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## Mother–Child Joint Conversational Exchanges During Events: Linkages to Children’s Memory Reports Over Time

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### Abstract

This longitudinal study explores linkages between patterns of mother-child conversation as events unfold and children’s subsequent event memory. A total of 89 mother-child dyads took part in novel “adventures” in their homes when the children were 36 and 42 months old. In contrast to “low joint talk” dyads, the conversations of “high joint talk” dyads were characterized by a high proportion of children’s correct responses to their mothers’ *Wh-* questions, and a low proportion of failures to respond to these queries. Children in the high joint talk dyads reported more in assessments of their memory at 36 and 42 months than their low joint talk counterparts. The results point to specific forms of elaborative conversational interactions that may be especially important for successful remembering.

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Within the past two decades, there has been a patent increase in research focusing on the linkages between mother-child conversational interactions about personally experienced events and children’s remembering (see Fivush, Haden & Reese, 2006, for a review). This work has been guided by sociocultural theory (e.g., Vygotsky, 1978) that pinpoints linguistic interactions as potentially powerful mediators of developmental change. Also consistent with sociocultural approaches, the literature emphasizes the importance of individual differences in maternal conversational styles that range along a dimension of elaborativeness (see Fivush et al., 2006; Ornstein, Haden, & Hedrick, 2004, for reviews). Specifically, in a majority of the work, an elaborative style is defined as including open-ended *Wh-* questions, closed-ended yes-no questions, and declarative statements that add new information about an event, as well as confirmations and evaluations that praise the child’s participation. Findings from an expansive body of research illustrate clear concurrent and longitudinal differences between children of mothers who adopt a “high elaborative” in contrast to a

“low elaborative” conversational style in their recall of past events (e.g., Haden, Haine, & Fivush, 1997; McCabe and Peterson, 1991; Reese, Haden, & Fivush, 1993).

The importance of the prior work on conversational style notwithstanding, relatively little is known about the mechanisms by which maternal elaborativeness impacts remembering. As such, the present study is motivated by questions concerning just what it is about elaborative conversational interactions that affect memory outcomes. Within the context of a longitudinal investigation in which two cohorts of children have been tracked over the first six years of life, the conversations of 89 mother-child pairs were recorded as they engaged in specially constructed events when the children were 36 and 42 months of age. A detailed examination was undertaken of the elaborative conversational interactions observed as these events were unfolding, focusing particularly on bouts of “joint talk.” In the current work, “joint talk” is defined by instances when the mother asked for new information with an elaborative *who*, *what*, *where*, *when*, *why*, or *how* question that was responded to with the provision of new information by the child, as opposed to times when these elaborative *Wh*-questions were not followed by a response. In addition, a major emphasis was placed on the linkages between these joint verbal exchanges as the events unfolded and the children’s subsequent recall of these experiences following delay intervals of 1 day and 3 weeks. Given the longitudinal design, it was also possible to explore associations between conversational interactions and remembering over time.

The use of *Wh*- questions has been highlighted as a key component of an elaborative style both in studies of conversations during (e.g., Boland, Haden & Ornstein, 2003) and after events (Farrant & Reese, 2000; Fivush & Fromhoff, 1988; Haden, 1998; Haden, Ornstein, Rudek, & Cameron, in press). As opposed to closed-ended yes/no questions, elaborative open-ended *Wh*- questions engage children in providing names, descriptions, actions, explanations, personal evaluations, and so forth, about events that are under discussion. Asking a child “What all would you like to put in the backpack?” or “What all did you put in the backpack when we went camping?” is more likely to produce an informationally-rich response than is posing a closed-ended yes/no question such as “Do you want to pack the hotdog in the backpack?” or “Did we put the hotdog in the backpack on the camping trip?”

Interestingly, in most studies of mother-child reminiscing about past events, researchers (e.g., Hudson, 1990; McCabe & Peterson, 1991; Reese et al., 1993) have not differentiated among various types of elaborative comments (e.g., *Wh*- questions, yes/no questions, statements). However, those investigators who have done so have observed that mothers’ open-ended elaborative *Wh*- questions are particularly supportive of children’s recall. Indeed, Farrant and Reese (2000) have reported that the sheer frequency of mothers’ use of open-ended elaborative questions when their children were 2 is associated positively with children’s later memory responding at age 3. Haden et al. (in press) have further demonstrated that in early reminiscing, mothers who ask as many or more elaborative open-ended questions as elaborative statements have children who provide more memory information about different events 1–1 1/2 years later, as compared with mothers who ask fewer elaborative *Wh*- questions relative to statements. Mothers’ elaborative *Wh*- questions also trump other elements of an elaborative style, including follow-ins and confirmations, in predicting children’s long-term memory responding (Cleveland & Reese, 2005). Moreover,

there is some evidence that the facilitative effects of *Wh*-questioning for memory are limited to elaborative questions that request new information from the child, and that high rates of repetitive open-ended questions that make the same request over and over may even negatively affect children's participation (Reese & Newcombe, 2007).

Paralleling this work concerning mother-child reminiscing, the results of the few studies to date that have examined mother-child talk during events indicate that preschoolers produce longer and more detailed reports of these experiences if their mothers use elaborative *Wh*-questions, follow-in on, and positively evaluate their children's behaviors as activities are unfolding (Boland et al., 2003; Ornstein et al., 2004). Further, investigations of conversations during events have emphasized the importance of "joint" verbal exchanges between mothers and young children as being more strongly related to children's later remembering than interactions characterized as primarily involving mother-only talk, child-only talk, or no talk (Haden et al., 2001; Ornstein et al., 2004; Tessler & Nelson, 1994). Extrapolating from these findings, Ornstein et al. (2004) have argued that by posing elaborative *Wh*-questions that ask for new information about an ongoing event, a mother may call a child's attention to specific aspects of the event and determine what he or she may or may not understand about an experience. In addition, Ornstein et al. speculated that subsequent remembering may be enhanced when this questioning results in a joint verbal exchange, particularly one in which the mother's *Wh*-question is followed by the child's verbal provision of the requested information (e.g., the mother asks "What is the spatula used for?" and the child responds "For flipping.").

Secondary data analysis of a study by Haden et al. (2001) illustrates this idea. Ornstein, Haden, Coffman, Cissell, and Greco (2001) examined children's recall of a very specific subset of component features from the camping and ice cream store "adventures" that a small sample of children experienced with their mothers when they were 30 and 42 months old, respectively. For each mother-child dyad, the researchers focused on features of these activities about which *Wh*-questions had been asked by the mother during the event and that had also been responded to by the child. It was found that features about which questions were posed and responses provided were better recalled than features about which mothers' *Wh*-questions did not result in the children's response. Although limited in scope by the focus on features, this analysis of Haden et al.'s data nonetheless suggest that mothers' *Wh*-questions that are responded to by the child during an event are especially highly related to recall. Indeed, features of the camping and ice cream store activities about which *Wh*-questions were both posed and responded to were better remembered than were those components that were probed with *Wh*-questions that did not result in responses.

Given these findings, it is important to examine more deeply the nature of mother-child interaction as events unfold, focusing on the specific conversational formats that seem most critically related to successful remembering. To undertake such an analysis, the emphasis in this study is on children's alternate patterns of responding or not responding to their mothers' elaborative *Wh*-questions. Mother-child dyads were grouped based on individual differences in these specific mother elaborative *Wh*-question – child response/no response patterns that the previous literature suggests should be predictive of children's subsequent recall. It was expected that children would show the greatest mnemonic benefits, at each age

and over time, when their conversational interactions with their mothers as events unfolded were characterized as involving high levels of joint verbal engagement. This pattern of engagement was defined by the extent to which mothers' *Wh*- questions about various aspects of the experience were answered by the child with (correct) requested information.

## Method

### Participants

The sample was drawn from participants enrolled in larger longitudinal study of children's developing memory skills. Younger and older cohorts of children were initially recruited at 18 and 36 months of age, respectively, with half the sample residing in and around Chapel Hill, North Carolina and the other half in and around Chicago, Illinois. Children in the younger cohort were assessed at 18, 24, 30, 36, 42, 54 and 60 months age (see Haden et al., in press, for a report involving only this cohort), whereas those in the older cohort were assessed at 36, 42, 54, 60, and 72 months of age. The present study involves 89 mother-child dyads drawn from both cohorts who, of the full sample of 110 families, had complete data at both the 36 and 42 month age points for the tasks included in this report. The sample was 91% European American and largely composed of middle to upper-middle class families. The majority (90.8%) of mothers held a college degree, and 42.5% had further earned an advanced degree.

### Procedures

The children were seen in their homes for three visits at each age. Because they were enrolled in a large-scale longitudinal investigation, they participated in a range of memory and language tasks at each age point. For all participants, the first opportunity to engage in one of the two specially constructed events described below occurred at 36 months. Engagement in the event was preceded in that first visit at each age by a working memory for locations task, mother-child reminiscing, and, at 36-months, the receptive language test. At each age, a second visit one day after the first began with the researcher eliciting the children's memory for the events, followed at 36 months by the expressive language test. At the start of the third visit, three-weeks after the first at that age, memory for the events was once more assessed.

**Mother-child event engagement**—At both the 36- and 42-month time points, mothers and children participated in one of two novel events: a pretend “camping trip” or a “birdwatching adventure.” The order in which dyads participated in the camping and birdwatching events was counterbalanced over time, so that half of the families participated in each event at each age point. Based on procedures developed by Haden et al. (2001), the camping event began with the dyads preparing for the trip by packing backpacks with food items and camping equipment (e.g., canteen and lantern) to take on the trip. Next, they traveled along a walking path to a fishing pond, where they could catch fish using a fishing pole and net. After fishing, they continued on to a campsite, where there was a grill and a picnic area (e.g., utensils, cookware, blanket) that could be used to cook and eat their food, as well as a sleeping bag. The birdwatching adventure was similarly structured. The mothers and children prepared for the adventure by collecting items they could use to find the birds

(e.g., birdwatching vest, binoculars, magnifying glass). Then, they walked along a path strewn with clues (e.g., feathers, eggs) that led them to find six plush birds. Once the birds were found, the mothers and children continued on to a wooden tree, where they could give each bird a home and feed them with a variety of assorted food (e.g., sunflower seeds, worms, bugs). As illustrated in Table 1, the camping and birdwatching activities included a comparable number of component features with which the dyads could engage.

At the start of both the camping and birdwatching events, a research assistant stated the event theme and described the three different aspects of each experience using a simple map as an aid that illustrated the sequence of activities (e.g., in camping: "...After packing up, we would like you to hike to the fishing pond."). The mothers were encouraged to talk with their children as they naturally would and were asked, over the course of 15–20 minutes, to spend some time at each part of the event (e.g., in birdwatching: gearing up, finding the birds, making a new home). Because the mother-child interactions were audio and videotaped, it was possible to determine *if* and *how* each mother-child pair nonverbally and verbally interacted with the component features as the activities unfolded.

**Memory assessments of the joint activities**—The children's remembering of the camping and birdwatching events was assessed using a hierarchically structured standardized interview adapted from that used by Haden et al. (2001). At both time points, a research assistant interviewed each child following delay intervals of 1 day and 3 weeks. The structured interview began with general open-ended questions about what the children had experienced on the adventure (camping or birdwatching) they had with their mothers (e.g., "What did you do on your camping adventure with your mom?"). These questions were followed by more specific open-ended questions pertaining to particular aspects of the event (e.g., "What did you do when you packed up to go camping?"). Finally, the children were asked yes-no questions requesting information about features that they did not provide in response to the open-ended probes. These memory interviews were also video and audiotaped for subsequent scoring.

**Language assessments**—The children's expressive and receptive language skills were assessed at 36 months using the Preschool Language Scale-3 (Zimmerman, Steiner, & Pond, 1992). The Auditory Comprehension subscale of the test was administered at the first home visit, and the Expressive Communication subscale was administered one day later. The children's scores on these two subscales were summed and averaged to calculate a total language score for each child. Standardized total language scores were used for all analyses.

## Coding and Measures

**Talk during the events**—In order to examine mother and child verbal engagement during the events, a coding scheme was adapted from that developed by Boland et al. (2003) and Ornstein et al. (2001). Clauses were the coding unit for all codes. Maternal elaborative *Wh*-questions were defined as open-ended *who*, *what*, *where*, *when*, *why*, and *how* questions that probed for new information about the events from the child. The children's responses to maternal elaborative *Wh*- questions were categorized into one of five different types of mutually exclusive codes: (1) *correct responses* that were accurate answers to the mothers'

questions (e.g., mother asked what color the fish were and the child responded, “Red and yellow.”); (2) *incorrect responses* that supplied what could be judged as inaccurate information (e.g., mother asked what color a blue egg was and the child responded, “Purple.”); (3) *placeholders* that offered no substantive information in response to the mothers’ question (e.g., “I don’t know.”); (4) *no responses*; (5) and *unclassifiable* utterances that could not be discerned by the coder. Because mother *Wh-* questions – child unclassifiable responses were uninterpretable as to meaning, they were excluded from the analyses.

At each age point, inter-rater agreement was established on 25% of the videos of each event. Mean percent agreement ranged from 79.7% to 93.2%, averaging 85.3% and 86.7% for maternal codes at the 36 and 42 month age points, respectively. Percentage agreement for the child codes ranged from 72.9% to 95.5%, averaging 86.8% and 91.2% for the 36 and 42 month age points, respectively.

In addition to the frequency information that was obtained for each coding category, conditional probabilities were calculated to convey the extent to which each mother elaborative *Wh-* question – child response pattern was observed for each dyad (see Bakeman & Gottman, 1997, for review of sequential analysis). Specifically, in instances when the mother asked an elaborative *Wh-* question, the proportions of the child’s replies that were correct responses, incorrect responses, placeholders, or no responses were calculated.

**Children’s event memory**—Scoring of children’s memory reports was confined in this study to the children’s responses to the open-ended questions during the memory interviews and was undertaken using a system adapted from Haden et al. (2001). Each unique piece of information the children reported about the event during open-ended questioning was classified as representing either *feature naming* or *event elaborations*. *Feature naming* involved the reporting of component features of the event. *Event elaborations* offered embellished information about the features (e.g., “My backpack was red.”), or about the event in general (e.g., “Then we went fishing at the pond.”). Inter-rater reliability was established at each time point on 25% of the 1-day and 3-week event memory interviews. Average agreement for ranged from 80.6% to 100%, at 36 months, averaging 89.9% for the 1-day interview and 91.7% for the 3-week interview, and ranged from 81% to 100% at 42 months, averaging 92.8% for the 1-day interview and 94.6% for the 3-week interview.

## Results

### Characterizing Dyadic Verbal Responsiveness during Event Engagement

In order to focus on the features of mother-child conversations that are most directly related to successful remembering, the primary analysis strategy was to explore the utility of characterizing distinct groups of dyads according to patterns of contingent responding during the event engagement. To do so, it was important to determine if meaningful groups could be created on the basis of mothers’ use of elaborative open-ended *Wh-* questions that were either correctly responded to by the child, or not responded to at all, as these contingent response patterns capture the degree of joint verbal engagement during the unfolding events. The first step in the analyses, therefore, involved establishing the groups

based on the mother elaborative open-ended *Wh*- question – child response patterns that were observed during the activities at 36 months. On average, mothers asked 15.80 ( $SD=10.54$ ) and 16.75 ( $SD=10.59$ ) *Wh*- questions when the children were 36 and 42 months, respectively. Moreover, as illustrated in Figure 1, of the categories of child responses, the children most frequently responded to their mothers' elaborative *Wh*- questions with correct responses: 49% of the time at 36 months, and 55% of the time at 42 months of age. As further shown in the figure, it was also common for children not to respond at all to these queries, with this being the case on average 24% of the time at the 36 month age point, and 13% of the time at the 42 month age point.

Formation of the contrasting groups involved first identifying those dyads in the sample who at 36 months were both: (1) at or above the median in terms of the mother *Wh*- question – child correct response pattern, and (2) below the median for the mother *Wh*- question – child no response pattern. A total of 36 dyads were assigned to this *high joint talk* group that was characterized by a relatively high proportion of child correct responses and low proportion of child no responses to mothers' *Wh*- questions. The remaining 53 dyads were assigned to a *low joint talk* group that was composed of pairs who were relatively low in the proportion of mother *Wh*- questions that were correctly responded to by the children, and relatively high in the proportion of mother *Wh*- questions that were not responded to at all. A cluster analysis involving Ward's method (Ward, 1963) was performed using the two contingent response patterns as the basis for forming groups of dyads that corroborated the group membership that was obtained via the median split method.

The next analytic steps involved examining in greater detail the nature of the conversations during the unfolding events and relating the mother-child verbal event engagement to children's subsequent remembering. A series of repeated measure analyses of variance (ANOVAs) with event talk group (high joint talk, low joint talk) and child gender as between-subjects factors and age point (36, 42 months) as a within-subjects factor were conducted to describe the mothers' and children's verbal engagement in the events, and the children's event reports. All ANOVAs were initially carried out with site (Illinois, North Carolina) as another between-subjects factor, but because no site differences were found, the data were collapsed across this variable in the analyses that are presented. In addition, preliminary 2 (Event)  $\times$  2 (Gender) ANOVAs were run separately for each measure of talk during the events at each age point to test for potential differences as a function of event (camping, birdwatching). Mothers asked more *Wh*- questions during the birdwatching than the camping event,  $F_s(1, 85) = 19.45$  and  $25.01$  for 36 and 42 months, respectively,  $ps < .001$ . However, there were no event or event  $\times$  gender differences for any of the measures of mother-child contingent responding,  $F_s = 2.09$ ,  $ps = .15$ .

As shown in Table 2, preliminary correlational analyses revealed that the children's 36 month total standardized language score on the Preschool Language Scale-3 (PLS-3) ( $M=117.86$ ,  $SD=17.63$ ) was weakly correlated with two measures of event engagement at 36 months: maternal elaborative *Wh*- questions and the proportion of maternal open-ended question – child correct response pattern. However, the PLS-3 was not reliably associated with any other event engagement variables at either time point,  $r_s = .19$ ,  $ps = .07$ , but, as further illustrated in Table 2, there were robust significant correlations between language

and the children's reported memory at both time points. Therefore, the language score was used as a covariate in all ANOVAs involving measures of the children's memory as dependent variables.

### Verbal Engagement in the Events

To examine the joint interaction between mothers and children during the events, the next series of analyses focused on describing maternal elaborative *Wh*- questions and children's responsiveness to these questions. The ANOVA for maternal *Wh*- questions indicated that mothers in the high joint talk group asked more *Wh*- questions ( $M= 19.66, SD= 7.92$ ) than did mothers in the low joint talk group ( $M= 15.35, SD= 8.23$ ),  $F(1, 85) = 6.12, p < .05$ . In addition, mothers of girls ( $M= 19.27, SD= 8.24$ ) asked more *Wh*- questions than did mothers of boys ( $M= 15.74, SD= 7.93$ ),  $F(1, 85) = 4.14, p < .05$ . However, no significant main effects of age, or interactive effects, were obtained,  $F_s = 2.59, p_s = .11$ .

Consistent with how the joint talk groups were formed, as illustrated in Figure 2, in contrast to dyads in the low joint talk group, dyads in the high joint talk group evidenced more of the mother elaborative *Wh*- question – child correct response pattern,  $F(1, 85) = 46.81, p < .001$ , and less of the mother elaborative *Wh*- question – child no response pattern  $F(1, 85) = 42.61, p < .001$ . As further shown in Figure 2, over time, correct responding to *Wh*- questions tended to increase,  $F(1, 85) = 3.63, p = .06$ , whereas the no response pattern decreased over the six month period,  $F(1, 85) = 19.67, p < .001$ . Finally, for both of these two maternal *Wh*- question – child response patterns, the main effects were qualified by the interaction between group and age,  $F_s(1, 85) = 24.34$  and  $29.97$  for the *Wh*- question – correct response and the *Wh*- question – no response patterns, respectively,  $p_s < .001$ . Follow up tests indicated that although children in the low joint talk group increased in their proportion of correct responses over time ( $M_s = .35$  and  $.52$  at 36 and 42 months, respectively),  $F(1, 52) = 30.62, p < .001$ , children in the high joint talk group maintained a relatively high level of correct responses to their mothers' elaborative open-ended questions at both age points ( $M_s = .69$  and  $.61$ , at 36 and 42 months, respectively),  $F(1, 35) = 3.24, p = .08$ , and remained significantly higher in this response pattern than the low joint talk group at the 42 month time point,  $F(1, 87) = 4.68, p < .05$ . Moreover, whereas children in the low joint talk group showed a decrease in the mother elaborative *Wh*- question – child no response pattern over time ( $M_s = .35$  and  $.18$ , at 36 and 42 months, respectively),  $F(1, 52) = 40.31, p < .001$ , the children in the high joint talk group maintained a relatively low level of no responses to mothers' elaborative open-ended questions at both ages ( $M_s = .07$  and  $.08$ , at 36 and 42 months, respectively),  $F(1, 35) = .921, p = .34$ , and remained significantly lower in this response pattern than the low joint talk group at 42 months,  $F(1, 87) = 8.67, p < .05$ . Thus, despite overall increases in the correct response pattern and decreases in the no response pattern, the groups remained distinctly different in these alternate patterns of responding over time.

Two additional ANOVAs were conducted for children's placeholder and incorrect responses to mothers' elaborative *Wh*- questions. As inspection of Figure 2 also reveals, the joint talk groups were not different on either of these response patterns,  $F_s(1, 85) = .002$  and  $.105$  for the placeholder and incorrect contingent response patterns, respectively,  $p_s = .29$ . Although



the children's provision of placeholders in response to mothers' *Wh*- questions increased from 36 ( $M = .19$ ,  $SD = .15$ ) to 42 months ( $M = .24$ ,  $SD = .16$ ),  $F(1, 85) = 5.14$ ,  $p < .05$ , no change over time was found in incorrect responding,  $F(1, 85) = .01$ ,  $p = .91$ . Girls ( $M = .24$ ,  $SD = .12$ ) provided more placeholder responses to their mothers' elaborative open-ended questions than did boys ( $M = .18$ ,  $SD = .11$ ),  $F(1, 85) = 4.39$ ,  $p < .05$ . However, no significant age, delay, group, or gender interaction effects for these measures were found,  $F_s = 1.91$ ,  $p_s = .17$ .

### Linking Joint Talk during Events to Children's Subsequent Memory Reports

To consider whether children who engaged in more joint talk with their mothers during events showed elevations in their reported memory, two analyses of covariance (ANCOVAs) were performed on the two memory measures: features and event elaborations. The delay interval between event engagement and the memory interview (1 day, 3 weeks) served as a third within-subjects factor in these analyses. Based on the preliminary analyses showing links between the children's language and memory reports, 36 month language score was included as a covariate, in addition to the frequency of maternal *Wh*- questions. As illustrated in Figure 3, that displays the mean frequency of component features in the events reported by joint talk group, no change in memory for features was evident over the delay interval,  $F(1, 85) = .761$ ,  $p = .36$ , and only a trend was detected for an effect of age,  $F(1, 85) = 3.71$ ,  $p < .06$ . However, children whose verbal engagement in the events had been characterized as high in elaborative joint talk reported more features than did children in the low joint talk group,  $F(1, 85) = 10.41$ ,  $p < .01$ . No age, delay, or group interaction effects for reported feature memory were found,  $F_s = 2.78$ ,  $p_s = .09$ .

Inspection of Figure 4 indicates that the children in the high joint talk group also reported more elaborative details about the events than their counterparts in the low joint talk group. The main effect of group for event elaborations was statistically reliable,  $F(1, 85) = 17.22$ ,  $p < .001$ . There were no main effects of age or delay,  $F_s(1, 85) = 1.17$  and  $.027$ , respectively,  $p_s = .28$ , and no interactive effects,  $F_s = 3.27$ ,  $p_s = .07$ , were obtained.

In sum, given that the only significant effects for the measures of the children's remembering involved their event engagement group membership, it appears that joint talk during the event was linked in a clear and persistent manner to the children's reported memory. A final set of analyses was conducted to provide a test of the unique effects of joint talk group membership at 36 months on the children's reports of different events at 42 months, over and above any consistency in the children's reports over time. As illustrated in Table 3, partial correlational analyses of the children's memory for the two activities, controlling for child language, revealed that the children were consistent in their level of reporting of features, and in their level of reporting of event elaborations across the two interviews within each age point (1 day and 3 weeks), as well as across age (36 and 42 months). In light of these associations, two additional ANCOVAs were run with the children's reports of features and event elaborations at 42 months serving as the dependent measures, and the child's corresponding memory measure at 36 months acting as a third covariate. It was found that the effect of joint talk on the children's feature reporting at 42 months was attenuated when earlier feature memory at 36 months was controlled,  $F(1, 83) =$

2.31,  $p = .13$ . However, the impact of joint talk on the children's reporting of event elaborations at 42 months was maintained, even when controlling for elaborations at 36 months,  $F(1, 83) = 4.98, p < .05$ . This finding thus indicates a lasting impact of high joint talk at 36 months on children's reporting of the embellished details of another event at 42 months.

## Discussion

The results of this study make two contributions to the current understanding of the development of children's memory for personally-experienced events. On the one hand, this work adds to a growing literature that focuses on mother-child conversations during events (e.g., Ornstein et al., 2004), while on the other, it offers a fine-grained analysis of particular patterns of elaborative verbal exchanges between mothers and children that are associated with children's reported event memory. The linkages that were found between mother-child joint talk as events unfolded and children's remembering over time suggest that a potentially critical mechanism for event memory development can be found in conversations in which a mother's elaborative *Wh*- questions as an event unfolds elicit a correct response from her child.

Much of the literature on the development of children's event memory skills has focused on the ways in which mothers engage their children in talk about the past, and from this body of work, a characterization of maternal elaborative style has emerged (Fivush et al., 2006). Although the emphasis in this study was on the impact of mothers' elaborative *Wh*- questions that were asked during ongoing activities, as opposed to previously experienced events, there is nonetheless a shared commitment across these literatures to a view – inspired by sociocultural theory (e.g., Vygotsky, 1978) – that elaborations that actively engage children in conversational interactions are critical for the development and internalization of new skills. When talking about events as they unfold, *Wh*- questions are regarded as particularly important in that they call attention to specific aspects of an experience that may be especially salient and also prompt the retrieval of names, descriptions, actions, explanations, and so forth, that can lead a child to construct enriched representations of his or her experiences (Boland et al., 2003; Haden et al., 2001). Practice in these types of conversational interactions may, in turn, lead children to encode events in ways that make them more accessible in the future.

The present investigation of mother-child conversations as events unfold is also similar to studies that examine talk about the past in being based on the premise that children's memory is facilitated by elaborative *joint* discussions. For example, Reese et al. (1993) reported that mothers who demonstrated a “high elaborative” reminiscing style were more likely than mothers with a “low elaborative” style to make elaborative comments when the children were not immediately responding, in an effort to encourage their verbal participation in ways that would promote joint talk. The focus in the current project on children's responses to mothers' elaborative *Wh*- questions fits well with an emerging perspective that it is not just how many questions mothers ask, but rather the way in which these questions are responded to by children that may influence encoding and later remembering (e.g., Ornstein et al., 2004).

Considerable variability in talk during the events was observed across the different mother-child dyads in the current sample, with individual differences in mothers' elaborative *Wh*-questions being met with variation in children's responsiveness to these questions. For example, at 36-months, children responded about half the time to maternal elaborative *Wh*-questions with a correct response, however, they simply did not respond at all to one-quarter of these questions. A consideration of the proportion of mothers' *Wh*- questions that were responded to in these two ways proved to be a meaningful way to make the dyad the unit of analysis, and to differentiate between those who were engaged in "high" versus "low" levels of joint talk. In contrast to the conversations of "low joint talk" dyads, the conversations of "high joint talk" dyads were characterized by an elevated proportion of children's correct responses and a low proportion of failures to respond to mothers' *Wh*- questions. These groups, established at the 36-month age point, remained distinctly different at 42 months, despite increases over time in children's correct responding, and decreases in the frequency with which they did not respond to these questions. Put another way, the dyads were consistent over time in the extent to which they did or did not engage in joint talk as the specified events unfolded (c.f., Reese et al., 1993 for evidence of consistency in maternal reminiscing style over time).

Most important, at both ages, children who were part of high joint talk dyads reported more features and event details in subsequent assessments of their memory for the experiences than did those in the low joint talk dyads. These findings were robust across the 1-day and 3-week delay intervals at each age, and from 36 to 42 months of age. Nevertheless, because children's memory reports of the events at one assessment was associated with their reports at other assessments, it was important to consider whether joint talk group membership at 36 months uniquely predicted children's 42 month memory, over and above any consistency in the children's abilities to report their memory over time. The strongest test of this would involve the use of a prior assessment of the children's event memory skills as a covariate; unfortunately, no such measure is available for one of the two cohorts involved in this longitudinal study. Even still, in the context of the analyses presented, the finding that the children's provision of event elaborations at 42 months was associated with their joint talk group membership is particularly noteworthy. This is because it adds to evidence that the strongest effects of joint talk during events may be for children's abilities to provide embellished information about the events beyond feature labeling (e.g., Boland et al., 2003; Haden et al., 2001). This result suggests that the children's memory for specific event details - such as that the backpacks were red and green or that they put the duck in the birdbath - is dramatically affected by joint verbal exchanges that occur during the events.

It should be noted that this study represents a departure from traditional approaches to examining the role of joint talk in remembering that have been taken in previous studies (e.g., Haden et al., 2001; Ornstein et al., 2001). Here, mothers' *Wh*- questions were considered irrespective of whether they were about features (e.g., grill, nest) or other aspects of the experience (e.g., packing up to go camping, feeding the birds), and therefore it was possible to explore more fully the richness of mother-child interactions as they related to recall. Moreover, in contrast to previous studies in which a variety of different conversational forms were classified together as instances of "joint talk," in the present

investigation, the emphasis was on the children's varying responses to mother-initiated *Wh*-questions. The findings obtained in the present study reinforce the view that such fine-grained assessments of mother-child interactions as events unfold are important for understanding mechanisms underlying the development of children's memory skills. Finally, the findings suggest that the effects of joint talk are not limited to children's reporting of features that were labeled by dyads during engagement in a particular event (e.g., Lange & Carroll, 2003). Indeed, differences between the joint talk groups established at 36 months were both substantial and maintained over time, especially when one considers the children's reports of elaborative detail of a different event that was experienced at 42 months. It therefore seems likely that what children gain from their engagement in joint conversations during events may be the means by which children construct elaborate representations of these experiences, making them more available for future recall.

To be sure, it is not clear why some dyads engage in more joint talk than others as events unfold, and this topic is certainly ripe for future research. Based on the findings presented here, children's language skills do not seem to drive this form of conversational engagement. Moreover, willingness to talk about events did not seem to underlie differences in joint talk as the events unfolded. Indeed, children in the high and low joint talk groups did not differ in their use of placeholders or in the provision of inaccurate information, measures that may be seen as proxy indicators of their interest in talking about their experiences. In addition, with regard to future studies, given the framework provided here, it is still necessary that researchers examine linkages between joint talk during and after events to determine if dyads who engage in high levels of joint talk during an event do also when reminiscing about the same and other events. The current findings also reinforce the idea that a more elaborated understanding of maternal conversational style is needed (e.g., Fivush et al., 2006), that the concept as it has evolved in the literature may be too global, and that different elaborative conversational patterns may be more or less associated with child outcomes. What is more, the results support the notion that a comprehensive examination of mother-child event engagement must include not only the frequency of maternal elaborative *Wh*-questions, but also whether children do or do not respond to such queries.

## Acknowledgments

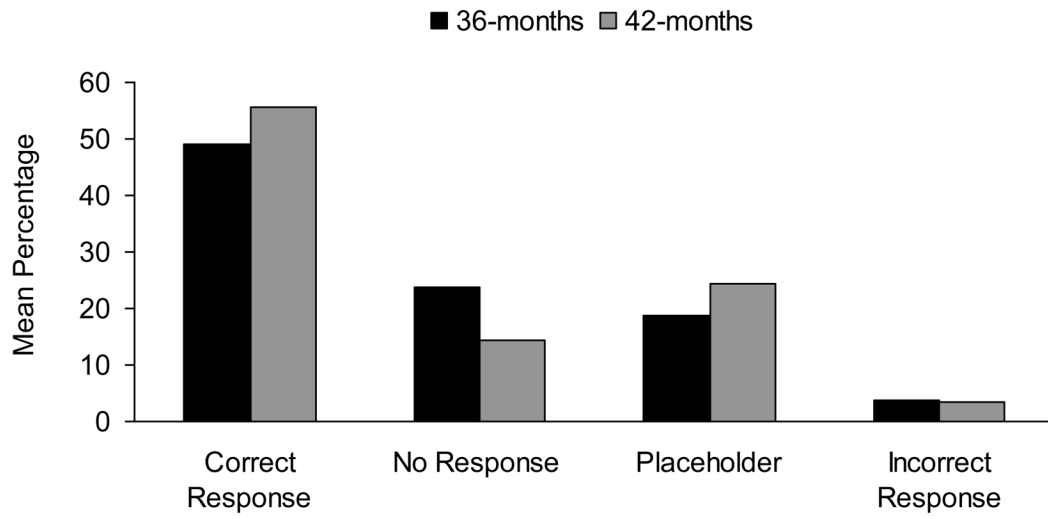
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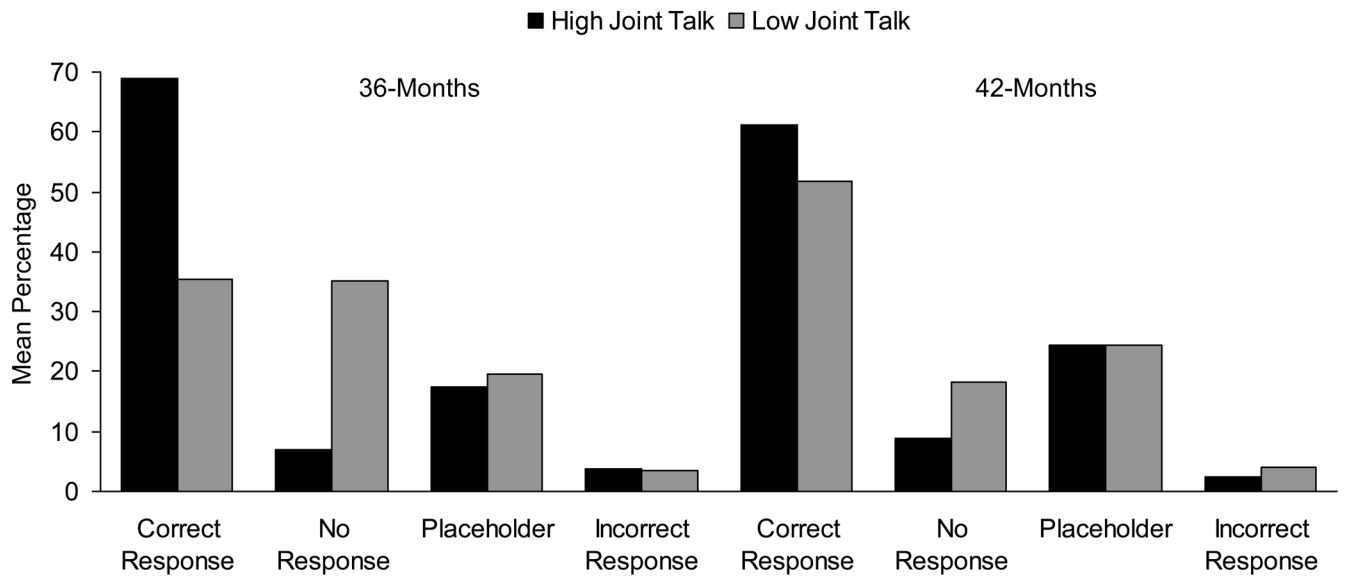
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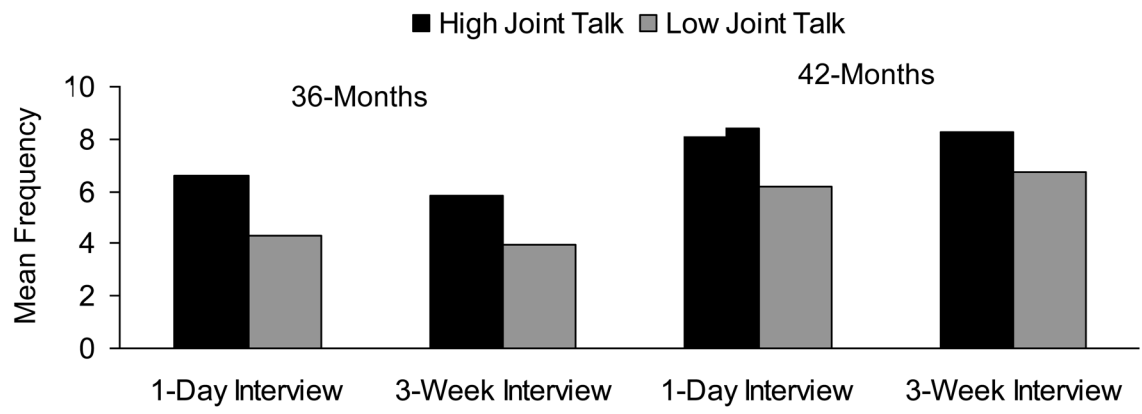


**Figure 1.**  
Proportion of Child Responses to Maternal *Wh*- Questions during the Events

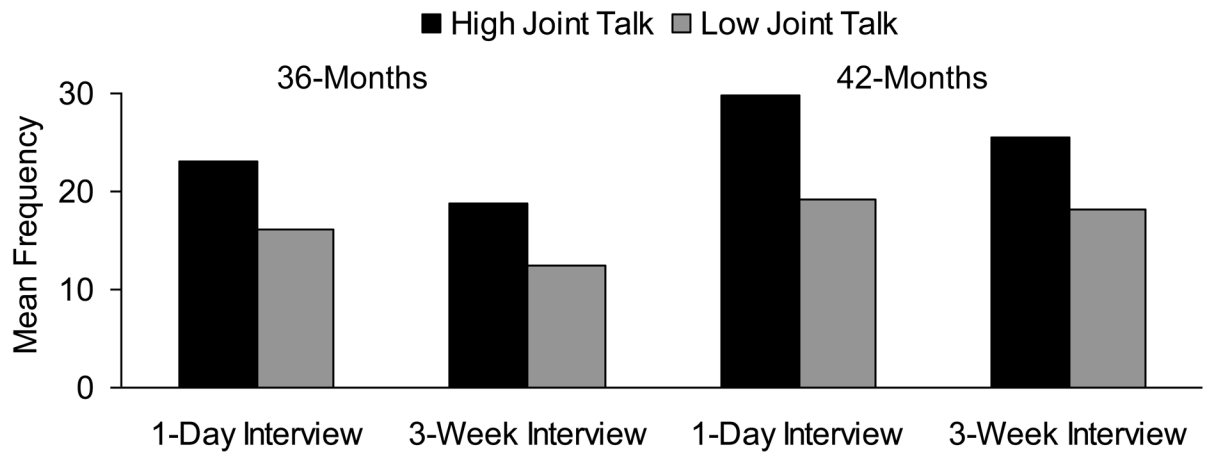


**Figure 2.**  
Proportion of Child Responses to Maternal *Wh-* Questions during the Events by Joint Talk Group





**Figure 3.**  
Children’s Reporting of Feature by Joint Talk Group



**Figure 4.** Children’s Reporting of Event Elaborations by Joint Talk Group

**Table 1**

## Features of the Camping and Birdwatching Events

<b>Camping</b>		<b>Birdwatching</b>	
Map	Tomatoes	Map	Duck
Backpacks	Marshmallows	Vest	Tree
Path (and footprints)	Drinks	Binoculars	Birdhouse
Lantern	Mustard	Magnifying glass	Nest
Fish	Potato Chips	Basket	Bird Feeder
Pond	Barbeque Grill	Field guide	Bugs
Fishing Rod	Frying Pan	Path	Worms
Net	Pot	Eggs	Peanuts
Hamburgers	Tongs	Feathers	Sunflower Seeds
Hotdogs	Plates	Owl	Strawberry
Buns	Cups	Robin	Flowers
Chicken	Napkins	Baby bluebirds	Flower Pot
Lettuce	Tablecloth	Blue jay	Watering Can
Cheese	Sleeping Bag	Eagle	Birdbath

**Table 2**

Correlations Between Children's Language Scores, Event Engagement, and Memory Measures

Event Engagement and Memory Measures	PLS-3 at 36 Months	
	36 Months	42 Months
Event Engagement		
Maternal Elaborative <i>Wh</i> - questions	.23*	.13
Maternal <i>Wh</i> - question – Child Correct Response Pattern	.21*	.05
Maternal <i>Wh</i> - question – Child No Response Pattern	– .15	– .17
Maternal <i>Wh</i> - question – Child Placeholder Response Pattern	.05	.19
Maternal <i>Wh</i> - question – Child Incorrect Response Pattern	.17	– .03
Memory		
Features at 1-Day Delay	.38**	.29**
Features at 3-Week Delay	.30**	.27**
Event Elaborations at 1-Day	.44**	.29**
Event Elaborations at 3-Week Delay	.36**	.33**

\*  $p < .05$ .\*\*  $p < .01$ .

Table 3

Partial Correlations Between Children's Memory Reports at 36 and 42 months Controlling for PLS-3 Total Language Scores

Memory Reports	36 months			42 months		
	1 Day	3 Weeks	Event Elaborations	1 Day	3 Weeks	Event Elaborations
	Features	Event Elaborations	Features	Event Elaborations	Features	Event Elaborations
Memory Reports at 36 Months						
Features						
1 Day	---					
3 Weeks	.64***	---				
Event Elaborations						
1 Day	.55***	.39***	---			
3 Weeks	.48***	.68***	.53***	---		
Memory Reports at 42 months						
Features						
1 Day	.31**	.37***	.09	.29**	---	
3 Weeks	.49***	.37***	.21*	.30**	.43***	---
Event Elaborations						
1 Day	.28**	.29**	.04	.23*	.64***	---
3 Weeks	.38***	.37***	.14	.27**	.43***	.67***

\*  $p < .05$ .

\*\*  $p < .01$ .

\*\*\*  $p < .001$ .