Training Mothers in Elaborative Reminiscing Enhances Children’s Autobiographical Memory and Narrative

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This longitudinal intervention assessed children’s memory at 2-1/2 years (short-term posttest; N = 115) and their memory and narrative at 3-1/2 years (long-term posttest; N = 100) as a function of maternal training in elaborative reminiscing when children were 1-1/2 to 2-1/2 years. At both posttests, trained mothers were more elaborative in their reminiscing than untrained mothers. At the long-term posttest, trained mothers were also more repetitive than untrained mothers. Children of trained mothers provided richer memories than children of untrained mothers at both posttests. Children of trained mothers also produced more accurate memories with researchers but only if they had high initial levels of self-awareness. Results are discussed with respect to theory and practice in autobiographical memory development.

Parents who talk in richly detailed ways with their children about past events have children who go on to discuss the past more elaboratively with their parents and with others (Engel, 1995; Fivush & Fromhoff, 1988; Hudson, 1993; McCabe & Peterson, 1991; Reese, Haden, & Fivush, 1993). This research demonstrating a link between parents’ elaborative reminiscing styles and children’s narrative and memory skill has been largely correlational (but see Peterson, Jesso, & McCabe, 1999). To examine causality more directly, in this longitudinal intervention we ask whether mothers can be trained to talk more elaboratively with their children about the past and whether this elaborative style of talking about the past affects the accuracy and narrative quality of children’s reminiscing.

Elaborative Reminiscing: Links to Children’s Autobiographical Memory and Narrative

Fivush and Fromhoff (1988) noted that middle-class mothers varied in the way they discussed past events with their children. Some mothers adopted a highly elaborative style in which they provided rich amounts of information in their statements and questions (e.g., “What did we call the big mean ugly fish?”). Children of these mothers provided more new information about the past event in the same conversation, which mothers confirmed profusely. Even when their children failed to provide new information (e.g., “I don’t know”), these mothers responded with further elaborative questions and statements. Other mothers were much less elaborative, and even repetitive, in their style of talking about the past, and their children provided less information overall about past events. The critical element for children’s provisions of new memory information appears to be parents’ use of open-ended elaborative questions (e.g., “What did we do at the adventure playground?”; Farrant & Reese, 2000; Haden, 1998).

Subsequent research replicated these different styles of reminiscing but extended the link to children’s reminiscing with parents over time (McCabe & Peterson, 1991; Reese et al., 1993), to children’s “independent” reminiscing with a researcher (Hudson, 1993; Leichtman, Pillemer, Wang, Koreishi, & Han, 2000), and to the narrative quality of children’s talk about the past (Haden, Haine, & Fivush, 1997; Minami, 2001; Peterson & McCabe, 1992, 1994). Researchers have not directly assessed the role of participants’ socioeconomic status (SES) in these studies, but individual variation in talk about the past extends to parents of lower education levels, such that a highly elaborative style also exists among mothers of lower education levels (Farrant & Reese, 2000). Culture is an...
important factor in an elaborative reminiscing style. Anglo mothers are on average more elaborative when talking about everyday past events than are Chinese mothers (Wang, 2001), Korean mothers (Mullen & Yi, 1995), and New Zealand Māori mothers (Hayne & MacDonald, 2003).

In the only experimental study of a parental elaborative reminiscing style, Peterson et al. (1999) trained 10 low-income mothers to use open-ended *where* questions (especially *where* and *when* questions) with their preschool children when talking about the past, to encourage children to say more by repeating children’s responses, and to follow children’s lead in the conversations. Researchers told another 10 mothers in the control group that the study was on children’s narrative development, but these mothers were not visited in the intervention year. At the end of the intervention, trained mothers had increased their use of open-ended *where* questions, especially *when* and *where* questions, and confirmed children’s responses more often during reminiscing. Children of trained mothers had increased more in their receptive vocabulary scores than children of untrained mothers. One year later, children of trained mothers (*n* = 7) told longer past-event narratives containing more context information (*where* and *when* information) compared with children of untrained mothers (*n* = 7). This study thus demonstrates that an elaborative reminiscing style can enhance children’s personal narrative skills and that the effects may be specific to the narrative devices mothers were trained to use. This study was with a small sample, however, and did not address causal contributions of an elaborative reminiscing style for the accuracy of children’s autobiographical memory narratives.

A recent maternal training study demonstrated that an elaborative conversational style increases children’s memory for descriptive details of an event. Boland, Haden, and Ornstein (2003) trained one group of mothers to talk elaboratively with their preschool children during a novel camping event. Children of trained mothers later recalled more descriptive details, and marginally more features, from the event compared with children of untrained mothers. McGuigan and Salmon (2006) also demonstrated the benefits of elaborative encoding for children’s nonverbal memory in the form of behavioral re-enactment. These studies verify that an adult’s elaborative style during an event can increase the accuracy and volume of children’s autobiographical memories, but they did not assess the role of an elaborative reminiscing style.

A final experimental study in this area compared the benefits of adult elaborations during and after a novel zoo event for children’s memory. McGuigan and Salmon (2004) found that elaborative talk after the event (reminiscing) was most effective at increasing the volume of children’s accurate verbal memory compared with elaborative talk during and before the event. Only elaborative reminiscing facilitated children’s nonverbal memory in the form of photo recognition relative to an empty talk (nonelaborative) condition. In this study, experimenters and not mothers were the children’s conversational partners, and they only discussed a single recent event.

**Mechanisms of Elaborative Reminiscing for Children’s Memory and Narrative**

Taken together, the correlational and experimental studies help us create a picture of the role of elaborative talk in children’s autobiographical memory and narrative development. Elaborative talk during an event may play a role primarily for children’s rich encoding of an event and, specifically, may draw children’s attention to the details (Boland et al., 2003) and goals of an event (McGuigan & Salmon, 2004). Elaborative talk that occurs after an event, however, may be especially beneficial for children’s overall memory for the event (McGuigan & Salmon, 2004) and perhaps for their event narratives (Peterson et al., 1999). We argue that this memory enhancement may occur through language and specifically through the narratives that parents and others tell after an event (see Fivush, Haden, & Reese, 2006, for similar arguments). Only after an event does a parent have the uninterrupted time to create a narrative about the event. Elaborative reminiscing may be uniquely important for children’s memory of the event in part because a coherent and evaluative narrative is more memorable than isolated elaborative comments. McGuigan and Salmon’s (2004) results demonstrated that elaborative reminiscing affects children’s memory at the level of representation, as accessed through their nonverbal memory. Elaborative reminiscing may be strengthening children’s existing event representations as well as enriching children’s existing representations through language, and in these ways enhance children’s memory and narrative for the event.

**The Role of the Child in Autobiographical Memory Development**

Children also play a role both in their parents’ reminiscing style and in their own reporting of past events. One powerful child factor in reminiscing is children’s initial interest in hearing about the past, even before they can contribute verbally to the conversations. Children’s placeholders, or their
empty but attentive conversational turns, at age 1-1/2 mediated in part their mothers’ use of open-ended elaborative questions when children were age 2-1/2 (Farrant & Reese, 2000). Children’s general language skills are also an important factor in their later event reports, with children of higher language levels reporting more information with their mothers (Reese, 2002a).

Children’s self-awareness is also hypothesized to be a critical factor in the beginning of autobiographical memory. Howe and Courage (1993, 1997) proposed that self-awareness in the second year of life, as displayed in the classic mirror task of self-recognition (Lewis & Brooks-Gunn, 1979), is a prerequisite for children to begin to encode, store, and retrieve events as personally relevant. Indeed, Prudhomme (2005) demonstrated that 20-month-old children who passed the mirror task of self-recognition displayed more mature declarative memory than did nonpassers in their ability to generalize to stimuli of a different color in a deferred imitation paradigm. Moreover, Harley and Reese (1999) demonstrated that children’s self-recognition at 19 months predicted the volume of their early memory reports at 25 and 32 months, both with mothers and with experimenters. Critically, the role of self-awareness for memory in this sample was mediated by mothers’ reminiscing style, such that mothers became more elaborative with children who had higher levels of self-awareness (Reese, 2002a). Maternal elaborations then directly predicted children’s later memory in mother–child conversations. Children with higher levels of self-awareness also showed a steeper rise in their independent memory reports from 25 to 32 months, especially if they had a highly elaborative mother (see Harley & Reese, 1999, Figure 3, p. 1344). Notably, mothers’ open-ended elaborative questions independently predicted children’s later event reporting even when all of these child factors were included in the same model (Reese, 2002a). Thus, although children’s early self-awareness does appear to play a role in their autobiographical memory, self-awareness appears to interact with maternal elaboration in complex ways to produce these effects.

The Present Study

This longitudinal intervention is the first large-scale experimental test of a maternal elaborative reminiscing style for children’s autobiographical memory and narrative development. One hundred and fifteen mothers were randomly assigned to receive training in elaborative reminiscing or to participate in a control condition from the time their children were 21 to 29 months old. Mother–child reminiscing, children’s language, and children’s self-awareness were assessed before the intervention at 19 months because this was the age at which the pass rate for mirror self-recognition was nearly 50% in a previous sample of New Zealand children (Harley & Reese, 1999). When children were 31.5 months, we assessed the short-term effects of the training on mothers’ reminiscing style and on children’s memory and participation in the same conversations. Farrant and Reese (2000) found that 32 months was the age at which New Zealand children started to internalize their mothers’ reminiscing style. At 44 months, we assessed the long-term effects of training for mother–child reminiscing, but we expanded the types of past event conversations to include talk about unshared past events and emotional past events (separation and misbehavior; see Laible & Thompson, 2000). Children are capable of providing a relatively coherent account of a past event to an unfamiliar conversational partner by 3-1/2 years (e.g., Fivush, Haden, & Adam, 1995) so at this last time point we assessed the completeness and accuracy of children’s autobiographical memory with a researcher, with mothers providing the accuracy check. All maternal and child conversations at the long-term posttest were also coded for narrative quality (Haden et al., 1997) because a coherent, evaluated narrative is hypothesized to be more memorable.

We predicted straightforward benefits of a maternal elaborative reminiscing style for children’s reminiscing with their mothers and expected these benefits to extend later to children’s independent memory and narrative. In accord with Harley and Reese (1999), we expected the effects of the maternal reminiscing training to interact with children’s self-awareness, especially for children’s independent memory reports, with the highest levels of memory coming from children who had stronger levels of self-awareness at the beginning of the intervention and whose mothers were trained to be more elaborative in their reminiscing.

Method

Participants

Researchers distributed flyers advertising a toddler study of language and memory development in day-care centers and health clinics to recruit 128 families with 19-month-old children from Dunedin, New Zealand. In all families, mothers identified themselves as the children’s primary caregivers. All 128 families participated in pretesting, but 2 families dropped out of the study before a training assignment because they were moving during the intervention.
Overview

The first visit at 19 months consisted of a pretest of maternal reminiscing style, children’s language, and children’s self-awareness. All dyads were then visited at 21, 23, 25, 27, and 29 months for interim assessments of children’s language and nonverbal memory that are not discussed here. Mothers who were assigned to the experimental group received training at the end of the 21-, 25-, and 29-month time points. All dyads participated in a short-term posttest at 31.5 months and a long-term posttest at 44 months.

19-Month Time Point

A team of two female graduate student researchers visited all families in their homes at the start of the study. Researchers gained maternal consent, obtained demographic information, conducted an assessment of the children’s self-awareness, and asked mothers to converse with their children about past events. Mothers were given a child language assessment to complete and mail back to the researcher in a prepaid courier envelope approximately 1 week after the visit. All visits were audiorecorded and videotaped.

Children’s self-awareness. Researchers administered a version of the classic mark test (Amsterdam, 1972; Lewis & Brooks-Gunn, 1979) in which they wiped blue face paint on the child’s nose with a tissue and then 2 min later placed the child 50 cm in front of a 40 × 60 cm mirror. One researcher videotaped the child’s reaction for 2 min while the primary researcher tapped the mirror, if necessary, to gain the child’s attention. The primary researcher coded children as passing the self-awareness test if they touched within 1 cm of the mark and as failing the test if they only touched the mirror instead of the mark or if they referred to the mark verbally but did not touch it. A third researcher coded 25% of these tasks from videotape and achieved 94% (kappa = .86) agreement with the primary researcher’s online coding. The two coders then resolved any disagreements.

Past-event conversations. Researchers asked mothers to choose two unique events they had participated in with their children to discuss at this first session.
Mothers chose events such as a farm visit, going to a parade, or a museum visit. A researcher coded these conversations from videotape for open-ended elaborative questions containing new information (e.g., “What did we feed the baby sheep?”), for children’s memory elaborations (e.g., “Milk”), and for children’s empty but attentive conversational turns or placeholders (e.g., ‘‘Dunno’’; see Farrant & Reese, 2000, for a full description of these codes). A second coder independently coded 25% of the conversations from videotape and reached reliability of 86% (kappa = .80) across all codes. The first coder coded all remaining videotapes.

Children’s language. Mothers completed the MacArthur Communicative Development Inventory: Words and Sentences (MCDI:WS; Fenson et al., 1993) for their children over the ensuing week. In this measure for older toddlers, mothers check which of more than 600 words their children have produced. We adapted this inventory slightly by listing a New Zealand equivalent beside 24 of the words (e.g., crib/cot and diaper/nappy; similar to Reese & Read, 2000). The language inventories were scored for children’s total vocabulary and the mean sentence length for their three longest sentences. Notably, Reese and Read (2000) showed that this adapted version of the MCDI:WS has high predictive validity for children’s later receptive and expressive vocabulary assessed using standardized language measures.

Training Group Assignment

Mothers were classified as having lower or higher levels of education based on the presence or absence of tertiary education. Dyads within each educational group were matched as closely as possible on the basis of child gender, self-awareness, total vocabulary, maternal open-ended elaborative questions, and children’s participation in the form of placeholders. Dyads were then randomly assigned to the training or no-training group. Scores on the initial variables for the 115 dyads who completed the training year are displayed in Table 2.

Training Phase

All families were visited every 2 months in the home during the training phase, when children were 21, 23, 25, 27, and 29 months of age. The same two female researchers from pretest each visited half of the families. Half of each researcher’s families were in the training group and half were in the no-training group. At each visit, researchers asked all mothers to complete another language inventory (again, the adapted version of the MCDI:WS) for their children. All children also participated in nonverbal memory assessments at each of these sessions using sets of novel objects. These tasks are not relevant for the present study and are not discussed further.

At the end of the 21-, 25-, and 29-month sessions, mothers in the training group received a bag with an instruction sheet (see the Appendix) and a tape recorder loaded with a 60-min cassette. Researchers asked mothers to talk more often with their children about past experiences, using the techniques listed on the instruction sheet, as a way of helping their children’s conversational skills. Researchers informed mothers about the types of past events they would probably have the most success discussing: novel or one-time experiences in which the child showed some interest. Researchers told mothers that the event conversations could take place anywhere and anytime. Mothers were asked to record their past-event conversations over the ensuing week and to return the completed tape and the tape recorder in a prepaid courier bag at the end of the week. We intended to use the tapes as a manipulation check, but because not all mothers returned tapes after each training session, the tapes were not analyzed and are not discussed further. The bag also contained a stamping set and a certificate entitled, “Well done—you talked about the past lots with your mum” that mothers could have children stamp each time they had a past-event conversation. The certificates were used solely to make the conversations more fun for the children and were left with the families. These brief instructions for discussing the past were the only way that mothers in the training and no-training groups were treated differently during the intervention phase.

Short-Term Posttest

The first posttest occurred across two sessions when children were 31.5 months old, 2.5 months after

<table>
<thead>
<tr>
<th>Pretest variable</th>
<th>No training</th>
<th>Training</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal education</td>
<td>13.86 (2.96)</td>
<td>14.89 (3.17)</td>
</tr>
<tr>
<td>Paternal occupation</td>
<td>3.06 (1.51)</td>
<td>2.91 (1.54)</td>
</tr>
<tr>
<td>Maternal open elaborations</td>
<td>1.54 (1.78)</td>
<td>1.42 (1.60)</td>
</tr>
<tr>
<td>Children’s elaborations</td>
<td>0.28 (0.77)</td>
<td>0.28 (0.74)</td>
</tr>
<tr>
<td>Children’s placeholders</td>
<td>0.30 (0.66)</td>
<td>0.26 (0.86)</td>
</tr>
<tr>
<td>Self-awareness</td>
<td>32% passed</td>
<td>36% passed</td>
</tr>
<tr>
<td>Vocabulary</td>
<td>87.81 (75.06)</td>
<td>73.44 (76.39)</td>
</tr>
<tr>
<td>Mean length of utterance</td>
<td>2.19 (1.02)</td>
<td>1.97 (0.98)</td>
</tr>
</tbody>
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the last intervention session. The same two female researchers visited all families together at this time point. Note that for each family, one of the researchers had not visited since the pretest and was unaware of their group assignment. This researcher conducted all tasks with the parent and child. The researcher who had visited the family during the intervention phase operated the audio and video equipment.

Mothers and children discussed two recent past events that had occurred since the last home visit 2.5 months before. Therefore, mothers never discussed with their children events they had previously discussed during the training phase. The primary researcher gave all mothers the same instructions for these past-event conversations, which was to talk in whatever way and for as long as they wished about the past events. Researchers were out of the room during the past-event discussions, which were audio-taped and videotaped. These conversations were transcribed verbatim in preparation for coding for mothers’ and children’s reminiscing style (Farrant & Reese, 2000). Transcripts were masked so that coders were unaware of the child’s identity, gender, or the dyad’s group assignment. In addition to the codes discussed previously (mothers’ open-ended elaborative questions and children’s memory elaborations and placeholders), the conversations were coded for mothers’ closed-ended elaborative questions (e.g., “Did we give the sheep a bottle?”), elaborative statements (e.g., “Then we went inside”), repetitions of their own previous statement or question (e.g., “What did we give the sheep?” and later “What did we give them?”), and confirmations (e.g., “Yes, that’s right, milk”). Children’s codes also included memory repetitions of information previously mentioned by mother or child (e.g., “Milk”), yes—no responses to mothers’ questions, and off-topic talk (e.g., “Can I go play now?”). Two coders completed coding on 25% of all transcripts, and then one coder coded the remaining transcripts. Average reliability was 80% (kappa = .76) for maternal codes and 82% (kappa = .77) for children’s codes.

**Long-Term Posttest**

The long-term posttest was conducted when children were 44 months old. One of the original researchers along with four new female researchers visited families in their homes in teams of two for two sessions. The primary researcher in each team was unaware of the dyad’s group assignment. Mothers’ reminiscing style was assessed during mother–child conversations about the past, and children’s memory and narrative were assessed both in mother–child and researcher–child conversations.

**Mother–child talk about past events.** In the first session of the long-term posttest, mothers discussed past events with their children in a similar manner as they had at the short-term posttest. Mothers selected two events in which they had participated with their children (shared events) since the short-term posttest, and two for which they were not present (unshared events). Mothers typically chose events that had positive themes, such as outings and special occasions. These conversations were conducted in the same manner as at the short-term posttest.

Researchers also asked mothers to select two additional events to discuss with their children in the second session: a one-time event when their children experienced separation from them and a one-time event when their children misbehaved (see Laible & Thompson, 2000). Examples of separation events included getting lost at a mall or staying away for the night without the mother. Examples of misbehavior events included running after a ball into the road, breaking a car headlight, and hitting a dog with a piece of wood. These conversations were conducted in the same manner as at the short-term posttest.

**Children’s independent memory and narrative.** At the first session of the long-term posttest, mothers selected three new past events for the researcher–child discussions. All events were unique, one-time experiences that had occurred since the short-term posttest and that had not been discussed in the mother–child conversations. The primary researcher interviewed children about these past events using a procedure adapted from Peterson and McCabe (1983). To make the interview more natural and to put the child at ease, the researcher provided the child with a pad of white paper and a set of markers and asked the child to draw whatever he or she wished. The researcher also drew on a separate pad of paper. After several minutes, the researcher began the interview by giving the child the title of each target past event in the following way: “Your mum told me that you went to the glow worm caves, but she didn’t tell me what happened. Tell me everything that you remember about going to the glow worm caves.” If the child did not respond, the researcher then stated, “I’d really like to hear about when you went to the glow worm caves.” The researcher then provided general prompts to facilitate the conversation, such as, “Tell me some more,” as well as general encouragement, such as saying “wow,” “cool,” and by repeating the child’s responses verbatim. The researcher never prompted the child to discuss what they were drawing but responded appropriately when the child wished to discuss the drawing. The
researcher paused for several minutes between each event discussion as the dyad continued to draw. When the researcher determined the child to have finished talking about the events, she concluded the conversation.

Coding past-event conversations for memory. All past-event conversations were transcribed verbatim and masked for child identity, gender, and group assignment. First, mothers’ and children’s utterances in the mother–child conversations, and children’s utterances in the researcher–child conversations, were coded for reminiscing style using the same scheme as at the short-term posttest. Reliability between two independent coders on 25% of the mother–child transcripts was 85% (kappa = .79) across event types for maternal codes and 88% (kappa = .80) across event types for children’s codes. For researcher–child conversations, reliability between two independent coders on 25% of the transcripts was 84% (kappa = .79) for children’s codes. One coder coded the remaining transcripts.

For the researcher–child conversations only, mothers judged the accuracy of children’s memory (cf. Fivush & Schwarzmueller, 1998; MacDonald & Hayne, 1996). Each unit of new information children offered about the past event (independent memory elaborations) was highlighted on a clean copy of the transcript, which was sent to the mothers as soon as possible after the interview took place. Mothers noted for each utterance whether it was definitely correct information or definitely incorrect information. They were also urged to use a third category called maybe correct. Researchers instructed mothers to use the maybe correct category whenever they were even slightly unsure of their own memory for the event or when the utterance concerned the child’s subjective perception of the event (e.g., “They scared me”). Eighty-eight of the mothers (88%) checked and returned the transcripts. Mothers who returned the transcripts verified, on average, 76% of the children’s memory elaborations as definitely correct. When mothers’ coding of maybe correct responses was included, 86% of children’s memory elaborations on average were verified.

Coding past-event conversations for narrative content. Next, children’s and mothers’ utterances that contained new information were coded for narrative content (see Haden et al., 1997; Newcombe & Reese, 2004). Each new utterance was subcoded into the following categories: description (“You wore a blue coat”); action (“You swam a long way”); orientation to person, place, or time (“Granny and Gramps were at Wanaka at Christmastime”); and evaluations. The evaluation category included references to internal states (“You were mad”), judgments (“You looked pretty”), intensifiers (“You were so mad”), and emphasis terms (“You nearly crawled; you had to sit real still”). Reliability between two independent coders on 25% of the mother–child transcripts was 93% (kappa = .90) across event types for maternal codes and 94% (kappa = .91) across event types for children’s codes. Reliability between two independent coders on 25% of the researcher–child transcripts was 92% (kappa = .89) for children’s codes. One coder coded the remaining transcripts.

Results

The plan for the analyses was as follows: (a) to ensure that the two groups were in fact similar at pretest; (b) to test the strength of the experimental manipulation on mothers’ reminiscing style at the short-term and long-term posttests, and to examine possible moderators of maternal training effects; and (c) to assess changes as a function of maternal training in children’s memory and narrative at the short-term and long-term posttests.

Preliminary Analyses

There were 10 pieces of missing data out of 645 tasks (self-awareness for 2 children; conversations for 8 events). Missing data were dealt with conservatively by substituting the mean score for that child’s gender and group assignment (Tabachnick & Fidell, 2000). The initial vocabulary score and five of the conversational variables were positively skewed. Log transformations were completed on the skewed variables and transformed scores were used in all correlational and covariance analyses. Untransformed variables are displayed in all tables and figures.

In some prior research on parent–child reminiscing in the United States, parents are more elaborative and evaluative with daughters, and girls remember and participate more in reminiscing than do boys (e.g., Reese & Fivush, 1993). We conducted one-way child gender ANOVAs on the mother and child memory and narrative variables at all time points. At the 19-month and 31.5-month time points, there were no significant gender differences (all ps > .12). At the 44-month time point, but only during the unshared past event conversations, mothers of daughters used more statement elaborations (M = 5.32, SD = 4.99) than did mothers of sons (M = 3.56, SD = 3.19), F(1, 98) = 3.97, p < .05, and girls gave more placeholders (M = 4.42, SD = 4.42) than did boys (M = 2.78, SD = 2.30), F(1, 98) = 4.76, p < .05. These
gender differences are in the same direction as in prior research, but because so few gender differences were apparent at these young ages, child gender was not considered in further analyses.

Pretest Analyses

Because 13 families dropped out of the study between the pretest and the short-term posttest, we first needed to ascertain that the two resulting groups were similar in all measured ways before the start of the intervention. We conducted one-way training group ANOVAs and chi-square analyses as appropriate on all pretest variables at 19 months. No significant differences between the two groups emerged from these analyses (refer to Table 2 for the group means).

Because many of the pretest variables were correlated with the outcome variables at the short-term and long-term posttests, we elected to use analysis of covariance (ANCOVA) with a standard set of pretest covariates for all analyses of the effects of maternal training. The pretest variables that were most strongly correlated with the outcome variables at the short-term and long-term posttests were maternal education ($r = -0.02$ to $0.36$), children’s vocabulary ($r = -0.29$ to $0.28$), children’s memory elaborations ($r = -0.14$ to $0.27$), children’s placeholders ($r = -0.22$ to $0.18$), and mothers’ open-ended elaborative questions ($r = -0.15$ to $0.31$). Children’s initial memory elaborations and placeholders were significantly correlated ($r = 0.49$, $p < 0.01$); therefore, we combined them for a final set of four pretest covariates (maternal education and open-ended elaborative questions, children’s total vocabulary and combined memory elaborations/placeholders). In moderator analyses, in which pretest maternal education or pretest maternal elaborative questions was a between-subjects factor, those variables were omitted from the standard set of covariates. Children’s vocabulary and initial memory variables, however, were included as covariates in all analyses.

Changes in Maternal Reminiscing and Narrative as a Function of Training

Our first goal was to conduct a manipulation check to determine whether the trained mothers differed from mothers in the control group in their past-event style shortly after the training phase ended, when children were 31.5 months, and again at the long-term posttest, when children were 44 months. The mother–child past-event conversations at each posttest were examined to address this question. We performed ANCOVAs on mothers’ reminiscing variables at the short-term and long-term posttests to examine our prediction that trained mothers would use more open-ended elaborative questions and confirmations, as the key features of the elaborative reminiscing style, than would untrained mothers. At the long-term posttest, we also examined changes in mothers’ narrative style as a function of training.

Changes in Maternal Reminiscing at the Short-Term Posttest

The first set of one-way training group ANCOVAs addressed differences in mothers’ reminiscing style at the short-term posttest as a function of training. As predicted, mothers who had received training used more open-ended elaborative questions, $F(1, 109) = 8.78, p < 0.01, \eta^2 = 0.09$, and confirmations, $F(1, 109) = 9.12, p < 0.01, \eta^2 = 0.10$, when reminiscing with their children than did untrained mothers (see Figure 1). Trained and untrained mothers did not differ significantly in their use of closed-ended elaborative questions, elaborative statements, or repetitions. Thus, the training worked in a specific way to increase the targeted utterances.

Interactions between training and mothers’ initial reminiscing style. A common occurrence in intervention research is that some participants take on the training to a greater extent than do other participants, and in developmental research the effects of a parent or teacher intervention would be specific to children who were actually exposed to the targeted behaviors. An example of this type of moderation occurred in
Whitehurst et al. (1994) in which teachers at some Head Start centers were more compliant than others in practicing dialogic reading with their students over the year-long intervention; correspondingly, the students in the more compliant centers showed greater effects of dialogic reading. In the current study, it could be that some mothers adopted the elaboration training to a greater extent than did other mothers, and the extent to which children changed was a function of these maternal differences. Possible moderating factors include mothers’ initial levels of elaboration and their education. Perhaps mothers who were initially more elaborative were more successful in adopting the training, or perhaps mothers with more education were able to adopt an elaborative style more easily. We tested for the first possibility by dividing the groups of mothers into initially high elaborative (n = 62) and initially low elaborative (n = 53) based on a median split of mothers’ open-ended elaborative questions at pretest. Then we performed two-way Training Group × Maternal Elaboration ANCOVAs on mothers’ reminiscing style variables at 31.5 months (omitting the covariate of mothers’ pretest open-ended elaborative questions). There was a main effect of maternal elaboration on mothers’ open-ended elaborative questions at 31.5 months, $F(1, 108) = 4.61, p < .05, \eta^2_g = .04$, with initially high-elaborative mothers continuing to ask more open-ended elaborations at the 31.5 time point compared with initially low-elaborative mothers. No other main effects of initial maternal elaboration were observed. More important, there were no significant interactions between mothers’ initial elaboration and training group for any maternal reminiscing variable at 31.5 months. Thus, mothers adopted the elaboration training regardless of their initial levels of elaboration.

Interactions between training and mothers’ education levels. We then tested for interactions between mothers’ education levels and training group on mothers’ reminiscing style at the short-term posttest. Mothers were classified as having less education (n = 56; < 14 years) or more education (n = 59; ≥ 14 years) based on a median split. This dichotomous education variable was used in two-way Training Group × Maternal Education ANCOVAs on mothers’ reminiscing at 31.5 months (omitting the covariate of maternal education). Significant main effects of maternal education were observed for every maternal conversational variable at 31.5 months (see Table 3). Mothers with more education used more of all conversational codes at 31.5 months, even after controlling for children’s initial language level, children’s initial conversational participation, and mothers’ initial elaborations. However, there were no significant interactions between maternal education and training group for any maternal variable. Thus, although mothers with more education were more talkative overall at the short-term posttest than were mothers with less education, mothers of different education levels adopted the elaboration training with equal ease.

Changes in Maternal Reminiscing at the Long-Term Posttest

Many parent intervention studies examine only short-term compliance (e.g., Peterson et al., 1999; Whitehurst et al., 1988). We were interested in whether trained mothers maintained the elaborative reminiscing style in the long term. At the 44-month time point, a full 15 months after the last training session, mothers discussed a wider range of past events with their children: shared (2), unshared (2), separation, and misbehavior events. We calculated mothers’ average use across the six events for the following variables: open-ended elaborative questions, yes–no elaborative questions, elaborative statements, repetitions, and confirmations.

We then performed a series of two-way Training Group × Maternal Education ANCOVAs on mothers’ reminiscing style variables at 44 months. As predicted, there were main effects of training on the key variables of mothers’ open-ended elaborative questions, $F(1, 93) = 10.72, p < .01, \eta^2_g = .10$, and confirmations, $F(1, 93) = 5.58, p < .05, \eta^2_g = .06$. Mothers who had received training continued to use more open-ended elaborative questions and confirm children’s responses more during past-event conversations at the long-term posttest than did untrained mothers (see Table 4). However, at this time point, trained mothers also used more statement elaborations, $F(1, 93) = 4.01, p < .05, \eta^2_g = .04$, and repetitions, $F(1, 93) = 12.00, p < .01, \eta^2_g = .11$. The effect of training on maternal repetitions was almost

---

Table 3

<table>
<thead>
<tr>
<th>Maternal variable</th>
<th>Less (n = 56)</th>
<th>More (n = 59)</th>
<th>F(1, 108)</th>
<th>$\eta^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open elaborations</td>
<td>4.90 (3.04)</td>
<td>6.92 (3.25)</td>
<td>8.74**</td>
<td>.08</td>
</tr>
<tr>
<td>Closed elaborations</td>
<td>5.60 (3.05)</td>
<td>7.38 (3.49)</td>
<td>6.60*</td>
<td>.06</td>
</tr>
<tr>
<td>Statement elaborations</td>
<td>1.81 (1.83)</td>
<td>4.17 (4.21)</td>
<td>13.32**</td>
<td>.11</td>
</tr>
<tr>
<td>Repetitions</td>
<td>4.84 (3.27)</td>
<td>6.38 (3.45)</td>
<td>4.10*</td>
<td>.04</td>
</tr>
<tr>
<td>Confirmations</td>
<td>4.45 (3.65)</td>
<td>7.51 (4.38)</td>
<td>12.55**</td>
<td>.11</td>
</tr>
</tbody>
</table>

*p < .05, **p < .01.
completely due to trained mothers using more open-ended repetitive questions, \(F(1, 93) = 11.97, p < .01, \eta^2 = .11\). Trained mothers did not, however, use more yes–no elaborative questions at this time point compared with untrained mothers, \(F(1, 93) = 1.48, ns\). Three significant main effects of maternal education for maternal reminiscing variables remained at this time point for mothers’ open-ended elaborative questions, \(F(1, 93) = 6.05, p < .05, \eta^2 = .06\); statement elaborations, \(F(1, 93) = 10.15, p < .01, \eta^2 = .10\); and confirmations, \(F(1, 93) = 10.55, p < .01, \eta^2 = .10\), with more educated mothers using more of these variables than less educated mothers (see Table 4). There were no significant interactions between training group and maternal education for any variable (all \(ps > .12\)). Therefore, trained mothers remained more elaborative and confirming during past-event conversations than did untrained mothers at this time point, but they also asked more open-ended repetitive questions. Thus, the effects of training on mothers became less specific to the targeted techniques by the long-term posttest.

Changes in Maternal Narrative at the Long-Term Posttest

Next, we tested the long-term effects of the training on the content of mothers’ past event narrative style at 44 months. All new pieces of information that mothers provided for each event (elaborations) were sub-coded for narrative content and averaged across the four event types. We ran a series of two-way ‘Training Group × Maternal Education’ ANCOVAs on mothers’ narrative codes. There were significant main effects of maternal training for mothers’ use of descriptions, \(F(1, 93) = 4.93, p < .05, \eta^2 = .05\); actions, \(F(1, 93) = 6.84, p < .05, \eta^2 = .07\); and evaluations, \(F(1, 93) = 7.20, p < .01, \eta^2 = .07\). In all cases, mothers in the training group used more of each narrative device than did mothers in the no-training group (see Table 5). There were also significant main effects of maternal education for all narrative variables: descriptions, \(F(1, 93) = 9.90, p < .01, \eta^2 = .10\); actions, \(F(1, 93) = 8.82, p < .01, \eta^2 = .09\); orientations, \(F(1, 93) = 7.63, p < .01, \eta^2 = .08\); and evaluations, \(F(1, 93) = 8.06, p < .01, \eta^2 = .08\). There were no significant interactions between training group and maternal education for any narrative variable (all \(ps > .51\)). Thus, mothers in the training group used a richer variety of most narrative devices, except for orientations, with their children than did mothers in the no-training group. These differences as a function of training were not dependent on mothers’ education levels.

Changes in Children’s Memory and Narrative as a Function of Maternal Training

Changes in Children’s Memory

Having established that trained mothers did indeed become more elaborative in their reminiscing style compared with untrained mothers, we sought to determine the role of maternal training in children’s memory outcomes. First, we tested for short-term effects of the training on children’s memory and participation levels when reminiscing with their mothers at 31.5 months. Second, we tested for long-term effects of maternal training on children’s memory with mothers and researchers at 44 months.

Changes in children’s reminiscing with mothers at 31.5 months. The first set of one-way training group ANCOVAs addressed differences in children’s reminiscing style with their mothers at 31.5 months as a result of the maternal training. We predicted that children of trained mothers would participate more, and perhaps remember more, in the conversations than would children of untrained mothers. Children are still
giving very little unique memory information in these conversations at age 2-1/2 (Farrant & Reese, 2000); therefore, we predicted the immediate effects of the training would be strongest for their participation, as measured by their memory repetitions, placeholders, and yes–no responses, as opposed to their actual memory performance, measured by their memory elaborations. Note that children’s repetitions function differently from maternal repetitions; children’s repetitions are positively correlated with maternal memory performance, measured by their memory repetitions, placeholders, yes–no responses, as opposed to their actual training would be strongest for their participation, as measured for pretest covariates. C-ELAB = memory elaborations; C-REP = memory repetitions; PL = placeholders; YN = yes–no responses; OFF = off-topic.

Figure 2. Children’s means per shared past event (+SE) during mother–child reminiscing at 31.5 months as a function of maternal training group, adjusted for pretest covariates. C-ELAB = memory elaborations; C-REP = memory repetitions; PL = placeholders; YN = yes–no responses; OFF = off-topic.

Table 6
Means per Shared Past Event (and Standard Deviations) for Children’s Reminiscing at 31.5 Months as a Function of Maternal Education (Less or More)

<table>
<thead>
<tr>
<th>Child variable</th>
<th>Less (n = 56)</th>
<th>More (n = 59)</th>
<th>F(1, 108)</th>
<th>p</th>
<th>( \eta^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elaborations</td>
<td>3.46 (3.07)</td>
<td>5.51 (3.77)</td>
<td>7.84**</td>
<td>.08</td>
<td></td>
</tr>
<tr>
<td>Repetitions</td>
<td>1.69 (1.58)</td>
<td>3.02 (2.20)</td>
<td>14.07**</td>
<td>.12</td>
<td></td>
</tr>
<tr>
<td>Placeholders</td>
<td>1.27 (1.37)</td>
<td>2.06 (1.98)</td>
<td>5.14*</td>
<td>.05</td>
<td></td>
</tr>
<tr>
<td>Yes–no</td>
<td>3.34 (2.57)</td>
<td>4.67 (3.40)</td>
<td>5.19*</td>
<td>.05</td>
<td></td>
</tr>
<tr>
<td>Off-topic</td>
<td>2.61 (2.45)</td>
<td>2.92 (2.42)</td>
<td>0.33</td>
<td>.01</td>
<td></td>
</tr>
</tbody>
</table>

*p < .05. **p < .01.
responses, $F(1, 93) = 8.13, p < .01, \eta^2_g = .08$, with children of more educated mothers using more of each of these utterance types. Thus, children of trained mothers continued to remember and participate more when discussing past events with their mothers at this long-term posttest. Children of less educated mothers who had received training were more off topic, however, than children of less educated but untrained mothers.

**Changes in children’s independent memory at 44 months.** Next, we tested for differences in children’s independent memory, as assessed by their memory elaborations in the researcher–child interview at 44 months, as a function of maternal training. Recall that only 88 mothers checked and returned the interview transcripts; therefore, these analyses were conducted on memory elaborations for the whole sample at this data point ($N = 100$) and then again on the memory elaborations verified by 88 mothers as definitely correct. Because researchers gave different numbers of prompts to children during the interviews, we calculated children’s independent memory as the ratio of the number of memory elaborations they provided divided by the number of researcher prompts they received (Harley & Reese, 1999).

We tested the role of maternal training in children’s independent memory both as a main effect and in interaction with children’s initial self-awareness, in accord with past research (Harley & Reese, 1999) and with our predictions that children who entered the study with advanced self-awareness would benefit the most from maternal elaborations in their independent memory. We first divided the sample into children with early ($n = 34$) or later ($n = 66$) self-awareness at the beginning of the study (based on passing or failing the mark test at 19 months). A series of unpaired $t$ tests revealed no significant differences between early and later recognizers’ vocabulary, mother–child reminiscing, or maternal education levels (all $p$s > .36). We then performed two-way Training Group $\times$ Self-awareness ANCOVAs on the children’s verified and unverified independent memory variables. The pattern was similar for the two variables. There were no significant main effects of self-awareness for either variable ($p$s > .69). There was a marginal main effect of maternal training for the verified memory variable, $F(1, 69) = 3.45, p = .07, \eta^2_g = .05$, but not for the unverified memory responses ($p > .40$). For both verified and unverified independent memory, there was a significant interaction between self-awareness and maternal training: verified, $F(1, 69) = 7.87, p < .01, \eta^2_g = .10$, and unverified, $F(1, 92) = 5.45, p < .05, \eta^2_g = .06$. Follow-up ANCOVAs within self-awareness groups indicated no main effects of training for later recognizers ($p$s > .20) but a significant effect of training for early recognizers: verified, $F(1, 22) = 6.13, p < .05, \eta^2_g = .22$, and unverified, $F(1, 28) = 2.85, p < .10, \eta^2_g = .09$. Children benefited in their independent memory from the maternal elaboration training when they had a higher level of self-awareness at the outset of the study (see Figure 3).

**Changes in Children’s Narrative at 44 Months**

Children’s narrative was measured in two types of conversations when they were 44 months old: mother–child and researcher–child past-event talk. Children’s provisions of new information (total memory elaborations) in each conversation were coded for their use of descriptions, actions, orientations, and

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**Table 7**

Means per Past Event (and Standard Deviations) for Children’s Reminiscing With Mothers at 44 Months as a Function of Training Group and Maternal Education (Less or More)

<table>
<thead>
<tr>
<th>Child variable</th>
<th>No training</th>
<th>Training</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Less (n = 26)</td>
<td>More (n = 26)</td>
</tr>
<tr>
<td>Elaborations</td>
<td>3.34 (1.58)</td>
<td>5.61 (2.94)</td>
</tr>
<tr>
<td>Repetitions</td>
<td>1.24 (0.98)</td>
<td>1.28 (1.02)</td>
</tr>
<tr>
<td>Placeholders</td>
<td>1.51 (0.86)</td>
<td>1.90 (1.23)</td>
</tr>
<tr>
<td>Yes – no</td>
<td>2.46 (1.68)</td>
<td>3.88 (2.09)</td>
</tr>
<tr>
<td>Off-topic</td>
<td>1.33 (1.06)</td>
<td>1.81 (1.74)</td>
</tr>
</tbody>
</table>

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**Figure 3.** Children’s memory elaborations per prompt (+SE) during researcher–child conversations at 44 months as a function of early self-awareness and maternal training group, adjusted for pretest covariates.
evaluations. We predicted that children of trained mothers would use more narrative devices than would children of untrained mothers, perhaps especially for the advanced narrative devices of orientations and evaluations.

Children’s narratives with mothers. Because we found large main effects of maternal education on mothers’ use of narrative devices at the 44-month time point, we analyzed children’s narrative content during the mother–child conversations with two-way Training Group × Maternal Education ANCOVAs (see Table 8). There were significant main effects of maternal training for children’s use of actions, \( F(1, 93) = 6.62, p < .05, \eta^2 = .07 \); descriptions, \( F(1, 93) = 6.16, p < .05, \eta^2 = .06 \); and evaluations, \( F(1, 93) = 4.17, p < .05, \eta^2 = .04 \). There were also main effects of maternal education for all narrative variables: actions, \( F(1, 93) = 17.32, p < .01, \eta^2 = .16 \); descriptions, \( F(1, 93) = 14.58, p < .01, \eta^2 = .14 \); orientations, \( F(1, 93) = 7.34, p < .01, \eta^2 = .07 \); and evaluations, \( F(1, 93) = 13.72, p < .01, \eta^2 = .13 \). There were no significant interactions between maternal training and education for any child narrative variable (all \( ps > .84 \)). Overall, then, the maternal training increased children’s use of all narrative devices except their orientations.

Children’s independent narratives. The new information that children provided in their independent narratives with researchers was also subcoded for narrative content. Given the finding that self-recognition moderated the effects of maternal training on children’s independent memory elaborations, we performed a two-way Training Group × Self-Awareness ANCOVA on children’s independent narrative codes. There was a significant main effect of maternal training for children’s provision of actions, \( F(1, 92) = 4.96, p < .05, \eta^2 = .05 \) (see Figure 4). Moreover, there was a significant interaction between training and self-awareness for children’s provision of actions, \( F(1, 92) = 5.29, p < .05, \eta^2 = .05 \); orientations, \( F(1, 92) = 7.74, p < .01, \eta^2 = .08 \); and evaluations, \( F(1, 92) = 4.28, p < .05, \eta^2 = .04 \). Follow-up analyses revealed that early recognizers benefited more from training than later recognizers in their provision of actions in their independent narratives, \( F(1, 29) = 5.22, p < .05, \eta^2 = .15 \). Early recognizers were only marginally more likely to provide evaluations and orientations as a result of training compared with later recognizers (\( ps < .10, \eta^2 = .09 \) to .10). Thus, long-term effects of the maternal training were apparent in children’s ability to provide an independent narrative, especially in terms of their provision of actions, but only when they were initially high in self-awareness.

Table 8
Means per Past Event (and Standard Deviations) for Children’s Narrative Content With Mothers at 44 Months as a Function of Training Group and Maternal Education (Less or More)

<table>
<thead>
<tr>
<th>Child variable</th>
<th>No training</th>
<th>Training</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Less (n = 26)</td>
<td>More (n = 26)</td>
</tr>
<tr>
<td>Descriptions</td>
<td>2.22 (1.58)</td>
<td>5.48 (3.26)</td>
</tr>
<tr>
<td>Actions</td>
<td>0.94 (0.79)</td>
<td>1.86 (1.22)</td>
</tr>
<tr>
<td>Orientations</td>
<td>0.71 (0.39)</td>
<td>0.96 (0.40)</td>
</tr>
<tr>
<td>Evaluations</td>
<td>0.66 (0.40)</td>
<td>1.09 (0.56)</td>
</tr>
</tbody>
</table>

In a final set of analyses, we explored the mechanism of changes in children’s reminiscing by examining whether mothers who increased the most in their elaborations over time had children who increased the most in their remembering over time. We also explored the point at which children generalized their remembering with mothers to their independent remembering, separately for the trained and untrained groups.

We addressed these questions with correlational analyses based on maternal and child gain scores, partialing out mothers’ and children’s initial elaborations, children’s vocabulary, and mothers’ education. For mothers, we computed their gains in open-ended...
elaborative questions from the 19- to 31.5-month time points, and again from the 31.5- to 44-month time points. For children, we computed their gains in memory elaborations from the 19- to 31.5-month time points, and again from the 31.5- to 44-month time points. Maternal elaboration gains were strongly correlated with children’s memory gains at both time points; these correlations were equally strong for the trained (31.5 months: $pr = .55, p < .01$; 44 months: $pr = .63, p < .01$) and untrained (31.5 months: $pr = .63, p < .01$; 44 months: $pr = .52, p < .05$) groups, probably because maternal elaborations and child memory naturally increase over these ages (Farrant & Reese, 2000). Maternal elaboration gains at both time points were uncorrelated with children’s independent memory elaborations for both groups ($prs = -.01$ to .11, ns). Children’s memory gains at 31.5 months, however, were correlated with their later independent memory but only for children in the training group ($pr = .34, p < .05$) and not for children in the untrained group ($pr = .16, ns$). Thus, across both groups, mothers who increased in their elaborations over time had children who increased in their remembering with mothers. Only for children in the training group, however, did their remembering with mothers at the earlier time point generalize to their independent remembering at the later time point.

**Discussion**

We successfully trained mothers to become more elaborate in their reminiscing styles, although they did not maintain the elaborate reminiscing style with strict fidelity 15 months after training. Nevertheless, we demonstrated short-term and long-term benefits of an elaborate reminiscing style for the completeness and narrative quality of children’s reminiscing with their mothers. For children who had higher self-awareness at the start of the study, we also demonstrated long-term effects of maternal training for the accuracy and narrative quality of children’s memories with others.

*Changes in Mothers’ Reminiscing Styles*

In the short term, mothers changed their reminiscing styles in specific ways in response to training, regardless of their initial levels of elaboration or education. Mothers in the training group did not simply talk more at this time point; they increased their use of the open-ended elaborative questions and confirmations in which they were trained. Taken together with other elaboration training studies (Boland et al., 2003; Peterson et al., 1999), it appears to be relatively easy to train mothers in an elaborate style of event talk using a variety of different training methods at different levels of intensity.

In the long term, a full 15 months after the last training session trained mothers still talked about a wide range of past events in more elaborate and confirming ways than untrained mothers, but the effects of training were less specific. Trained mothers also asked more open-ended repetitive questions at this time. Trained mothers used more narrative descriptions, actions, and evaluations in their conversations than did untrained mothers, but they did not differ in their orientations. If we had conducted only a short-term manipulation check, as is typical in parent interventions (e.g., Peterson et al., 1999; Whitehurst et al., 1988), we would never have known about these ways in which mothers continued to adapt the training in the long term.

Over time, mothers appeared to translate our request to ask more open-ended elaborative questions as a request to simply ask more open-ended questions in general. In future elaboration interventions with parents, we recommend that researchers highlight to an even stronger degree the possible deleterious effects of repetitive questions on children’s memory and participation. Moreover, all maternal elaboration training studies have been conducted primarily with mothers of White European descent. It is possible that elaboration training will not work in the same way with mothers of different cultural backgrounds in which past-event talk is conducted for moral reasons (e.g., Miller, Wiley, Fung, & Liang, 1997; Wang, 2001) or in cultures in which it is less appropriate for mothers to engage in child-centered talk (Ochs, 1982).

In our sample, we had only a small number of non-European New Zealand participants (9% of the mothers were Māori or Pacific Island); therefore, we could not conduct parametric analyses as a function of ethnicity. Exploratory nonparametric analyses (available on request from the first author), however, revealed no significant differences in the way mothers of different cultures adopted the training or in their conversations with children at 19 and 31.5 months. There was some evidence by the final time point, however, that Māori and Pacific Island mothers had begun to offer fewer open-ended elaborative questions ($M = 7.22, SD = 3.42$) and confirmations ($M = 5.89, SD = 4.96$) than European New Zealand mothers (elaborative questions: $M = 10.66, SD = 5.45$; confirmations: $M = 11.18, SD = 7.12$) but only for shared past events. This preliminary finding needs to be verified with a larger sample, but it is consistent with other findings that Māori mothers are less elaborate
than European New Zealand mothers when discussing everyday shared past events with their children (Hayne & MacDonald, 2003; Reese & Farrant, 2003) but are equally or more elaborative when discussing significant events in the child’s life (Reese, Hayne, & MacDonald, in press).

**Changes in Children’s Reminiscing Styles**

Children of trained mothers responded at both time points by remembering and participating more in the mother–child conversations and correspondingly using more narrative descriptions, actions, and evaluations. In their conversations with researchers, children of trained mothers produced higher rates of accurate information and referred to more actions in their narratives but only if they had higher self-awareness at the start of the study. Children of trained mothers, but not untrained mothers, generalized their reminiscing style with mothers at 32 months to their independent reminiscing style with a researcher by 44 months. Although this generalization to independent reminiscing also occurs naturally over time (e.g., Farrant & Reese, 2000; Haden et al., 1997), it appears that the training helped children form the link sooner between their remembering style with mothers and their remembering style with others.

Mothers who use high rates of open-ended repetitive questions could turn past-event talk into an interrogation instead of an enjoyable conversation. In partial support of this hypothesis, children of trained but less educated mothers became dramatically more off topic at the long-term posttest. We are not sure why the children of trained but more educated mothers, who also used more open-ended repetitive questions, did not similarly respond with increased off-topic talk. In future research, we plan to explore the role of maternal repetitions in children’s reminiscing as a function of social class and culture.

**Theories of Autobiographical Memory**

These results are in accord with past research on the role that mothers’ elaborative reminiscing style plays in children’s autobiographical memory (e.g., Cleveland & Reese, 2005; Fivush & Fromhoff, 1988; Haden, 1998; Hudson, 1993; Reese, 2002a; Reese et al., 1993) and narrative development (Haden et al., 1997; Peterson et al., 1999). This study, however, is the first to provide experimental evidence for the memory benefits of mothers’ elaborative reminiscing. Similar to the recent Boland et al. (2003) study of the effects of maternal elaboration training during encoding, our elaborative reminiscing training was linked to children’s ability to provide complete details about past events with their mothers and, for children with higher self-awareness, to their ability to provide complete and accurate details when interviewed by a researcher. This moderating effect of self-awareness found in the children’s independent reminiscing is in line with the pattern observed in Harley and Reese (1999) on a different sample of New Zealand children and their mothers’ naturally occurring reminiscing styles. In that study, children with higher self-awareness showed a steeper increase in their independent memory skill from ages 2 to 2-1/2, with the highest levels of independent memory coming from children with high self-awareness and a highly elaborative mother. Moreover, Welch-Ross (2001) noted a similar interaction between maternal elaboration and various indexes of self-awareness for preschoolers’ autobiographical memory, with children with more advanced self-awareness benefiting the most from maternal elaborations in their own memory. The present results provide an experimental replication of these patterns.

Povinelli (2001) argued that the mirror task of self-recognition assesses the beginning of children’s representational view of self, as an outgrowth of domain-general advances in representational abilities (cf. Bard, Todd, Bernier, Love, & Leavens, 2006). If this interpretation is correct, it is possible that having a concept of self earlier in development may help children internalize maternal elaborations about past events to enrich their store of personal memories. Howe and Courage (1997) hypothesized that children who pass the mirror task earlier are amassing self attributes at a faster rate and would be expected to develop richer, longer lasting autobiographical memories of early events. In the present study, however, there was no significant main effect of children’s self-awareness on independent memory by 44 months (cf. Reese, 2002a). We would like to qualify Howe and Courage’s (1993, 1997) theory by positing that early self-awareness on its own is not a strong predictor of later autobiographical memory. Very young children in particular may need the added benefit of adults’ elaborative talk about events to maintain memories in the long term. Remembering our personal past is in most cases an interpersonal enterprise (cf. Bauer, 2006; Nelson & Fivush, 2004; Reese, 2002b; Thorne, 2000).

**Maternal Education and Mother–Child Conversations**

In contrast to earlier research with New Zealand samples that revealed few links between mothers’ education levels and their reminiscing (Farrant & Reese, 2000; Newcombe & Reese, 2004), we found...
large main effects of maternal education for nearly every maternal and child conversational variable measured. Regardless of training group, less educated mothers and their children had sparser and less evaluative conversations about the past. The range of education in the present sample was broader than in past research, with some mothers having as few as 10 years of education and other mothers as many as 24 years. It is apparent that social class differences in the quantity and quality of adult language input to young children exist in New Zealand, similar to findings in the United States (e.g., Hart & Risley, 1995; Hoff, 2003).

Implications and Limitations

We achieved relatively large and long-lasting effects on children’s autobiographical memory and narrative with a brief maternal intervention at 3 points during the child’s 3rd year of life. Only for children of trained mothers did we observe a link between their memory with mothers at age 2-1/2 and their later memory with a researcher at age 3-1/2. Moreover, by age 3-1/2, the children of trained mothers who began the study with higher levels of self-awareness told longer, more accurate, and richer memory narratives with a researcher. A growing number of educators and researchers recognize the importance of personal narrative skill for children’s school achievement (Griffin, Hemphill, Camp, & Wolf, 2004; O’Neill, Pearce, & Pick, 2004). Children’s ability to tell a coherent narrative also affects teachers’ judgments about a child’s intellect and abilities (Michaels, 1991). Before advocating widespread training in maternal elaborative reminiscing, however, it will be important to know if these training effects eventually generalize to independent storytelling for all children, not just those with advanced self-awareness, and to compare the benefits of elaborative reminiscing with other narrative interventions.

There were several limitations to this study. First, our measure of children’s memory accuracy in the researcher–child conversations was constrained to maternal judgments. Given the fallibility of memory even in adults, it is best to think of these maternal judgments as “converging perspectives” on an event instead of objective accuracy (cf. Fivush & Schwarzmueller, 1998), but they remain, to our knowledge, the only method of checking children’s memory for naturally occurring events. In future research we will also test children’s memory for a documented event. Second, we only examined the effects of training mothers in elaborative reminiscing; therefore, we do not know from these results if reminiscing is uniquely important for children’s memory and narrative or if other types of elaborative talk are equally beneficial. One final limitation of our study is that it was conducted primarily with European New Zealanders and thus the results may not generalize to other populations. Because of New Zealand’s social safety net, the less educated mothers in our sample most likely experienced a higher quality of life than mothers with similar education levels in a more industrialized country such as the United States. In ongoing work, we are examining the benefits of maternal elaboration training with low-income samples in the United States.

References


Appendix

Tips for Talking About the Past

1. Select one-time events to discuss.
2. Draw your child into the conversation with what, where, who, when questions.
3. Respond to your child:
   - Praise your child’s responses
   - Follow in your child’s responses with related questions
   - If your child doesn’t respond, rephrase your question with new information
   - Keep it fun! (cuddles, stamps on the certificate)