



“There Were Spooks in the Park”: Children’s Reminiscing with Parents and Siblings Following a Staged Halloween Event



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This study examines children’s reminiscing with different members of their family. Sociocultural research shows how mothers and fathers each scaffold children’s memory narratives, yet it is not clear how children reminisce with siblings. We therefore captured multiple dyadic conversations from twelve young families including mother, father, and two children. In Session 1, families completed a Halloween-themed obstacle course. In Session 2, families reminisced in various combinations (mother-child, father-child, sibling-sibling). We coded conversations for their overarching approach, for the reminiscing style of each partner, and for remembering of core event details. Parent-child conversations were more likely than sibling-sibling conversations to use a child-focused approach. In contrast, sibling-sibling conversations were more likely than father-child conversations to use a collaborative approach. Parents also asked more open-ended “wh” questions than older siblings, but showed no difference in their provision of information. These findings have implications for our understanding of memory development within family contexts.

General Audience Summary

This study examines how children reminisce about the past with different members of their family. Reminiscing amongst families is remarkably common, and may play an important role in supporting children’s developing autobiographical memories. Research shows that mothers who reminisce with their children using an “elaborative” reminiscing style, asking open-ended “wh” questions and providing detail to the unfolding memory story, have children who eventually come to remember more about the past. Mothers who reminisce using a

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less elaborative style, with fewer questions and less detail, have children who do not remember the past as richly.

Despite this strong body of research with mothers, and a small body of work with fathers, there is no research to date that has examined how children reminisce about the past with their siblings. Siblings are prominent social figures in children's lives, and may spend as much or more time interacting with one another as with their parents. Notably, however, siblings may differ from parents in the way that they remember together. To test this possibility, we asked families to take part in a Halloween-themed obstacle course called "Spooks in the Park". We then recorded mother-child, father-child, and sibling-sibling pairs as they remembered the event. We found that parents were more likely than siblings to use a child-focused approach. To support and extend the child's memory, for example, they asked the child "wh" questions and yes/no questions about the event. In contrast, sibling-sibling conversations were more likely to use a collaborative approach: providing frequent information statements, but few questions.

Although our findings are exploratory, they have possible downstream implications for our understanding of children's memory development within a family context. In particular, the findings suggest different patterns of influence for parents and siblings.

Keywords: Autobiographical memory, Scaffolding, Reminiscing, Parent-child, Family, Sibling

A wealth of sociocultural memory research highlights the important role that parents, typically mothers, play in scaffolding young children's autobiographical memory (Fivush, Haden, & Reese, 2006; Salmon & Reese, 2016; Wareham & Salmon, 2006). Children of mothers who reminisce using an elaborative reminiscing style, asking open-ended "wh" questions and providing narrative structure and detail, come to remember the past in rich and coherent detail (Fivush et al., 2006; Reese & Newcombe, 2007). Children of mothers who are less elaborative come to remember in less detail.

Notwithstanding the rich body of sociocultural memory research with parents, there has been little research examining how children reminisce within a broader family network (including siblings). Moreover, there is little research with children of elementary school age. One notable exception is a set of two studies by Bohanek et al., who captured the spontaneous memory conversations of 40 two-parent families eating dinner together. All families had a child aged 9–12, and up to four siblings aged 2–23. In the first study, Bohanek, Marin, Fivush, and Duke (2006) found evidence of five overarching conversational approaches: (a) collaborative, in which family members contributed equally to the unfolding memory narrative, (b) child-centred, in which parents were focused on scaffolding children's contributions, (c) parallel, in which family members took turns to tell their own individual stories or perspectives, (d) facilitated-moderated—in which one parent directed the memory conversation and determined who contributes, and (e) disharmonious, in which there was mild disagreement and few shared details. In the second study, Bohanek et al. (2009) focused on the individual contributions that each conversational partner made to the conversation. Coding utterance-by-utterance to determine the reminiscing style of each conversational partner, they found characteristic differences in the individual reminiscing styles of mothers, fathers, and children. Mothers and fathers each asked more open-ended questions than children, indicating a more highly elaborative reminiscing style, while mothers also provided more detail.

The aim of our study was to compare how children in middle childhood reminisce one-on-one with different members of their

family, and to determine the implications of these different patterns of reminiscing for total event recall. Although Bohanek et al. captured full-family conversations, no research to our knowledge has simultaneously compared overarching conversational approaches and individual reminiscing styles used within different child-partner dyads (i.e., mother-child, father-child, and sibling-sibling). Moreover, none has focused specifically on sibling-sibling reminiscing. Yet dyadic interactions in families are remarkably common. Dyadic interactions differ from group interactions in that each partner has greater responsibility and opportunity for contribution, with less potential for social loafing or exclusion (Moreland, 2010). In the case of families, dyads may also differ from groups in their balance of expertise and power (Brown & Dunn, 1992). These differences have important implications for siblings, who may interact differently when reminiscing with each other than with a parent who can shape and direct the unfolding memory conversation.

Below we briefly sketch the rich body of autobiographical memory research focused on parent-child reminiscing, and consider how sibling-sibling reminiscing might differ. We then describe the current study.

Parent-Child Reminiscing

According to sociocultural memory theory, parents facilitate children's autobiographical memory development by scaffolding their participation in reminiscing conversations: building on and extending their own memory contributions to co-construct a more sophisticated memory narrative (Fivush & Nelson, 2004; Nelson, 2014). This theory is supported by three decades of empirical research, as above, which has examined how differences in children's memory outcomes emerge as a consequence of individual differences in reminiscing style. Parents' reminiscing styles are remarkably consistent across different conversations (Fivush et al., 2006; Haden, 1998) and siblings (Haden, 1998), influencing recall for both the event being discussed (Van Bergen, Salmon, Dadds, & Allen, 2009) and other, undiscussed events (Reese & Newcombe, 2007).

Research comparing mothers to fathers is limited and suggests that outcomes may differ by context. In dyadic interactions, Reese and Fivush (1993) found relatively little difference in the number of elaborative utterances made by mothers and fathers when reminiscing with their preschoolers (also see Reese, Haden, & Fivush, 1996). In contrast, mothers in Bohanek et al.'s (2009) dinnertime study provided more memory details than fathers. Using a five-point rating scale, Zaman and Fivush (2013) also found that mothers were more elaborative for emotional events. These findings are broadly consistent with beliefs held by married couples that women are the family "story keepers" (see Ross & Holmberg, 1990). When the discussion is shared amongst the family, and particularly when it is emotional in tone, fathers may be more inclined for mothers to guide the conversation. In other contexts, fathers may be more active contributors. On this limited evidence, both mothers and fathers are important "socialising agents" for young children when reminiscing about the past.

Sibling-Sibling Reminiscing

Given that siblings are prominent social figures in children's lives, it is surprising that no research has yet considered how sibling pairs reminisce together. From the late preschool years and onwards, siblings may spend as much or more time interacting with one another as with their parents (Brown & Dunn, 1992). Notably, however, siblings may differ from parents in both overarching conversational approaches and individual reminiscing styles.

Despite the lack of research on sibling reminiscing, characteristic differences have been observed in the ways that mother-child and sibling-sibling pairs talk in other contexts. For example, Perez-Granados and Callanan (1997) found that mothers were more likely to scaffold the performance of preschool-aged children on a picture categorisation task, whereas older siblings were more likely to direct their younger sibling's performance or perform the task themselves. Brown and Dunn (1992) similarly found that mothers are more likely than older siblings to scaffold young children's feeling talk, and Strapp (1999) found differences in grammatical corrections between parents and older siblings. Drawing on earlier theoretical work (Hinde, 1979; Piaget, 1932; Ross, Cheyne, & Lollis, 1988), Brown and Dunn (1992) described mother-child interactions as complementary—characterised by unequal power relations and diverse family roles—but described sibling-sibling interactions as reciprocal—characterised by equal status, shared understandings, and sometimes-competing self-interest.

If siblings differ from parents in their ability or inclination to support their brothers' and sisters' reminiscing about an event, as they do in other kinds of dyadic interactions, then there are likely to be characteristic differences in their patterns of reminiscing together. However, there may also be differences according to age or sibling position. Although complementarity is characteristic of parent-child relationships, it may emerge to a lesser degree in some sibling pairs also, particularly when there is strong asymmetry in sibling ages (Brody, 1998) or when compared to same-age friends and peers (Recchia, Wainryb, &

Pasupathi, 2013). Younger siblings have been found to require more help and support from their family members (Brody, 1998; Harrist et al., 2014), whereas older siblings have been found to exert more control over the interaction (Howe & Recchia, 2008): acting as "caretakers, teachers, and protectors to their younger counterparts" (Recchia et al., 2013, p. 1461). Drawing on these findings, therefore, we were interested in mapping how children's reminiscing conversations might differ according to both their family partner and their own sibling status.

The Current Study

In this study we compared for the first time how children reminisce about an immersive and salient event when partnered with different family members: mother, father, or sibling. By implementing a "staged event" methodology, with specific known locations, action sequences, and objects, we also were able to measure how many of these core event details children could remember within different partnerships (see Conroy & Salmon, 2006; Hedrick, Haden, & Ornstein, 2009; McGuigan & Salmon, 2004; Van Bergen & Salmon, 2010).

We recruited twelve families of four, with two parents, an older sibling, and a younger sibling. All families recently had taken part in "Spooks in the Park": a Halloween-themed community orienteering event with distinct stations (e.g., "splat the bat"; "vampire run"). After a three-week delay, and drawing on other staged event research with similar delays between event and recall (e.g., Hedrick et al., 2009; McGuigan & Salmon, 2004; Van Bergen & Salmon, 2010), we asked older and younger children to remember two stations with their mother, two with their father, and two with their sibling. Stations were remembered in order, thus preserving the natural event structure, but partners were counterbalanced. We analysed three key aspects of reminiscing: the overarching conversational approach used in each dyadic conversation, the individual reminiscing styles used by each conversational partner, and the total number of core event details recalled.

Our first hypothesis related to overarching conversational approach. In line with theoretical notions of complementarity in parent-child relationships and reciprocity in sibling-sibling relationships, we predicted that mother-child and father-child dyads would be more likely than sibling-sibling dyads to use a child-centred approach (or, in the case of sibling-sibling dyads, a younger-child centred approach) during reminiscing. Specifically, mothers and fathers each should use their experience, knowledge, and skill to scaffold and extend children's reminiscing contributions (Fivush et al., 2006; Salmon & Reese, 2016; Wareham & Salmon, 2006). In contrast, we predicted that sibling-sibling dyads would be more likely to be use a collaborative and parallel approach during reminiscing: either working together to co-construct the emerging narrative or taking turns to share their own perspective.

Our second hypothesis related to the reminiscing style used by each individual. Drawing again on the notion of parent-child complementarity, and on our prediction that parent-child reminiscing will be characterised by a child-centred approach, we predicted that mothers and fathers would each use more

elaborative utterances (i.e., open-ended questions and information statements) to elicit their children's contributions than would siblings. As a marker of their increasing maturity, we also predicted that older siblings would use more elaborative utterances (i.e., open-ended *wh*- questions and information statements) than would younger siblings.

Our third hypothesis related to the recall of core event details. In line with potential differences in overarching conversational approaches and individual reminiscing styles, as above, we predicted that children would recall more core event details when reminiscing with a parent than a sibling. Thus, the total number of core event details recalled by mother-child and father-child dyads would also exceed the amount recalled by sibling-sibling dyads. We expected this to be especially the case for younger siblings, who may rely more heavily on scaffolding from their partners for memorial support.

Method

Participants

Participants included 46 parents and children from 12 young families. Families included a mother, father, older child ($M_{\text{age}} = 8.27$, $SD = 1.84$), and younger child ($M_{\text{age}} = 6.48$, $SD = 1.98$). Two families identified as Asian-Australian and the remaining 10 families identified as Caucasian-Australian, with all families speaking English at home. There were no families with mixed ethnicity. Families involved 5 female-male sibling dyads (41.67%), 2 female-female sibling dyads (16.67%), and 5 male-male sibling dyads (41.67%), with an average age gap of 1.73 years ($SD = 1.24$) between siblings. In two families, the participating siblings were twins and therefore had no age gap. Because our analyses (described below) required an older and younger sibling to be entered, we randomly allocated one twin to each condition and entered the age difference into the model as 0. This enabled us to compare sibling-sibling reminiscing to parent-child reminiscing in each family, while still retaining both families in the sample. Fidelity checks showed that the pattern of findings for both parent-child and sibling-sibling reminiscing in these two families was consistent with the overarching pattern of data. In addition, in two families, work commitments meant that only one parent was available to be interviewed. Because the full family participated in the event itself, we included both families in the analysis and entered the scores for the absent parent as missing data. The pattern of findings for both parent-child and sibling-sibling reminiscing in these two families also was consistent with the overarching pattern of data.

We recruited families immediately following their participation in a Halloween-themed orienteering event staged in a Sydney park. This was arranged with the permission of the organisers (Orienteering NSW) and with institutional ethics approval. Two research assistants stood on the finish line and asked families if they would like to sign up for a memory study about Spooks in the Park, in which they would visit our University laboratory to remember and talk about this event together. Of the families who expressed interest and provided contact details, 12 met the specified criterion of having parent(s) and two children who all had taken part in the event and were

Table 1
"Spooks in the Park" Stations

Station	Summary
1. Pumpkin bowling	Roll small pumpkins to knock over ghoulish figures
2. Zombie run	Run across a field of zombies
3. Skull hoopla	Toss hoops over skull props
4. Spider's web	Climb through a giant spider web made of elastics suspended between trees
5. Splat the bat	Hit a plastic bat with a stick as it drops through a tube
6. Test of terror	Feel inside buckets of goo with scary labels (e.g. zombie brains)
7. Skeleton golf	Hit sticky golfballs onto a velcro picture of a skeleton
8. Vampire maze	Escape a maze while avoiding a vampire

available to attend campus together. In return for their participation for 1.5–2 hours, we compensated families \$15AUD per person per hour. We also gave a small gift of stickers or a notebook to each child.

Materials and Procedure

"Spooks in the Park" event. This Halloween-themed orienteering event for families was held in Centennial Park: a 470-acre parkland in central Sydney, Australia. In orienteering events, participants use a special map to navigate around a course, visit marked stations or check points on the way, and receive a stamp at each station. For Spooks in the Park, children and parents navigated through an approximately five-acre course and visited eight stations in a set order (see Table 1 for descriptions). Each station had a Halloween-themed mini event. For instance, at Station 4, participants crawled through a giant spider's web made of black tape and elastics suspended across trees (see Appendix for photo). These mini-events were novel, engaging, and sometimes a little scary; they took 5–10 minutes to complete. At each station, volunteers (dressed in Halloween costumes) gave reminders of the next station to travel to. Families then walked 5–10 minutes through the park navigating with their map to the next station, completed the next mini-event, and received a stamp. After navigating the entire course, families navigated to the finish line and received a "dead gingerbread man." The full event, which offered a rich, detailed, and emotional experience for later reminiscing, took participants approximately 60–90 minutes. It is worth noting that because Spooks in the Park was a community run event, we had no control over its staging. Volunteers at each station changed in shifts and children's exact experience at each station depended on the number of other children present and similar idiosyncratic factors. Thus, in our analysis of families' memories of the event we focus on their overarching style of reminiscing and on the recall of core event details that were invariable across the day, rather than on total recall of all event details.

Reminiscing. Three weeks after the Spooks in the Park event, families visited our laboratory where we first obtained written consent for the session and compensated participants for their time. Working as a team, two female researchers then

showed participants to two adjoining rooms where we conducted the reminiscing conversations. To discuss stations 1–2, 3–4, and 5–6, we paired participants with each of their other family members in turn. The possible combinations within each family were: (a) mother-older child and father-younger child, (b) mother-younger child and father-older child, or (c) sibling-sibling and mother-father. Stations were always discussed in the same order, while the three partnership combinations were counterbalanced. To discuss stations 1–2, therefore, four families started with combination (a), four with (b), and four with (c). In each case, one dyad worked in the first room with the first researcher while the other dyad worked in the second room with the second researcher. To discuss stations 3–4, families moved to new combination.

To discuss the first station, we asked dyads to reminisce using the following prompt: “*Now I’d like you to think about the Spooks in the Park event you went to in Centennial Park. Working together I want you to try and tell me in as much detail as you can about the <first station>. Do you remember what that one was? . . . Great! What I’d like you to do is to talk together and try and help each other remember as much as you can about <first station>.*” We asked them to reminisce about the second station using the prompt: “*The next station you went to was <station>. I’d like you to talk together and try and help each other remember as much as you can about <second station>.*” We then re-arranged participants into new dyads and repeated this pattern for stations 3 and 4, and finally re-arranged them into new dyads and repeated this pattern for stations 5 and 6.

In all reminiscing conversations, the researcher averted eye contact and worked on a shielded computer in the corner of the room, approximately 5 m away, to allow the dyad to discuss the station together. Although this meant that the researcher was present in the room—a step we considered necessary both for giving conversational prompts between stations and for ensuring the wellbeing of sibling-sibling pairs—we did not intrude in the conversations proper (see Fivush, Marin, McWilliams, & Bohanek, 2009; Reese, Meins, Fernyhough, & Centifanti, 2018, for similar approaches with mother-child dyads). Consistent with these efforts, all dyads appeared to talk comfortably with one another. We allowed dyads up to three minutes to talk about each station, although conversations typically were shorter than this. If a dyad indicated that they had finished discussing the station before three minutes were complete, the researcher used a follow-up prompt to ensure there was nothing else they could remember (“*Is there anything else you can remember about the -----?*”).

For stations 7–8, participants all returned to the same room, working as a full family to remember as much as possible about these events. Thus, we collected 64 conversations across our 12 families (including 68 possible pairings and 4 instances of missing data). In this paper, we focus specifically on those conversations that involved mother-child, father-child, and sibling-sibling dyads. At the conclusion of the session we debriefed families, gave them the opportunity to ask questions, and thanked them for their time.

Transcription and Coding of Memory Conversations

As noted above, we recorded all reminiscing conversations between dyads and transcribed them verbatim. An independent coder who was blind to the study hypotheses then coded these conversations for (a) the overarching interactional style that children shared with different reminiscing partners, (b) the specific discussion techniques that children and their different reminiscing partners used, and (c) their recall of core event details.

To measure each dyad’s overarching conversational approach, we used Bohanek et al.’s (2009) family coding scheme. As noted above, this scheme outlines five possible conversational approaches: collaborative, child-centred (or, in the case of sibling-sibling reminiscing, younger-child centred), parallel, facilitated-moderated, and disharmonious. Consistent with the notion of the “dominant narrator” in studies of shared and collective memory (e.g., Cuc, Ozuru, Manier, & Hirst, 2006), in which one partner guides the conversation and provides the body of content, we renamed the facilitated-moderated style as a “dominant narrator” style (see Table 2 for descriptors and example snippets). We further modified the descriptors used for each style so that they were appropriate to dyadic talk rather than whole-family talk. Each conversation was given a global score of 0 to 3 on each style, where 0 indicated that the style was not present at all in the conversation and 3 indicated that the style was dominant in the conversation.

To measure the individual reminiscing styles that children and their partners each used when remembering together, we divided each individual’s contributions to the conversation into subject-verb utterances. Drawing on established coding schemes we have used in previous work (e.g., Farrant & Reese, 2000; Haden, 1998; Van Bergen & Salmon, 2010; Van Bergen et al., 2009), we then coded each individual utterance as an open-ended wh-question, close-ended yes/no question, information statement, or as a repetition of one’s own previous utterance. For example, “*You had to splat the bat when it came down the tube. What did you get when you splat the bat?*” was coded as two information statements and one wh-question, whereas “*She read your palm. Was she a witch?*” was coded as an information statement and a yes/no question. Note that open-ended wh-questions varied in the degree to which they sought specific information, yet all allowed recipients the opportunity to contribute new information to the narrative themselves. In close-ended yes/no questions, in contrast, all necessary information was provided and the recipient needed only to confirm the information (“yes”) or negate it (“no”). To retain our focus on elaborations that add or request specific event information, simple confirmations of the partner’s contributions (e.g., “that’s right!”), negations of the partner’s contributions (“no”), and off-topic utterances were also excluded (see Farrant & Reese, 2000).

Although most sociocultural memory studies focused on mothers determine individual reminiscing styles by calculating either the raw number of high-elaborative utterances used or the percentage of high- to low-elaborative utterances, both of these approaches combine different kinds of utterances together (e.g., information statements and open questions). We were particularly interested in whether different reminiscing partners would

Table 2
Overarching Conversational Approaches used by Different Dyads (Mother-Child, Father-Child, Sibling-Sibling) when Reminiscing within Families

Conversational approach	Description	Indicators	Example
Collaborative	The narrative unfolds as the family members each add small bits of information; the narrative being told by all the participants simultaneously, as if they are all of one mind	Family members finish each other's sentences, say the same thing simultaneously, or interrupt without changing topic	Child 1: He helped us cross the road Child 2: And then. . . I think it was. . . Child 1: I know, you had to throw this ball I think Child 2: Oh yeah, it was you had to throw a hula hoop
Child centred	<i>One or more person (e.g., a parent, an older sibling with a younger sibling)</i> try to elicit information from <i>less able others</i> by asking leading questions, prompting them, and giving them cues	This conversation is dominated by questions from parents or others and responses by the children	Mum: Were you feeling scared at all? No? You were rushing to get into the maze, not scared at all! Very excited to play. Child 2: Yeah, because it's a maze.
Parallel	Family members take turns telling the story, each telling their own point of view	Family members listen to each other and are allowed to finish their own thoughts without interruption	Child 1: There were all these elastic things [spider webs]. . . Child 2: We had to give the glasses back. . . Child 1: And there were spiders everywhere. . .
Dominant narrator	The conversation is moderated and facilitated primarily by one <i>person (e.g. a parent or older sibling)</i>	A single moderator initiates topics, chooses speakers, gives extended monologues, or ignores other family member's input	Dad: Was he standing or sitting? Child 1: Sitting Dad: He was sitting on the side. Child 1: Yeah, he was like behind a. . . Dad: And it was at the back of the golf and there was like a "carnie" setup, wasn't there?
Disharmonious	Family members appear disconnected, are not like-minded, or don't have a shared understanding of events	Mild disagreements, denial of feelings, little shared affect, put-downs, complaining, and parental lecturing	Child 2: You had to feel these yuck things. That was the witches nails. . . Mum: We already talked about that Child 2: [Silence] Mum: Was it the spiders?

Note. Adapted from Bohanek et al. (2009) with changes indicated in italics. The snippets provided in the example column are all taken from the current study.

use these utterances in different proportions. Specifically, and in contrast to mothers and fathers, we predicted that siblings using a collaborative or parallel conversational approach would be more likely to use high-elaborative information statements than questions. We therefore considered each type of utterance separately. More frequent wh-questions and information statements were considered indicative of an elaborative reminiscing style, whereas more frequent yes/no questions and repetitions were considered indicative of a less elaborative reminiscing style.

Finally, to measure participants' recall of core event details, we developed a standardised coding scheme that counted, for each station, two core location details (e.g., "down a big hill"; "in the forest"), two core action details (e.g., "climb through the spider webs"; "wear glasses"), and two core object details (e.g., "golf clubs"; "skeleton pictures"; see Nicholas, Van Bergen, & Richards, 2015; Van Bergen & Salmon, 2010, for similar schemes). Although we note above that the event was an immersive real-life orienteering event—and we were therefore unable to control the number of children present at the same time as our target families, or the different volunteers who may have changed shifts during the day—details regarding the location, actions, and salient objects were core elements of the event that did not

vary across the day. Because each conversation included discussion of two stations, there was a possible "core event recall" score of twelve points per dyad.

To calculate inter-rater reliability, a second independent coder who was blind to the study hypotheses recoded 15 conversation transcripts (23.4%). For the coding of overarching conversational approaches, intra-class correlations ranged from .77 to .81. For the coding of reminiscing style utterances, Cohen's Kappa was .86. Finally, for the scoring of core event details, the intra-class correlation was 1.00.

Statistical Approach

To compare the different ways in which parents and siblings reminisced with one another about the Spooks event, we ran a series of General Estimating Equations (GEEs) in SPSS Statistics 25. GEEs are a flexible and robust form of the regression model. GEEs extend the general linear model approach, enabling the comparison of outcomes between different groups, but also allowing for multiple dependencies within the data. GEEs are semi-parametric, meaning that the model distribution need not be fully specified, and population-level estimates

of model parameters are produced using Estimated Marginal Means.

GEEs were selected for our current study for three reasons. First, GEEs allow for correlations to exist between different data observations. In contrast, many statistical procedures assume that each observation is independent. This distinction is important for our data, as our dyads are each nested within families, and younger and older siblings' talk with one another is taken from the same sibling-sibling reminiscing conversation.

Second, GEEs are more flexible than multilevel models. Although multilevel models (or mixed models) also allow for correlated data, they also require that an accurate model structure be specified. In the present study this model structure was difficult to capture in a satisfactory way, as the relationship of our observations changed across different combinations of siblings and parents. Using a multilevel approach, therefore, there was a risk that unverifiable or inaccurate assumptions could lead to "potentially misleading estimates and biased inference" (Hubbard et al., 2010, p. 467). The GEE procedure is similar to the multilevel model approach in that it requires a working correlation structure be chosen, yet it differs from the multilevel approach in that it is highly robust against misspecification (Hubbard et al., 2010). Accurate specification simply provides an increase in efficiency.

Third, GEEs effectively manage missing data. Using the GEE procedure meant that we were able to include families for whom we had randomly missing child-parent reminiscing data for one parent, but complete data with the other parent and with a sibling (see Method). Missing data represented only a small proportion of the total data collected, with no systematic patterns in the characteristics or circumstances of families affected.

Our dataset for each GEE regression model consisted of 64 cases (observations) across our 12 families. Each case represented an older or younger child's reminiscing conversation with one of three partners: sibling, mother, or father. All conversations were nested within family. Our predictors were therefore sibling position (younger, older) and reminiscing partner (mother, father, sibling), with the age difference between siblings entered as a covariate and family entered as a grouping variable. Our dependent variables included the overarching conversational approach used (collaborative, child-centred, parallel, dominant, disharmonious), the reminiscing style utterances used by individual conversational partners (wh-questions, yes/no questions, and information statements), and the "core event recall" score achieved by each dyad (with a supplementary analysis examining children's individual contributions to this dyadic score).

As above, a requirement of the GEE regression procedure is that a working correlation matrix structure be specified. We specified an exchangeable structure, in which the matrix variance and covariance were assumed to be equal. To determine the significance of each effect (i.e., main effect of sibling position, main effect of reminiscing partner, sibling position \times reminiscing partner interaction), a Wald Chi-Square (W_T) test statistic of the Estimated Marginal Means was produced. Because reminiscing partner had three levels, we additionally requested pairwise comparisons of the Estimated Marginal Means. We used a Sidak correction to account for multiple comparisons.

Although SPSS does not produce standardised effect sizes for GEE analyses, as it does for other regression analyses, we highlight above that Estimated Marginal Means are estimates of population-level values. For this reason, the differences between groups that are calculated when conducting multiple comparisons also represent unstandardised effect sizes.

Results

Overarching Conversational Approach

In our first group of analyses we focused on the overarching conversational approach that different dyads used when reminiscing about the Spooks in the Park event. We discuss each approach in turn: collaborative, child-centred, parallel, dominant narrator, and disorganised.

Collaborative approach. There was a significant main effect of reminiscing partner on dyads' use of a collaborative approach, $W_T = 7.62, p = .022$. Pairwise comparisons showed that sibling-sibling reminiscing conversations were more collaborative than father-child reminiscing conversations, $p = .017$ (see Table 3). Mother-child reminiscing conversations were not significantly different from either sibling-sibling or father-child reminiscing conversations, $ps > .351$. Although there was a significant Partner \times Sibling order interaction, $W_T = 6.39, p = .041$, no follow-up comparisons were significant once the Sidak correction was applied, $ps > .191$. The main effect of sibling order also was not significant, $W_T = 2.32, p = .128$: thus, averaged across partner, there was no difference in younger siblings' ($M = 1.24, SE = 1.93$) and older siblings' ($M = 1.57, SE = 2.04$) experiences of a collaborative approach.

Child-centred approach. There was a significant main effect of reminiscing partner on dyads' use of a child-centred approach (or, in the case of sibling-sibling dyads, a younger-child centred approach), $W_T = 33.52, p < .001$. Pairwise comparisons showed that mother-child reminiscing conversations and father-child reminiscing conversations were each more child-centred than sibling-sibling reminiscing conversations, $ps < .001$. Mother-child and father-child reminiscing conversations did not differ from one another, however, $p = .759$ (see Table 3). There also was no main effect of sibling order, $W_T = 1.31, p = .252$: thus, averaged across partner, there was no difference in younger siblings' ($M = 1.34, SE = 1.91$) and older siblings' ($M = 1.11, SE = 1.92$) experiences of a child-centred approach. There was also no significant Partner \times Sibling order interaction, $W_T = 1.83, p = .401$.

Parallel approach. There was no significant main effect of reminiscing partner on dyads' use of a parallel approach, $W_T = 1.13, p = .568$. There also was no significant main effect of sibling order, $W_T = 1.20, p = .273$: that is, no difference in younger siblings' ($M = 0.36, SE = 1.35$) and older siblings' ($M = 0.48, SE = 1.61$) experiences of a parallel approach. Finally, there was no Partner \times Sibling order interaction, $W_T = 1.40, p = .497$.

Dominant narrator approach. There was no significant main effect of reminiscing partner on dyads' use of a dominant narrator approach, $W_T = 1.63, p = .443$ (see Table 3). There was, however, a significant main effect of sibling order, $W_T = 7.54$,

Table 3

Estimated Marginal Means and Standard Errors of the Overarching Family Approach Used by Different Dyads. Scores were Given on a Scale from 0 to 3 where 0 = Not Present and 3 = Dominant. All Scores are Averaged Across Younger and Older Siblings

	Mother-child dyads ($n = 22$) M (SE)	Father-child dyads ($n = 22$) M (SE)	Sibling-sibling dyads ($n = 12$) M (SE)
Collaborative	1.37 (0.28)	0.85 (0.28)	2.00 (0.31)
Child-centred	1.55 (0.33)	1.96 (0.32)	0.17 (0.16)
Parallel	0.26 (0.18)	0.41 (0.28)	0.58 (0.25)
Dominant narrator	0.28 (0.16)	0.35 (0.16)	0.75 (0.33)
Disharmonious	0.57 (0.21)	0.42 (0.20)	0.33 (0.18)

$p = .006$. Younger siblings ($M = 0.65$, $SE = 0.18$) were more likely to participate in reminiscing conversations with dominant narrators than were older siblings ($M = 0.27$, $SE = 0.12$), $p = .006$. There also was a significant Partner \times Sibling order interaction, $W_T = 8.08$, $p = .018$; however, no follow-up comparisons were significant once the Sidak correction was applied.

Disharmonious approach. There was no significant main effect of reminiscing partner on dyads' use of a disharmonious approach, $W_T = 0.71$, $p = .703$ (see Table 3). There also was no significant main effect of sibling order, $W_T = 0.56$, $p = .812$: that is, no difference in younger siblings' ($M = 1.34$, $SE = 1.91$) and older siblings' ($M = 1.11$, $SE = 1.92$) experiences of a disharmonious conversation. Finally, there was no Partner \times Sibling order interaction, $W_T = 1.53$, $p = .466$.

Summary. Sibling-sibling dyads were more likely than father-child dyads to use a collaborative conversational approach, whereas mother-child and father-child dyads were each more likely than sibling-sibling dyads to use a child-centred approach (see Table 3). Although most reminiscing conversations involved contributions from both partners, mothers, fathers, and older siblings were more likely to dominate the conversation when they reminisced with the younger siblings.

Individual Reminiscing Styles

In our second group of analyses we focused on the high-elaborative and low-elaborative reminiscing utterances used by each family partner (mother, father, or sibling) when reminiscing about the Spooks in the Park event, together with the specific reminiscing utterances that each child used when reminiscing with different family partners. We analysed wh-questions and information statements as components of a highly elaborative reminiscing style, and yes/no questions as components of a less elaborative reminiscing style. Repetitions were rare, perhaps because the children in our study were older than in many reminiscing studies (see Farrant & Reese, 2000), and were subsequently excluded from the analyses.

Wh-questions. There was a significant main effect of reminiscing partner on the number of wh-questions that children's conversational partners asked them, $W_T = 33.48$, $p < .001$ (see Table 4), modified by a significant Partner \times Sibling order interaction, $W_T = 35.92$, $p < .001$. Pairwise comparisons showed that younger siblings were asked significantly more wh-questions by their mothers ($M = 5.10$, $SE = 1.40$) and fathers ($M = 6.09$, $SE = 1.79$) than by their older siblings ($M = 0.67$, $SE = 0.21$), $ps < .037$. The pattern was somewhat similar, although

nonsignificant ($ps > .07$), for older siblings, who also tended to be asked more wh-questions by their mothers ($M = 5.80$, $SE = 1.94$) and fathers ($M = 3.40$, $SE = 1.06$) than by their younger siblings ($M = 0.34$, $SE = 0.21$). The main effect of sibling order was not significant, $W_T = 0.53$, $p = .465$.

There was no main effect of partner on the number of wh-questions that children asked their conversational partners, $W_T = 2.31$, $p = .316$, nor was there a main effect of sibling order, $W_T = 0.01$, $p = .953$, or a Partner \times Sibling order interaction, $W_T = 8.97$, $p = .110$. Overall, both older children ($M = 0.42$, $SE = 0.11$) and younger children ($M = 0.41$, $SE = 0.15$) asked very few wh-questions of their partners (see Table 4).

Yes/no questions. There was a significant main effect of reminiscing partner on the number of yes/no questions that children's conversational partners asked them, $W_T = 66.55$, $p < .001$ (see Table 4), modified by a significant Partner \times Sibling order interaction, $W_T = 69.37$, $p < .001$. Pairwise comparisons showed that younger siblings were asked significantly more yes/no questions by their mothers ($M = 11.60$, $SE = 2.24$) and fathers ($M = 12.82$, $SE = 2.66$) than by their older siblings ($M = 0.74$, $SE = 0.27$), $ps < .001$. We found the same significant pattern for the number of yes/no questions that older siblings were asked by their mothers ($M = 9.61$, $SE = 2.47$) and fathers ($M = 8.51$, $SE = 1.94$) compared to their younger siblings ($M = 0.24$, $SE = 0.28$), $ps < .008$. The main effect of sibling order was not significant, $W_T = 1.92$, $p = .166$.

There was no main effect of reminiscing partner on the number of yes/no questions that children asked their conversational partners, $W_T = 1.24$, $p = .538$ (see Table 4). There was, however, a main effect of sibling order, $W_T = 5.40$, $p = .020$, with older siblings ($M = 0.78$, $SE = 0.19$) asking more yes/no questions of their partners than younger siblings ($M = 0.28$, $SE = .10$). Although the overall Partner \times Sibling order interaction also was significant, $W_T = 13.56$, $p = .019$, no follow-up pairwise comparisons were significant once the Sidak correction was applied.

Information statements. There was a significant main effect of reminiscing partner on the number of information statements that children's conversational partners offered to them, $W_T = 9.03$, $p = .011$ (see Table 4), modified by a significant Partner \times Sibling order interaction $W_T = 17.05$, $p = .004$. For younger siblings, there was no difference in the number of information statements offered by their mother ($M = 67.71$, $SE = 12.44$), father ($M = 58.45$, $SE = 12.80$), or older sibling ($M = 51.45$, $SE = 7.18$) as they reminisced together, all $ps > .989$. When reminiscing with older siblings, however, mothers

($M = 63.08$, $SE = 9.72$) and fathers ($M = 52.48$, $SE = 11.43$) each offered significantly more information statements than did younger siblings ($M = 26.45$, $SE = 6.43$), $ps < .025$.

There was no significant main effect of reminiscing partner on the number of information statements that children offered to their conversational partners, $W_T = 0.20$, $p = .906$ (see Table 4). There was, however, a main effect of sibling order, $W_T = 7.01$, $p = .008$, with older siblings ($M = 49.51$, $SE = 5.78$) offering more information statements than younger siblings ($M = 31.78$, $SE = 3.39$). Although the overall Partner \times Sibling order interaction also was significant, $W_T = 12.60$, $p = .027$, no follow-up pairwise comparisons were significant once the Sidak correction was applied.

Summary. Mothers and fathers each asked children significantly more wh-questions and yes/no questions than did their siblings, and this was particularly the case when they reminisced with younger children. Older siblings, mothers, and fathers all contributed a similar number of information statements to each reminiscing conversation, whereas younger siblings contributed very few information statements (Table 4).

Core-Detail Recall Scores

In our final group of analyses we focused on each child-partner dyads' "core-detail" recall score: that is, the number of core event details that each dyad recalled from the standardised coding scheme. Because the core-detail recall score included recall from both partners, summed, we also focused on children's own independent contributions to this total.

Core detail recall scores between child-partner dyads.

The main effect of reminiscing partner on dyadic core-detail recall scores was significant, $W_T = 6.03$, $p = .049$. Pairwise comparisons showed that mother-child dyads ($M = 8.34$, $SE = 0.44$) remembered more core event details than did sibling-sibling dyads ($M = 7.25$, $SE = 0.24$), $p = .045$. Father-child recall scores ($M = 7.65$, $SE = 0.49$) fell in between, and father-child dyads did not differ significantly in their recall of core event details from mother-child or sibling-sibling dyads, $ps > .619$. There was no main effect of sibling order, $W_T = 0.150$, $p = .703$: that is, averaged across partner, dyads with younger siblings ($M = 7.65$, $SE = 0.38$) did not differ from dyads with older siblings ($M = 7.84$, $SE = 0.32$) in the number of core event details recalled. There was also no Partner \times Sibling order interaction, $W_T = 1.211$, $p = .546$.

Independent contributions of the child. The main effect of reminiscing partner on children's own independent contributions to the core-detail recall score approached significance, $W_T = 5.86$, $p = .053$, and there was also a significant main effect of sibling order, $W_T = 7.43$, $p = .006$. Both findings were moderated by a significant Partner \times Sibling order interaction, $W_T = 7.36$, $p = .025$. The number of core event details that older siblings contributed to the core-detail recall score did not differ, irrespective of whether their partner was their younger sibling ($M = 5.17$, $SE = 0.45$), their mother ($M = 4.70$, $SE = 0.63$), or their father ($M = 5.40$, $SE = 0.81$), $ps = 1.00$. In contrast, younger siblings contributed significantly fewer core event details to the core-detail event recall score when talking with their older

sibling ($M = 2.00$, $SE = 0.52$) than with their mother ($M = 4.20$, $SE = 0.56$), $p = .031$, or father ($M = 4.10$, $SE = 0.73$), $p = .007$.

Summary. Mother-child dyads recalled significantly more core event details than did sibling-sibling dyads. Much of this difference was driven by younger siblings, who contributed significantly fewer core event details when reminiscing with an older sibling than with a parent.

Discussion

In this study we aimed to compare how children remember a salient past event with different family members, including mothers, fathers, and siblings. Our study was exploratory, with twelve full families (46 individuals) participating. We coded for each dyads' overarching conversational approach, for the individual "reminiscing style" utterances of each conversational partner, and for the recall of core event details during reminiscing.

As hypothesised, mother-child and father-child reminiscing conversations were more likely than sibling-sibling reminiscing conversations to take a child-centred approach (or, in the case of sibling-sibling dyads, a younger-child centred approach). In contrast, sibling-sibling reminiscing conversations were more likely than father-child reminiscing conversations to take a collaborative approach. Our findings are consistent with theoretical notions of complementarity and reciprocity (Brown & Dunn, 1992; Harrist et al., 2014), with parents supporting children's contributions in a sensitive and child-focused manner. In the case of mothers, who used both child-centredness and collaboration, there was evidence in our sample of both complementarity and reciprocity.

Interestingly, we also found evidence that younger siblings were more vulnerable than older siblings to dominant narration from their partners. Older siblings and parents each have more power than younger siblings, and some may simply have taken control of the conversation when the opportunity arose (Howe & Recchia, 2008; Recchia et al., 2013). Younger siblings, in contrast, may not yet have the conversational skills to interject when working with a dominant partner. Given our small sample size, we were unable to isolate the characteristics that contributed to dominance amongst different pairs (e.g., task motivation, cognitive sensitivity). We nonetheless highlight this as an opportunity for future research.

Our second hypothesis related to individual reminiscing styles. We predicted that parents would use more elaborative utterances than siblings, and found partial support for this hypothesis. Mothers and fathers each asked children more wh-questions and yes/no questions than did siblings, but gave a similar number of information statements. These findings converge with the child-centred nature of parent-child conversations, noted above, and suggest that questioning was the primary tool used to scaffold children's recall (see Fivush et al., 2006; Salmon & Reese, 2016).

Although we found no evidence of gender differences between mothers and fathers in our twelve families (see Reese & Fivush, 1993; Reese et al., 1996), we did find emerging patterns of scaffolding from older children. Specifically, and despite both

Table 4

Estimated Marginal Means and Standard Errors of the Individual Reminiscing Utterances used by Family Members with Children and by Children with Other Family Members. All Means are Averaged Across Younger and Older Siblings

	Wh-questions <i>M (SE)</i>	Information statements <i>M (SE)</i>	Yes/no questions <i>M (SE)</i>
Partner utterances			
Mother with child (<i>n</i> = 11)	5.45 (1.20)	65.40 (7.90)	10.60 (1.67)
Father with child (<i>n</i> = 11)	4.74 (1.04)	55.71 (8.60)	10.66 (1.79)
Sibling with child (<i>n</i> = 24)	0.50 (0.15)	38.94 (4.84)	0.49 (0.20)
Child utterances			
Child with mother (<i>n</i> = 24)	0.50 (0.21)	41.30 (7.64)	0.40 (0.21)
Child with father (<i>n</i> = 24)	0.25 (0.18)	41.75 (4.46)	0.70 (0.18)
Child with sibling (<i>n</i> = 24)	0.50 (0.15)	38.87 (4.83)	0.50 (0.17)

older and younger siblings rarely asking wh-questions of their partners, older siblings showed emerging signs of asking yes/no questions. This onset of questioning may represent an important change. Older siblings who had begun asking such questions may have intended to encourage and extend the contributions of their partners (see Brody, 1998); alternatively, they may simply have begun to adopt the same reminiscing techniques that they observe their parents using. In either case, and although children and parents reminisce in fundamentally different ways, our findings suggest that they may become closer with time.

Our third hypothesis related to the recall of core event details. We predicted that children would remember more core event details with a parent than with a sibling, and this was true for younger siblings. This finding aligns with our earlier finding that parents are more likely than siblings to scaffold children's memory performance: adopting a child-centred approach and asking open-ended and yes/no questions to elicit more narrative detail. Older siblings were unaffected by partner, suggesting less need for scaffolding as their independent memory skills become stronger. Taken together, our findings across all three analyses show that children may reminisce with their mothers, fathers, and siblings in characteristically different ways.

We recognise important limitations to our study, including the small number of families who participated. With 46 participants nested in 12 families, we were unable to test hypotheses relating to ethnicity, temperament, relationship quality, or child gender. We also did not have sufficient power to test for small or moderate effects. As a result our findings are exploratory, and may underestimate the differences in children's reminiscing with different family partners. Second, despite increasing diversity in family structures across Western countries, our study was also limited in its focus on nuclear families with mother, father, and two siblings. We are therefore unable to generalise to multigenerational households, to single parent households, or to families with same-sex parents or step-parents. Third, we note that our study design required the researcher to be present in the room. Although we made all efforts to be unobtrusive, it is possible that the presence of a researcher may have influenced some parents to attempt to "recall well." Similar studies in which a tape recorder is left in the room may be less susceptible to this influence. Finally, our GEE approach allowed us to determine differences in conversational approaches between partners, but not the most popular approaches overall. We recommend that future research

consider how these approaches may cluster together in different ways for different partners.

Notwithstanding these limitations, a key strength of our study was the use of a staged event with multiple stations, allowing us to test for three different kinds of reminiscing outcomes. Although it was not possible to test dyads' reminiscing about emotions, as these were not standardised across stations, we note that the event was both emotionally meaningful and ecologically valid. All families participated as part of a fun family outing together. Consistent with the conceptual distinction between complementary and reciprocal relationships, we were able to identify large differences in children's patterns of reminiscing with parents versus siblings. That these findings emerged as broadly consistent with our hypotheses, despite our small sample, further highlights their robustness. Our findings therefore provide new evidence that different communication partners in children's lives may have important, but distinct, patterns of influence on their autobiographical reminiscing.

Author Contributions

Dr Penny Van Bergen conceived the study (in collaboration with other authors), recruited participants, supervised data collection and coding, conducted the primary analyses, and drafted this manuscript. Professor Amanda J. Barnier conceived the study (in collaboration with other authors), assisted in the recruitment of participants, designed the coding scheme for total recall, and contributed to this manuscript. Professor Elaine Reese conceived the study (in collaboration with other authors), provided expert guidance on coding and background literature, and contributed to this manuscript. Associate Professor Doris McIlwain conceived the study (in collaboration with other authors), assisted in the recruitment of participants, and conducted preliminary analyses. Sadly, Associate Professor Doris McIlwain passed away before this manuscript was complete. Her family have given permission for her to be included as an author.

Conflicts of interest

The authors declare that they have no conflicts of interest.

Appendix.

To illustrate the nature of the event we show Station 4, the spiders' web, in which participants must climb through a giant web made of elastics. Permission for image granted.



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