nonverbal recall. Schoofer (2002) has described a process of verbal overshadowing, whereby attempting to verbalize memories that are not readily verbalizable (such as a face or color) impairs memory for these stimuli. According to Schoofer, verbalization is problematic to the extent that it causes a processing shift that dampens the individual's reliance on nonverbal
processes. Whether this occurs in the context of adult—child discussion of events is yet to be established.
In conclusion, our findings show that adult—child discussion enhances children's memory of an event and clarifies some of the mechanisms underlying its effectiveness. Talk after an event potentially affords optimal benefit to recall, providing the opportunity for spaced encoding and, to the extent that the child makes an active contribution to the conversation, practice of the retrieval task that will be required in future conversations about the same topic, including the interview. Nonetheless, talk in the here and now also benefits recall, permitting the child to develop an understanding of the event goals. Finally, our findings also highlight that in participating in discussion, the child plays a critical role in shaping his or her memory report.

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nu...
We are here. The first thing you need to do to tidy up Giraffe is to blow the soapy bubbles on her fur like this. That’s terrific. Next, you need to give Giraffe’s spotty coat a brush. Just like this, great. Next thing you do to tidy up giraffe is to get down low and to polish Giraffe’s hooves, with this special polishing cloth. Terrific, you are a great polisher. Look how shiny the hooves are. Last of all, you need to put this red ribbon in Giraffe’s tail. Well done—you did a great job of tidying up Giraffe. Now that Giraffe is tidy, let’s wave good-bye.

Post-talk

The first animal we saw when we visited the zoo was the Giraffe and we said “Hello Giraffe, Have you seen the Lost Baby Elephant?” Giraffe hadn’t seen the lost baby Elephant, but we needed to tidy up Giraffe whilst we were there. The first thing you did to tidy up Giraffe was to blow soapy bubbles on her fur. You did a terrific job at that. Then you did a great job of brushing Giraffe’s spotty coat with a brush. After that you got down low and polished Giraffe’s hooves with the special polishing cloth—you were really good at making them shiny. Then, the last thing you did with Giraffe was to put the red ribbon on Giraffe’s tail. Then you were done with tidying up Giraffe. You did a great job and you waved good-bye.