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Natural Conversations as a Source of False Memories in Children: Implications for the Testimony of Young Witnesses

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Abstract

Research on factors that can affect the accuracy of children's autobiographical remembering has important implications for understanding the abilities of young witnesses to provide legal testimony. In this article, we review our own recent research on one factor that has much potential to induce errors in children's event recall, namely natural memory sharing conversations with peers and parents. Our studies provide compelling evidence that not only can the content of conversations about the past intrude into later memory but that such exchanges can prompt the generation of entirely false narratives that are more detailed than true accounts of experienced events. Further, our work shows that deeper and more creative participation in memory sharing dialogues can boost the damaging effects of conversationally conveyed misinformation. Implications of this collection of findings for children's testimony are discussed.

Keywords

Memory; Suggestibility; Children; Social Interaction; Rumor; Eyewitness Testimony

Perhaps only one simple and straightforward claim can be made about the accuracy of children's testimony: not all statements made by children are true. Admittedly, exact accuracy is not the usual goal of memory in everyday life. Most autobiographical remembering is carried out for social purposes, such as to build bonds and foster connectedness with friends and family (see e.g., Nelson, 1993), and can serve these functions even when recollections do not precisely represent the past. In fact, many everyday situations encourage some degree of unfaithfulness. Exaggerated, improvised, or even fabricated stories can be more engaging or more amusing to conversational partners than veridical reports. These tendencies to embellish personal experiences may be especially pronounced at young ages given children's proclivity for pretense and adults' willingness to play along. To illustrate, only young children can get away with fantastic stories of a fairy who gives prizes for baby teeth or a monster that lives under the bed (see e.g., Principe & Smith, 2007).

Against this backdrop of memory in everyday life, the courtroom is a rather unusual setting for children's remembering. In the real world, accounts of personal experiences are successful to the extent that they are relayed in a compelling or affecting manner. In the

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legal system, precise accuracy is the goal. Remembering is successful to the degree that witnesses “tell the truth, the whole truth, and nothing but the truth.” Forensic settings, therefore, put unique demands on memory that are at odds with the way that recollections of the past typically are used. This contrast notwithstanding, because many criminal offenses that bring children to court, such as sexual abuse and other forms of molestation, lack other witnesses or corroborating evidence, children’s testimony often serves as the sole piece of evidence against criminal defendants. Likewise, children’s memories impact many civil and family court cases. For example, children’s accounts of parental transgressions, such as domestic violence and substance abuse, as well as more mundane events, such as daily home routines, commonly play a role in custody, support, and visitation decisions. Considering the centrality of children’s testimony in many legal situations, research on factors that can compromise children’s abilities to provide accurate accounts of the past has considerable relevance to forensic professionals and fact finders.

Given that children’s testimony is elicited in interviews, many investigators have focused on the mnemonic effects of various suggestive features of interviews. This voluminous literature has revealed that a range of factors, such as types of questions asked, the sorts of ancillary aids used, and the characteristics of interviewers, can seriously derail children’s accuracy and even lead to entirely false accounts (see Bruck, Ceci, & Hembrooke, 2002, for a review). Despite the significance of this work for developing effective interviewing protocols, researchers have become increasingly concerned with examining suggestive factors outside of the formal interview context that also can contaminate memory. This move to exploring extra-interview factors has been prompted by findings that even when children are interviewed under optimally nonsuggestive conditions, some nonetheless relay fabricated stories in line with suggestions encountered from other sources, such as parents (Poole & Lindsay, 2001) and television (Principe, Ornstein, Baker-Ward, & Gordon, 2000).

In everyday life, one common way to encounter suggestions is during memory sharing conversations with others. A compelling reason for focusing on conversational forms of suggestion concerns the social nature of autobiographical memory. Sharing memories through conversations with friends and family members is a typical and frequent part of children’s everyday social interactions. During such exchanges, however, children constantly are encountering others’ versions of the past. Different versions can arise unwittingly when conversational partners misremember what happened, but also can occur when they purposefully exaggerate or even fabricate details to tell, say, a more glamorous story than give a precisely accurate account. Given that memory is constructive (Bartlett, 1932), it is within this realm that bits and pieces of the suggestions and stories told by others may find their way into children’s recollections of their experiences.

Emphasizing the social nature of remembering are theories of collective memory (e.g., Hirst & Manier, 2008; Reese & Fivush, 2008) that characterize memories of shared experiences as dynamic representations that are shaped by group conversational processes. In this framework, as memories of the past are reconstructed within a group, its members negotiate a collective version of experience. Consequently, individual representations are revised to become progressively alike among group members (see Harris, Paterson, & Kemp, 2008). However, when misinformation is introduced into group remembering, either deliberately by a confederate (Meade & Roediger, 2002) or unknowingly by a group member who experienced a slightly different version of the event (Gabbert, Memon, & Allan, 2003), individuals are prone to later recall occurrences that were nonexperienced but merely suggested by their conversational partners.

The practical importance of studies of conversational sharing for discussions of children’s testimony comes from real world examples demonstrating that witnesses often talk with one

another. Consider, for instance, Paterson and Kemp's (2006a) finding that over 80 percent of witnesses to a crime or serious accident reported discussing the event with another witness, or other work showing that it is not uncommon for multiple witnesses to be questioned at the same time (e.g., Garven, Wood, Malpass, & Shaw, 1998). Issues of conversational contamination are particularly relevant to situations involving multiple abuse victims, as children caught up in these cases may attend group therapy sessions or community meetings where allegations are shared (Rabinowitz, 2003).

There are also reasons to suspect that young children may be especially vulnerable to the contributions of others in their constructions of experience. First, young children's difficulty keeping track of the source of their memories (e.g., Poole & Lindsay, 2001) may put them at increased risk for mistakenly attributing events relayed by others as their own actual experiences. Second, young children are somewhat dependant on others to help them figure out how to represent and recount their experiences. Such collaboration benefits children's construals of novel events and narrations of existing memories (Nelson, 1993), but it might also lead to problematic distortions in memory when others incorrectly frame legally relevant events. Consider, for instance, a father who frames sexual abuse as a special game or a mother in a custody dispute who says, "Daddy hurts you when he gives you a bath, doesn't he?" Third, younger preschoolers do not yet realize that others can have memories that are false; rather they believe that the mind literally copies experience and that everyone therefore has only true memories (e.g., Perner, 1991). This tendency usually is not problematic in the real world but it can be in legal situations. To illustrate, when a child hears from a friend that she saw Santa put presents under the Christmas tree or that their teacher Mr. Bob does bad things, both claims are unquestionably believed. Finally, young children rarely receive feedback on what a false memory feels like. Adults do, for example, when they remember parking their car on the second level of the garage but find it on the first. Children, in contrast, get away with all sorts of memory errors, such as claiming to have spent the afternoon with an invisible friend.

As this brief analysis indicates, examination of the sorts of conversational activities that might be linked to later errors in remembering is central to an understanding of children's ability to provide testimony in legal settings. However, because the extant literature on memory errors focuses almost exclusively on the effects of suggestive questioning or other forms of scripted misinformation, we know very little about the ways that memory may be transformed in the normal course of discussing the past with others. With these theoretical and applied issues in mind, in the remainder of this article, we offer an overview of a programmatic series of studies carried out by our research group concerning how knowledge gained from and within conversations with age-mates and adults can shape children's constructions of the present and reconstructions of the past.

Co-Witness Influence

Our exploration of mnemonic effects of memory sharing began in the context of a study on the influence of naturally occurring interactions with peer witnesses on children's memory for a personal experience (Principe & Ceci, 2002). Given extant demonstrations of the potency of collective remembering in shaping individual memories in the direction of the group, co-witness discussions might, at least at times, cause children within a peer group to construct a collaborative story that does not veridically reflect the independent experiences of each group member. This issue may be especially important for legal cases involving multiple purported victims because fact finders may rely on the number and similarity of allegations to determine the credibility of any single child's testimony. It is likely very compelling to hear child after child tell the same story, especially if one believes that each witness has arrived at the same storyline independently. In some situations, however, the

exact opposite might be the case. The story may have been arrived at in a collaborative manner among peers who initially had very different representations of the event.

There are numerous real world examples that discussions among co-witnesses can influence children's testimony. Consider, for instance, the following exchange between a young witness and a forensic investigator in the Wee Care Nursery School case in Maplewood, New Jersey. In this case, Kelly Michaels, a teacher at the school, was accused of sexually molesting her students. Here a child reveals that the source of her allegation was another child rather than her own observation:

Interviewer: Do you know what [Kelly] did?

Child: She wasn't supposed to touch somebody's body. If you want to touch somebody, touch your own.

Interviewer: How do you know about her touching private parts? Is that something you saw or heard?

Child: Max told me.

(Ceci & Bruck, 1995, p. 150)

To explore co-witness contamination, three groups of 3- to 5-year-olds participated in a staged event at their preschools, namely an archaeology dig with a confederate archeologist named Dr. Diggs. Children used plastic hammers to dig pretend artifacts, such as dinosaur bones, gold coins, and jewels, out of specially constructed blocks of mortar mix and play sand. Each dig included two "target" artifacts: a bottle with a map to a buried treasure and a rock with a message written in a secret language. One third of the children, those in the Witness condition, saw Dr. Diggs ruin the target artifacts (heretofore referred to as target activities). He "accidentally" spilled coffee on the map, smearing the ink and rendering the map illegible. He appeared upset and said, "I messed up the map! Now I'll never find the buried treasure!" Dr. Diggs also dropped the rock, shattering it into pieces, and said, "I've broken the rock! Now I'll never know what the secret message says!" A second third of the children, those in the Classmate condition, did not witness the target activities during the dig but were the classmates of those in the Witness group. We expected that some of these children would hear about the ruined map and broken rock through natural conversations with their classmates who saw these activities. The remaining children in the Control condition were drawn from different preschools than the Witness and Classmate children. These children did not have any opportunities to interact with those who saw the target activities nor did they see these activities themselves. This group provided the likelihood that target activities would be reported by a random nonwitness without exposure to any peer witnesses. Teachers were discouraged from initiating or participating in conversations with children about the dig.

Given evidence of the use of suggestive techniques in forensic settings, we also examined whether suggestive interviews might augment the influence of co-witnesses. Following the dig, all children were questioned on three occasions spread out over a 3-week interval. Half of the children received neutral interviews, whereas the remaining half were questioned in a suggestive manner. Embedded in the suggestive interviews were strongly worded leading questions that implied that the target activities had occurred. Thus these questions were in line with what the Witnesses children had seen, but inconsistent with the experience of the Classmate and Control children.

Four weeks after the dig, a new interviewer questioned all of the children in a neutral manner and asked them to recall “only about things that you remember happening to you—things that you really did or remember seeing with your own eyes.” The hierarchically ordered interview began with an open-ended prompt: “Tell me what happened when Dr. Diggs visited your school.” After exhausting open-ended recall, specific questions were asked if one or both of the target activities had not yet been reported (e.g., “Did anything happen to a treasure map?”). For each target activity relayed, children were asked to elaborate (“Tell me more about that.”) Children who made reports of target activities also were asked for the source of their memories, that is, whether they actually saw the target activity occur with their own eyes or merely heard about it from someone (e.g., “Did you see Dr. Diggs spill his drink on the treasure map with your own eyes, or hear that he did it?”).

Table 1 shows the proportion of target activities reported and the degree of prompting needed to elicit the information at the 4-week interview. As shown, children in the Witness conditions evidenced quite good recall of these actually experienced activities, with both groups reporting over 80 percent. However, the Classmate children, who did not witness the ruined map or the broken rock, also reported many of these activities. Under both interviewing conditions, the Classmate children wrongly reported more target activities than the Control children, demonstrating that natural contact with peer witnesses can induce false accounts in non-witnesses. In fact, many errant accounts were at the open-ended level of questioning, indicating that the effects of peer witnesses are not limited to cued reports can but can result in abundant spontaneous errors. Perhaps the most interesting finding to emerge from this study is that when the Classmate children were exposed to the suggestive interviews, they reported as many target activities as those in the Witness conditions who actually experienced these activities. Thus the combined effects of exposure to peer witnesses and suggestive interviewing among the non-witnesses resulted in levels of recall that were indistinguishable in terms of magnitude from those of the Witness children.

Several other findings also are of interest. First, among those non-witnesses who reported target activities, the Classmate children were more likely than the Control children to report actually seeing these activities occur with their own eyes (as opposed to merely having heard about them). Such claims of seeing suggest that natural conversations with co-witnesses not only can induce false reports but they also can lead to source confusions. Second, given that fact finders often consider detail as an index of testimonial accuracy (Ceci, Kulkofsky, Klemfuss, Sweeney, & Bruck, 2007), we explored the narratives accompanying the reports of target activities. As expected, the Witness children generated relatively detailed accounts of these experienced events. Many non-witnesses, however, also relayed elaborate reports of these occurrences they never saw but merely heard about, with many embellishing with details that went beyond the Witness children’s experiences but nonetheless were consistent with them. Consider, for example, a Classmate child who said that after spilling coffee on the map “Dr. Diggs walked away and then we just got in big trouble... all my friends and he had to be punished for a whole weekend...The ladies in the cafeteria cleaned it because he didn’t have a mop...They took him away and put him in jail.” In fact, the Classmate children’s false accounts of the target activities were more voluminous than the true narratives of the Witness children. This pattern demonstrates that narrative detail is not diagnostic of accuracy when children have been exposed to peer witnesses, and is consistent with other work showing that false accounts induced by other forms of suggestion can be more elaborate than true reports (e.g., Bruck et al., 2002; Poole & Lindsay, 2002). Interestingly, examination of the content of children’s narratives indicated that this group difference occurred neither because the Classmate children more completely relayed their peers’ experiences or the interview suggestions nor because they more readily invented fantastic or idiosyncratic embellishments, but because they generated

more original constructions consistent with the notions of a ruined treasure map and a broken rock.

Rumor Mongering and Remembering

In our next study, we sought to extend our (Principe & Ceci, 2002) demonstration of the impact of conversational interactions by determining whether peer interactions can influence children's reports of an experience even when *none* of them actually witnessed the event in question. To do this, we planted a false rumor about an experienced event among some members of preschool classrooms and examined the degree to which the rumored information leaked into their own and their classmates' recollections when later interviewed. We also explored the degree to which the interfering effects of the rumor might be exacerbated when paired with suggestive interviews that are consistent with the rumor.

We chose to study rumor transmission because a large literature in social psychology demonstrates that rumors often are generated about events that are meaningful and upsetting where the truth is unclear (see Rosnow, 2001). These conditions sound a lot like those created by the sorts of offenses that usually bring children to court, such as sexual abuse and other forms of maltreatment, because they are unsettling and typically lack corroborating witnesses or physical evidence. In such cases, rumors may emerge to fill in the gaps of missing information or to impose an explanation on an unsettling allegation. Considering that individuals generally assume that information exchanged during everyday conversations is true (Gilbert, 1995), shared rumors likely have much potential to prompt revisions in memory in line with overheard information.

There also are real world examples of rumor contamination. One comes from a case in which children who were absent from school on the day of a sniper attack recalled seeing things that only their peers, who were present, could have experienced. A rumor allegedly began to circulate that a second sniper had eluded police and was on the loose. When the children were asked to describe the attack several months later, many described in detail how the second sniper had escaped and still was loose in the neighborhood (Pynoos and Nader, 1989).

To examine whether rumor can leak into memory, four groups of 3- to 5-year-olds saw a scripted magic show in their preschools (Principe, Kanaya, Ceci, & Singh, 2006) in which a magician named Magic Mumfry tried to pull a live rabbit out of his top hat. After several failed and frenzied efforts, Mumfry apologized and left the school. Immediately after the show, children in the Overheard group overheard a scripted conversation between two adults in which one alleged that the trick failed because Mumfry's rabbit had gotten loose in the school rather than residing in his hat. We maximized children's attention to the rumor by having them stand quietly in a line awaiting a sticker during the planned conversation. Children in the Classmate group did not overhear the adult conversation about the escaped rabbit but were the classmates of the Overheard children. Of interest was whether these children would learn about the alleged lost rabbit through natural interactions with their classmates who heard the rumor and whether details in line with the rumor might leak into their later recollections. Control children had no exposure to the rumor; they were not the classmates of those who overheard the rumor, nor did they overhear it themselves. The remaining children in the Witness group had no exposure to the other three groups but experienced the event suggested by the rumor, namely seeing Mumfry's rabbit loose in their school after the failed trick. One week later, all children were questioned in either a neutral or suggestive manner. Embedded in the suggestive interviews were coercive questions that implied that the interviewee had witnessed Mumfry's escaped rabbit, when in fact only those in the Witness group did.

Two weeks after the show, all children were questioned by a new, neutral interviewer in the same hierarchical manner as in Principe and Ceci's (2002) study. As shown in Table 2, all of the Witness children correctly recalled that Mumfry's rabbit had gotten loose in their school. Table 2 also illustrates the powerful effects of the rumor on children's accounts. All but one of the Overheard and Classmate children wrongly reported a loose rabbit. Thus these children were as likely as those who actually saw a live rabbit to report that Mumfry's rabbit was loose, thereby eliminating differences in levels of recall between true and false accounts. This pattern not only shows that information overheard from adults can lead to near ceiling levels of false reports of nonexperienced events, it also indicates that rumors transmitted by peers can be as detrimental as those spread by adults. Moreover, the majority of the Overheard and Classmate children's reports of the escaped rabbit were in response to open-ended probes, demonstrating that errant rumors can lead to high levels of spontaneous fabrications. Further, many Overheard and Classmate children claimed to have seen, as opposed to heard about, the loose rabbit. These reports of seeing a nonoccurring event represent a considerably more extreme demonstration of peer-generated suggestibility than our prior study (Principe & Ceci, 2002) considering that none of these children witnessed the event in question. Further demonstrating the potency of rumor, the non-witness children described the rumored loose rabbit with much elaborative detail that went above and beyond the literal rumor. To illustrate, a Classmate child said that, "The rabbit was in the playground, and then it was over the gate and, the rabbit was over, the rabbit jumped, hopped over the gate...I tried catching him with a bucket but he bit me on the finger... They found him in the potty." In fact, the Overheard and Classmate children's descriptions of the rumored-but-nonoccurring loose rabbit were twice as voluminous as the accounts of the Witness children, demonstrating that false narratives engendered by rumor can be much more elaborate than true narratives generated on the basis of experience.

Considering the ease with which suggestive questions can induce false reports (see Ceci et al, 2007), it is worth noting that the loose rabbit misinformation engendered higher levels of error when planted via a rumor than when suggested during an interview. Those children who heard the rumor from an adult or peers gave more errant reports of the nonevent, were more likely to wrongly recall seeing (as opposed to hearing about) it, and embellished their accounts with more elaborative detail compared to those for whom the very same false information was suggested during an interview. This finding is particularly noteworthy given that the Overheard children were not instructed to share the rumor with their peers but ended up naturally propagating this information to them in a manner that was more mnemonically damaging than an aggressively suggestive interview.

Conflicting Rumors

The major finding of our initial study on rumors was that overheard false information that provides a reasonable explanation for an earlier ambiguous event can lead children to mistakenly recall details consistent with the rumor (Principe et al., 2006). This finding prompted us to consider whether the effects of rumor might be less powerful in situations where the rumored information conflicts with the past rather merely fills a gap. This contrast was of interest because when rumors only fill a gap, overheard details can be imported into memory without displacing or overwriting any experienced details. But when rumors conflict with the past, there is a contradiction between what was experienced and what was overheard and children must resolve it.

One important factor that may moderate children's resistance to rumors that contradict with their experiences is their ability to reason about conflicting mental representations. This notion comes from researchers in the theory of mind tradition who propose that there is a major transition in children's understanding of representational processes between 3 and 6

(e.g., Perner, 1991). Younger preschoolers possess a copy theory of mind and believe that the mind exactly represents the world and that consequently everyone has the same true beliefs about it. In contrast, older preschoolers develop an interpretive theory of mind and recognize that representation is a subjective process shaped by experience as well as beliefs, expectations, goals, and so on. Thus they realize that different people can have different, even contradictory, representations of the same experience.

With these issues in mind, 3- to 6-year-olds participated in our usual magic show (Principe, Tinguely, & Dobkowski, 2007). At the end of the show, one third of the children, those in the Conflicting Representation condition, experienced an extra activity that provided a plausible explanation for the failed trick but that conflicted with the rumor that they would later overhear. Mumfry uncovered a previously unseen cage that held a live rabbit. He explained that he had found his missing rabbit and that it was sick because when it is sick it will not leave its cage, not even to do its favorite hat trick. To encourage belief in this explanation, Mumfry got out his vet kit, checked the rabbit with a stethoscope, and gave it some “medicine.” Then he and the rabbit left the school. Replicating our original procedure, these children then overheard an adult allege that Mumfry’s trick failed because the rabbit had gotten loose in the school. Importantly, the rumor created a conflicting representation for the failed trick for these children given their prior exposure to the sick rabbit. A second third of the children, those in the Nonconflicting Representation group, overheard the same rumor conversation but did not experience the extra sick rabbit activity. Thus for these children the rumor provided a plausible explanation for the failed trick. The remaining Control children did not overhear the rumor or interact with the children in the other two groups. One week later, all children were questioned using our standard interview protocol.

Replicating our earlier findings, nearly all of the children for whom the rumor did not conflict with their experiences reported that Mumfry’s rabbit had gotten loose in the school. Interestingly, there were no effects of age in this group, suggesting that increased resistance to gap-filling rumors may not develop during the preschool years. However, the 5- and 6-year-olds were better able than the 3- and 4-year-olds to resist the rumor when it conflicted with their experiences than when it merely filled a gap, whereas the 3- and 4-year-olds were equally likely to be misled by both types of rumors. All but one of the Conflicting Representation young children reported a loose rabbit, whereas less than half of the older children did. These findings qualify our earlier work by revealing that younger preschoolers may be more vulnerable than older preschoolers to conflicting rumors.

Examination of children’s false narratives describing the rumored loose rabbit suggests that their developing ability to deal with conflicting representations played some role in this age trend. The younger Conflicting Representation children based the majority of their false accounts on only one representation of the failed trick—the nonoccurring rumor. The older children in this condition, in contrast, imported many details consistent with the sick rabbit activity they actually saw, suggesting that they had more ready access to both representations and consequently drew from both in constructing their accounts. We also found that poorer performance on a separate series of tasks that index conflicting representation understanding was associated with increased proneness to report the rumored target activity and heightened levels of descriptive detail consistent with the rumor. This relation remained significant after controlling for age, supporting the notion that the development of a conceptual understanding of the mind, particularly the ability to reason about conflicting mental representations, may be important for resisting suggestions that contradict with children’s experiences. It is worth noting that the distinction between conflicting and nonconflicting misinformation generally is not made in the suggestibility literature, but these findings suggest that this may be an important contrast useful for explaining age trends.

Child-Generated Suggestibility

These findings demonstrating the potency of rumors planted by adults prompted us to consider the mnemonic effects of rumors generated by children themselves. This issue was of interest because of a growing attention in the memory literature to autosuggestibility (Brainerd & Reyna, 1995), or errors in memory that emanate from internal, constructive processes in which an individual's own beliefs, expectations, goals, and so on, distort their recollections. For instance, autosuggestion errors can occur when people make causal inferences during an event and later mistake their inferences for memories of the actual experience. To illustrate, when shown a slide sequence of a familiar event (e.g., grocery shopping) that shows an effect (e.g., oranges on the supermarket floor) but not its cause, many people wrongly report seeing the most probable cause of the observed effect (e.g., a woman pulling an orange from the bottom of the stack). Hannigan and Reinitz (2001) attribute this tendency to a reality monitoring error that occurs when people misattribute their memory of an internally generated inference as arising from an externally experienced slide. Given that children as young 3 make inferences about the causes of observed events (e.g., Sophian & Huber, 1984), we wondered whether they may be vulnerable to causal inference errors about experienced events.

In this study, 3- to 6-year-olds watched a modified version of our usual magic show in which Mumfry failed at two tricks: pulling a rabbit out of his hat and producing a baked cake from a cake pan (Principe, Guiliano, & Root, 2008). For the cake trick, Mumfry put several real ingredients into cake pan, covered it, and promised a fully baked cake. However, when he opened the lid, the pan was empty. To prompt the generation of rumors, one third of the children, those in the Clue condition, were exposed to two sets of clues: carrot ends with "teeth marks" and a plate with cake crumbs and a dirty fork. The carrot and cake "clues" were expected to induce two inferences (heretofore referred to as target activities): one about the cause of the failed hat trick (i.e., the rabbit got loose in the school) and one about the cause of the vanished cake (i.e., someone ate the cake). To investigate whether these children would naturally propagate their inferences about the escaped rabbit and the eaten cake to peers, the children in the Classmate condition were the classmates of those in the Clue group, but were not exposed to the clues. The remaining children in the Control condition were not the classmates of those who saw the clues, nor did they see the clues themselves.

The results indicated that the clue manipulations prompted the generation of rumors (or explanations) about what happened to the missing rabbit and cake that made their way into children's later memory reports. When interviewed one week after the show, nearly 80 percent of the Clue children reported that Mumfry's rabbit had gotten loose or that someone had eaten the cake. Forty percent of these errors were at the open-ended level of questioning. Interestingly, the clues were more mnemonically damaging to the 5- and 6-year-olds than the 3- and 4-year-olds. Not only were the older children more likely than the younger children to mistakenly report their inferences during free recall, their reports of nonexperienced-but-inferred occurrences were embellished with double the amount of detail. This pattern might seem counterintuitive because younger children typically are more suggestible than older children. But given that causal inferencing ability develops rapidly during the preschool years (e.g., Sophian & Huber, 1984), a reverse developmental trend in interference errors makes sense on empirical grounds. Assuming the older children more readily generated relevant inferences following the clues, they likely had created for themselves more opportunities than the younger children to make causal inference errors. Supporting this explanation is that compared to the younger children, the older children's false accounts contained more logical inferences based on the clues and they more often elaborated on their inferences in a rational manner. The younger children, in contrast, were

more likely to recount illogical or even impossible details about the target activities. Considering that fact finders tend to view detail as diagnostic of accuracy, these findings have some applied relevance as they suggest that when conditions are ripe for causal inferences, older children may be more prone to construct false reports that are more compelling or believable than those produced by younger children.

Examination of the Classmate children's performance indicated that the Clue children readily propagated their inferences to peers. Nearly 40 percent of the Classmate children reported one or both of the target activities, and the majority of these claims occurred during free recall. Interestingly, the spread of inferred information was particularly potent among the 3- and 4-year-olds, as they were more likely than the older children to report actually seeing events that their peers merely inferred. These data provide original evidence that rumors generated by children themselves, rather than those planted by adults, can intrude into the recollections of peers. This is an important extension of our earlier work because although much is known about how adults can induce errors in children's memory, little is understood about how children themselves can affect other children's recall. It is noteworthy, however, that the Clue children made more false reports than the Classmate children, demonstrating that the children generally were more influenced by their own conclusions for the failed tricks than their peers'. This rationale is in line with findings in the source monitoring literature that internally generated events are more easily confused with one's own experiences than are externally suggested events (e.g., Lindsay, Johnson, & Kwon, 1991).

The more frequent errors among the Clue relative to the Classmate group notwithstanding, higher levels of details accompanied the Classmate children's reports of the target activities. This finding suggests that children may be especially likely to embellish information picked up from peers—a trend that we found in our original Mumfry study (Principe et al., 2006) and in follow-up work reported below. Examination of the content of children's narratives made it clear that the rise in elaboration among the Classmate children was driven by an increase in statements consistent with the notions of a loose rabbit and eaten cake but beyond inferences that could be derived directly from the clues. Perhaps because the Classmate children did not see the clues themselves but based their ideas on their peers' stories about the causes of the failed tricks, they were less limited than the Clue children to describing the simple inferences implied by the clues.

Social Processes

In our three rumor studies described so far, levels of errant reports are higher and the accompanying false narratives more voluminous than are typical of suggestibility research in which children are exposed to misinformation during interviews (e.g., Bruck et al., 2002) or in other private contexts (e.g., Leichtman & Ceci, 1995; Poole & Lindsay, 2001). Of interest therefore is what gives rumor its potency? One clue comes from studies in the adult social influence literature that demonstrate the very same misinformation more easily intrudes into memory if it is encountered in a social context via a confederate than if it is picked up in a nonsocial manner, such as through written suggestions or leading questions (Paterson & Kemp, 2006b), with the magnitude of social conformity building as exposure to others' erroneous responses increases (Vrij, Pannell, & Ost, 2005). Given that children in our rumor studies interact freely with their entire class after the rumor is planted, it is possible that this social experience, rather than the rumor itself, drives the exceptionally high levels of false reports and fictitious elaboration. The purpose of our next study, therefore, was to examine whether opportunities for natural discussions with others following exposure to a false rumor exacerbate its effects on later recall.

To investigate this question, 3- to 5-year-olds watched our Mumfry show and then overheard the loose rabbit rumor (Principe, Daley, & Kauth, 2010). Immediately after overhearing the rumor, some of the children were given 30 minutes of free play time to interact naturally with one another. Other children were engaged in a structured “circle time” activity for 30 minutes that prohibited them from talking about the rumor. After these 30 minutes, all children went home for the day and we took several measures to ensure that none of the children had any further interactions with their schoolmates that day.

When interviewed 1 week later, those children who heard the rumor and then interacted freely with peers made more false reports of the rumored occurrence, were more likely to admit to seeing this nonevent, and described this nonoccurrence in more detail than those who did not have the opportunity to naturally converse with their peers immediately after the rumor. These findings demonstrate that the infusion of misinformation into a group has more powerful effects on memory than if the very same information is encountered individually without the opportunity for immediate collaborative reflection. Further, analysis of the content of children’s narratives revealed that more than one-third of the details reported by those who interacted naturally following the rumor overlapped with something that someone else in their classroom had uttered, whereas those who were denied an opportunity to interact evidenced only a 9 percent overlap in their reports (most of which were mere verbatim repetitions of the rumor). This group difference in shared utterances clearly indicates that the natural conversations that occurred in the classrooms immediately following the provision the rumor had a powerful effect in shaping children’s reports one week later.

The ease of contamination brought about by socially provided misinformation notwithstanding, a second social factor that might impact the transmission and mnemonic effects of rumored information within a group is the group’s prior history. Supporting this notion are findings in the classical social influence literature demonstrating that the magnitude of conformity escalates with group cohesiveness (Wren, 1999). Further, experimental work in the rumor literature demonstrates that the transmission of unfounded information within a group increases with the level of familiarity between participants, or a desire to establish such a level (Rosnow, 2001).

To examine whether familiarity might exacerbate the interfering effects of errant rumor on memory, 3- to 5-year-olds were assigned to one of two conditions that differed in terms of their social history (Principe, Daley, & Kauth, 2010). Half of the children had been classmates for at least 6 months, whereas the remaining half were complete strangers. We carried out the magic shows in an unfamiliar location to ensure that the group’s social history rather than the familiarity of the setting drove any group differences in memory. Once the rumor was planted, all of the children engaged in free play for 30 minutes.

As expected, the rumor induced greater memory contamination if it was planted among familiar peers than if it was encountered among strangers. Those children who interacted freely with their preschool classmates made more false reports of the rumored occurrence, were more likely to claim to have seen this nonevent, and provided more elaborate narratives compared to those children who interacted with unfamiliar peers following the rumor. The familiar children also displayed greater overlap in the content of their errant accounts compared to unfamiliar children, demonstrating that a group’s social history can augment the degree to which narrative details invented during natural interactions later become infused into children’s individual reports.

Representational Changes

Given our findings that overhearing an errant rumor—either from an adult or classmates—can lead children to make detailed false reports, we next sought to explore the extent to which such accounts are driven by changes in children’s memory representations that lead to a genuine belief that the rumored information was actually seen. The alternative is that children’s errant reports following rumor are driven merely by social demands to relay information they knew they hadn’t experienced but was only suggested. This theoretically significant distinction is also important for discussions of testimony. If rumor can bring about errant beliefs about witnessing events that only were overheard, then there may be little that forensic interviewers can do to mitigate rumors’ effects. But if reports of rumored occurrences merely are driven by compliance to social pressures, such effects may be reduced by protocols that boost the retrieval and reporting of information in memory, such as the Revised Cognitive Interview or the National Institute of Child Health and Human Development Investigative Interview (see e.g., Lamb, Hershkowitz, Orbach, & Esplin, 2008).

To examine this issue, we used a warning manipulation that minimized social pressures to report an overheard rumor about an experienced event and we examined the qualitative characteristics of children’s false narratives prompted by the rumor (Principe, Haines, Adkins, & Guiliano, 2010). Three- to 6-year-olds watched a magic show in their schools and we replicated the Overheard, Classmate, and Control procedures from our rumor original study. When interviewed one week later, half of the Overheard and Classmate children received a series of emphatic warnings that eliminated social demands to report the rumor by telling them that any information overheard after the show was wrong and therefore should not be reported. Thus if children were able to discern the correct source of the rumor, there were no social pressures to relay it.

Demonstrating that compliance to social pressures can lead to false claims, the warning reduced false reports in line with the rumor when it was planted by an adult. However, when the rumor was picked up from peers, the warning decreased false reports among 5- and 6-year-olds, but not 3- and 4-year-olds. The warning, however, had no effect on children’s claims of actually seeing the loose rabbit. That is, when children who reported the loose rabbit were probed for the source of their memory, warned and nonwarned children were equally likely to claim to have seen the loose rabbit with their own eyes (as opposed to merely having heard about it). This pattern suggests that social demands produced at least some false reports of the rumored occurrence, but that demand characteristics had little or nothing to do with children’s claims of *seeing* the rumor.

Considering this evidence that claims of *seeing* generally were not due to social demands, to what extent did they reflect a genuine belief in having seen the rumored event? Analyses of children’s false narratives provide some insight. Replicating findings of all of our prior rumor studies, those children who recalled seeing a loose rabbit provided more voluminous false narratives consistent with the theme of the rumor than those who did not admit to seeing it. This pattern suggests that when memories for rumored events contain much elaborative detail, children may be prone for mistaking them for real experiences. However, analysis of the content of children’s false narratives indicated that there was more to the story. Those children who did and did not recall seeing the rumored occurrence generated different narrative profiles. Specifically, those children who reported seeing a loose rabbit described this rumored event with relatively more perceptual (e.g., color and sound) and contextual (e.g., spatial location and temporal order) detail than either those who were unable to determine a source of their false reports or who claimed another source.

This distinction is important because according to Johnson and colleagues' source-monitoring framework (Johnson, Hashtroudi, & Lindsay, 1993), individuals distinguish the source of information is memory by evaluating certain characteristics of the representation at retrieval. In this view, experienced events are represented with more perceptual, contextual, semantic, and affective information than imagined, suggested, or otherwise nonexperienced events, and the differing profiles of these two classes of memories serve as cues to discriminate their origins. Thus given that perceptual and contextual details are characteristic of experienced sources, it may be that the generation of these qualities in representations of the rumor interfered with the usual source-judgment process and consequently led some children to misattribute it as a witnessed event. This interpretation presumes that rumored events can come to be represented similarly to experienced events and that such representational changes put children at risk for wrongly judging heard about events as seen. The point is that children who made false claims of seeing might not have been engaging in faulty reasoning about source, but rather were dealing with a memory that was uncharacteristic of its class. This interpretation is in line with other work showing the usually successful source judgment process can go awry when representations of nonexperienced events develop qualities typical of real experiences (e.g., Blandon-Gitlin, Pezdek, Lindsay, & Hagen, 2009).

The current results also suggest developmental improvements in children's vulnerability to make false claims of seeing rumored events. As expected, 3- and 4-year-olds were more likely than 5- and 6-year-olds to recall seeing the rumor. Common explanations of these sorts of heightened source errors among younger children are their immaturities in theory-of-mind understanding, representational ability, and the strategy of using memory characteristics to identify source (see e.g., Sluzenski, Newcombe, & Ottinger, 2004). We found, however, more abundant perceptual detail in the false accounts of the younger versus older children. This raises another possibility, namely that young children may be particularly prone to generate perceptual images in response to postevent suggestions and subsequently infuse them into their representations of experience. Indeed, such a tendency would constrain the efficiency with which source-monitoring processes can operate.

We also found that the Classmate children were more suggestible than the Overheard children. In particular, the Classmate children made more frequent reports of seeing and gave more lengthy descriptions of the rumored occurrence relative to the Overheard children. Examination of false narratives indicated that the Classmate children reported proportionately more perceptual and contextual detail than the Overheard children. This pattern suggests that what makes rumors picked up from peers particularly potent is that this mode of transmission can lead to an abundance of perceptual and contextual detail in memory that children are prone to judge as indicative of an authentic witnessed experience.

Consistent with current conceptualizations of memory (Ceci, Papierno, & Kulkofsky, 2007), the results of this study highlight the notion that individual and developmental differences in underlying representations play an important role in children's suggestibility. These data also have implications for children as witnesses. First, the effectiveness of the warning in reducing false claims suggests that legal professionals would be prudent to consider instructions to young witnesses to ignore any heard about information if it is known that a false rumor has been circulating. Second, we found that even though the warning reduced reports of rumored information, it did not affect children's ability to correctly report the actually experienced portions of the magic show. This finding indicates that legal professionals may not need to be concerned that warnings will reduce false detail at the expense of true information. We found however, that the warning was associated with an increase in the provision of constructive details and a corresponding decrease in reports of fantastic details about the rumored occurrence, suggesting that false accounts of rumored-

but-nonexperienced events that persist following a warning might appear particularly believable and compelling.

Linking Rumor Mongering to Later False Reports

In our next study, we sought to investigate directly the content of children's post-rumor conversations to begin to make claims about which specific qualities of these discussions are linked to later errors in remembering (Principe, Cherson, DiPuppo, & Schindewolf, accepted pending revision). To do so, we replicated our original magic show procedures and formed three groups: Overheard, Classmate, and Control. To document the transmission of rumored information among peers, we recorded children's natural conversations for 20 minutes following their exposure to the rumor. Children wore a small belt pack with a digital audio recorder and a microphone that attached to their shirts. Children were interviewed at both 1 and 4 weeks following the show. We added this 4-week delay to explore the decay rate of overheard rumors.

Children's performance at the 1-week interview replicated our earlier results. Nearly all of the Overheard and Classmate children, but none of the Control children, reported that Mumfry's rabbit was loose. Likewise, many Overheard and Classmate children recalled seeing the alleged loose rabbit and many provided high levels of constructive embellishments in line with the rumor, with the Classmate children being more likely to make claims of seeing and generating more voluminous false accounts. Reports of the loose rabbit and recollections of seeing remained high across the 4-week delay. Only the older Overheard children evidenced any decline in the volume of their false narratives over the delay. These patterns indicate that the memory alterations engendered by false rumor do not dissipate rapidly but rather reflect more lasting changes in remembering.

Examination of children's natural exchanges with peers in their classrooms following their exposure to the rumor revealed a remarkable amount of dialogue going on among those who heard the rumor directly from the adult as well as those who had picked it secondhand up from their peers. In fact, every child in both groups uttered at least one statement about the alleged loose rabbit, demonstrating that every Overheard and Classmate child encoded the rumor and was actively engaged, albeit in varying degrees, in circulating the rumored information.

Analysis of the content of children's natural talk in their classrooms showed that they did not merely stick to propagating the rumor verbatim to peers. Nor was there much fantastic talk in the post-rumor dialogues, suggesting that the children generally did not interpret the rumor as an invitation to engage in pretense. Most of the information transmitted was made up of constructive utterances in line with the theme of rumor but above and beyond its literal content. Thus the children were inventing and sharing new details that generally were believable. Considering findings in the adult literature that believability is necessary for rumors to be spread readily and widely (see Rosnow, 1991), the constructive nature of the information generated and circulated in the classrooms likely boosted the influence of the rumor on children's subsequent remembering.

Next we explored the degree to which things said in the interview originated in the classroom on the day that the rumor was spread. At the 1-week interview, 20 percent of the details relayed about the rumored loose rabbit overlapped with what they themselves had uttered in the classroom. Thirty-two percent of their narrative reports during the interview originated in their classmates' transmissions. At the 4-week interview, 13 percent of children's false reports overlapped with their own transmission in the classroom, and 23 percent overlapped with their classmates contributions. These findings provide direct evidence that the very narrative details invented and circulated among children following

their exposure to the rumor intruded into their own and their peers' subsequent individual accounts of the event out to a 4-week delay. Thus the children were not merely fabricating constructions about the rumored occurrence on the fly during the interview but also were remembering a good deal of the transmissions that had originated one or four weeks earlier in the natural dialogues on the day the rumor was planted. Further, these findings of the ready infusion of the content of peer dialogues into later memory provides some insight into why the effects of postevent misinformation are exacerbated when it is encountered in a group rather than individually without the opportunity for co-witness exchange.

Consistent with our earlier findings, the rumor was more damaging to memory when it was gleaned from agemates than when it was overheard from an adult. At both interviews, the Classmate children made more frequent reports of seeing the rumored occurrence and they offered more lengthy false narratives than the Overheard children. Further, among those children who erroneously reported the rumored event at both interviews, the Classmate children evidenced no decline in narrative detail across the 4-week delay. The older Overheard children, however, displayed a drop in elaborative detail from the 1-week to the 4-week interview.

In line with findings that the Overheard and Classmate children remembered differently, comparison of their post-rumor talk revealed that the Classmate children also talked differently than the Overheard children about the alleged occurrence on the day the rumor was planted. Compared to the Overheard children, the Classmate children uttered more original transmissions. Both groups of children improvised quite freely—overall 58 percent of children's utterances in the classroom were novel (i.e., no other child in the classroom had yet uttered), but the Classmate children relayed more than twice as many original transmissions as their Overheard peers, demonstrating that they engaged in much more inventive rumor mongering than their agemates. Further, the Classmate children also were more affected than the Overheard children by what went on in the classrooms on the day the rumor was planted. At both the 1- and 4-week interviews, the Classmate children evidenced a greater overlap than the Overheard children between things they themselves had said as well as things their classmates had uttered on the day the rumor was planted and their subsequent interview reports. Likewise, at both interviews, the Overhead children relayed higher levels of nonoverlapping information, suggesting that they were more likely than the Classmate children to fabricate their interview reports on the fly.

These findings of heightened peer-suggestibility are at odds with the typical finding in the suggestibility literature that children are more easily misled by adults than peers (e.g., Ceci, Toglia, & Ross, 1990). An important contrast between the usual suggestibility study and the current work concerns the differing manners by which suggestions were delivered by peers. In typical suggestibility research, children make scripted suggestions during formal interviews, whereas in our paradigm, familiar children transmitted freely varying suggestions—without being instructed to do so—during the course of naturally occurring interactions. This contrast suggests that the naturalness of the reception context might boost the impact of misinformation. Consistent with this interpretation are findings in the rumor literature that rumors are more readily spread when picked up from a peer than an authority figure (Jaeger, Anthony, & Rosnow, 1980), with higher degrees of propagation within an individual's own social group (Almirol, 1981). Also supporting this explanation is the finding that the Overheard children generally did not constrain themselves to stay true to the information transmitted by a presumed authority figure; rather their propagations in the classrooms were highly inventive. Thus, it may be the improvised nature of the Overheard children's original transmissions and the Classmate children's subsequent tendencies to do more constructive spinning of the rumor that made peer suggestions particularly powerful.

In line with prior findings, the older children provided more errant narrative detail at both interviews than the younger children. We also found that the 5- and 6-year-olds were the master rumor propagators in the classroom. Compared to the 3- and 4-year-olds, they generated more constructive utterances and improvised more original transmissions about the rumored occurrence. This deeper and more inventive participation in rumor exchanges with their peers suggests that the older children simply had created for themselves more opportunities than the younger children to be influenced by what went on in the classrooms. Supporting this notion is that the older children provided more interview details that overlapped with their own utterances (1-week interview) and their classmates' utterances (1- and 4- week interviews) in the classroom than the younger children. Given that fact finders tend to judge detail as an index of accuracy, these findings suggest that when conditions are ripe for rumor mongering, older children may be more prone to construct false narratives that are more compelling or believable than those produced by younger children.

Maternal Suggestibility and Memory Sharing Style

These findings demonstrating the mnemonic effects of peer discussions following misinformation notwithstanding, little is known about how conversations with parents who have been exposed to misleading information might affect memory. It is well known that young children rely heavily on their parents to help them frame and guide their formulations of experience. But what happens when parents has preexisting beliefs about what has happened to their children? Both case study (see Ceci & Bruck, 1995) and empirical investigations (White, Leichtman, & Ceci, 1997) show that when interviewers believe unfounded allegations to be true, they are prone to shape their interviews with children to elicit untrue statements consistent with their extant beliefs and consequently put children at increase risk of making false claims in line the unfounded beliefs. Little is known, however, about whether parents' false beliefs might similarly drive children's accounts.

Understanding the influence of parents' beliefs also has implications for discussions of the testimony of young witnesses. Consider, for instance, the case of Lillie and Reed v Newcastle City Council & Ors (see Bruck, Ceci, & Principe, 2006) in which, on the basis of a two-year-olds' uncorroborated allegations, parents of children in a daycare center were told that a child in the center may have been sexually abused and then were asked to talk with their children about the possible abuse. Similarly, in the McMartin Preschool case in Manhattan Beach, California, prompted by a mother's allegation that her son had been sexually molested by a school aid, Police Chief Harry Kuhlmeier sent a letter to nearly 200 mothers whose children attended the school (see Ceci & Bruck, 1995). The letter urged mothers to question their children and suggested events that might have taken place: "Please question your child to see if he or she has been a witness to any crime or if he or she has been a victim. Our investigation indicates that possible criminal acts include: oral sex, fondling of genitals, buttock or chest area, and sodomy." Given that parents in both of these cases were told that abuse was possible, some may have believed in the defendants' guilt and inadvertently molded their memory discussions with their children to elicit accounts in line with their beliefs.

To explore whether discussions with misinformed parents might affect children's later memory, we had children watch our usual magic show and then gave their mothers a letter that asked them to naturally discuss the show with their children (Principe, DiPuppo, & Gammel, under review). In the letters of half of these mothers, those in the Suggestive Letter condition, was a suggestion that Mumfry's rabbit may or may not have gotten loose in the school on the day of the magic show. The letters of mothers in the Neutral Letter condition was identical except for the suggestion. Both sets of mothers were asked to hold their discussion on the morning of our interview which took place 1-week after the show. We

gave mothers a digital recorder to record their conversations. A third group, the Control condition, neither received the suggestion nor were they asked to talk about the event with their children.

Results indicated that the letter was a potent form of suggestion. During the interview, the Suggestive Letter children were more likely to wrongly report a loose rabbit and to claim to have seen this rumored-but-nonconcurring event than the Neutral or Control children, providing original evidence that parents can be a natural source of report contamination when they have been misinformed. Earlier work has shown that parents can be a source of memory error when they suggest experimenter-provided scripted nonoccurrences (e.g., Poole & Lindsay, 2001), but this is the first study to demonstrate that misinformation encountered by parents can leak into children's later accounts when they are not asked to suggest the nonevent to their children but merely to talk with their children in a natural manner.

Admittedly, the current suggestibility manipulation was rather weak compared to the more direct and coercive forms used in most of the literature (e.g., Bruck et al., 2002). Nonetheless, children's error rates during the interview in the current study are comparable to those in research on suggestibility that use more direct forms (60 percent of the Suggestive Letter children claimed that the rabbit was loose, compared to less than 10 percent in the other two groups). Not only was a substantial proportion of children's false reports at the open-ended level of questioning (20 percent), their errors also were accompanied by a fair degree of elaborative detail in line with the theme of the suggestion to their mothers.

Given the well-known distinction in style that mothers take on when remembering with their children, namely high versus low elaborative (see Nelson & Fivush, 2004, for a review), we next sought to explore whether the influence of our misinformation manipulation varied as a function of maternal style. This issue was of interest because maternal style influences how children represent and remember the past. High-elaborative mothers scaffold children's accounts by asking many *-wh* questions and encourage extended narratives by providing more and more memory information with each succeeding question. Low-elaborative mothers in contrast, provide less structure and ask their children few and redundant questions about the past. Despite much evidence that children of high-elaborative mothers tend to relay the past in a more elaborated and coherent manner than children whose mothers use a low elaborative style, unknown is whether maternal style might affect children's remembering when mothers have been exposed to misinformation. Given the tendencies of high elaborative mothers to provide new memory information to aid their children's recollections, when these mothers hold false beliefs about their children's experiences they may be more likely than low elaborative mothers to weave their own beliefs into the ongoing co-constructed narrative and consequently more greatly affect their children's later accounts.

In line with the prediction that children of high-elaborative mothers tend to display more sophisticated autobiographical memory skills, we found that these children, compared to those of low-elaborative mothers, provided more detailed narratives of the actually experienced portions of the magic show and were less likely to make errors when describing these actual experiences. Despite these positive associations between maternal elaborativeness and children's recall of experienced events, we found that children with high elaborative mothers were twice as likely as those with low elaborative mothers to wrongly report a loose rabbit. Likewise, of those who made a false report, children whose mothers displayed a high elaborative style described the suggested nonevent in more narrative detail than those whose mothers talked in a low elaborative fashion. Thus, these results

demonstrate that the high elaborative style usually associated with more skilled autobiographical remembering is also linked with increases in children's memory error when mothers are exposed to misinformation about their children's experiences.

Interestingly, there were no differences in the qualities of mothers' conversations as a function of experimental group, suggesting that misinformation exposure did not affect maternal style. However, examination of mothers' contributions during the mother-child conversation suggests that maternal style affected how mothers used the misinformation in their discussions with their children. In particular, high elaborative mothers provided more than three times the elaborations consistent with the theme of the suggestion than those who were low elaborative, indicating that after exposure to the misinformation the high elaborative mothers created a more coercive memory sharing environment than the low elaborative mothers. Importantly, these mothers were not instructed to provide elaborations consistent with the suggestion or offer new information if their children were not remembering a loose rabbit. Rather, they were merely instructed to ask their children if the magician's rabbit had gotten loose. These findings suggest that mothers with a high elaborative predisposition often went above and beyond a simple "Was the rabbit loose?" question and offered new and necessarily false details describing the suggestion. Interestingly, there were no differences in the extent to which low- versus high-elaborative mothers believed the loose rabbit suggestion to be true, suggesting that maternal style may override any influence of belief on how mothers question their children about the past.

Conclusion and Implications

This collection of studies demonstrates the importance of considering the mnemonic consequences of natural conversational interactions for discussions of children's memory and suggestibility. Our findings show that not only can conversations with co-witnesses be a potent source of errors in autobiographical remembering, but that interactions with others can lead to false reports even when they have not witnessed the event in question but merely have been exposed to misinformation about it. These investigations also demonstrate several conditions under which the potential of natural conversations to taint memory are exacerbated. Memory sharing conversations with familiar peers as opposed to strangers more readily shape subsequent memory, and discussions about the past with high-elaborative mothers exhibit greater influence than those with low-elaborative mothers. Also, the nature of the shared false information can impact its mnemonic effects. With age, children develop some resistance to being misled by conversationally conveyed misinformation when it conflicts with their actual experiences, but they also become more likely to generate their own causal inferences about events that can put themselves as well as their peers at increased risk of wrongly recollecting occurrences that were merely inferred.

Researchers interested in children's memory generally have overlooked peers as a source of error. Our findings of high levels of peer-generated suggestibility, however, underscore the importance of a continuing examination of peers. Importantly, none of the children in our studies were asked to invent or share information with their classmates. Rather they naturally generated and spread misinformation in such a manner that it intruded into their own and their peers' subsequent autobiographical accounts. In fact, on many measures of memory, misinformation picked up from peers was more mnemonically damaging than suggestions planted by adults. Indeed, inspection of the content of children's false accounts suggests that what might make peer transmitted misinformation particularly potent is that it leads to the generation of perceptual and contextual images in memory that children wrongly judge as indicative of an authentic experience. Future work is needed to more fully explore this interpretation and the sorts of conversational exchanges that can prompt the generation of high levels of nonexperienced perceptual and contextual detail and consequent reports of

seeing. Nonetheless, our examination of children's classroom conversations suggests that these representational differences as a function of informant might be linked to differences in the ways that children talk with others following the reception of misinformation from peers versus an adult. Specifically, our findings suggest that children who glean false information from peers engage in deeper and more inventive rumor mongering than those who overhear the very same information from an adult. Finally, our findings of elevated errors with familiar peers as opposed to strangers show that social history is also an important variable in understanding conversational suggestibility. Consequently, an important question for future work is how fast and over what course does familiarity augment the potential for memory contamination.

Admittedly, an exploration of conversational processes in remembering has not been completely off the radar screen for investigators exploring children's autobiographical memory. Developmental researchers have long explored the effects of mothers' memory sharing style on children's event narratives. Accuracy for a specific event, however, has rarely been a dependent variable in this line of work. Our findings not only show that mothers can be a potent source of errors in remembering, but that high maternal elaborativeness—a quality associated with increases in children's memory and narrative skills—is linked with decreases in accuracy when mothers have been exposed to misinformation about their children's experiences. Given that this link is correlational, an important next step is to carry out experimental studies of maternal style to bolster the causal argument. Also of interest in future work is exploring in a more fine-grained manner how the content of mother's elaborative statements and questions influence children's independent remembering. This sort of analysis would deepen our understanding of how a high elaborative style can both help and hinder children's memory when mothers and their children disagree on the facts of a past event. Indeed, mother-child negotiation is a critical context for children's developing abilities to represent and recollect their experiences, but a closer look at such conversations may provide some insight into how memory exchanges teach young children that others can represent the past differently and that memory is a subjective, dynamic process rather than a static product.

Our work also holds some applied relevance to legal settings involving young witnesses as it reveals powerful sources of memory error not readily eliminated by common techniques used to minimize reporting errors in forensic interviews (e.g., exclusive nonsuggestive questioning, videotaping interviews). Caution, of course, is required in generalizing our findings to situations involving child witnesses (e.g., our to-be-remembered events are enjoyable, children are not pressured to make false reports, interviewers are not rewarded for eliciting certain claims). Nonetheless, our data provides clear evidence that even when children are interviewed in a supportive and neutral manner, misinformation from peers and parents can contaminate their reports. In fact, because the level of peer influence in our experimental paradigms is likely pale compared to that which occurs in group therapy sessions or joint police interviews, our findings underscore the importance of considering the potential contaminating influence of peers in legal cases involving multiple child witnesses. Likewise, our findings suggest that exposing mothers to unfounded claims, such as Police Chief Harry Kuhlmeier did in the McMartin case described above, might engender false allegations, especially if mothers talk with their children in a high elaborative manner. As such, experimental studies that suggest nonoccurring experiences to mothers may be relevant for forensic situations where unfounded allegations emerge and families are asked to play a role in diagnosing the truthfulness of such allegations in their own children.

Further, the current body of work demonstrates that the tendencies of judges and juries to use certain qualities of children's testimony, such as corroboration, spontaneity, elaborativeness, and consistency, as markers of accuracy are unwarranted. For instance, the

near ceiling levels of reports of rumored-but-nonoccurring events in our studies show that corroboration can occur even when none of the witnesses are accurate. Second, children's spontaneous and elaboratively detailed accounts of nonevents following rumor provide compelling evidence that these qualities of children's accounts are not reliable indexes for gauging accuracy. Third, the high levels of consistency in reports of the rumored event across a 4-week delay make it clear that consistency across interviews is not diagnostic of truthfulness.

In summary, this collection of findings provides unique insight into why memory sharing conversations can be such a potent source of children's report contamination. Not only do children and parents naturally share misinformation in conversations about the past, but they also improvise embellishments that go above and beyond the literal suggestions—a tendency that seems to put themselves and their conversational partners at risk for representational changes and consequent memory errors. Further, certain qualities of the informer, such as age, familiarity, and conversational style, can affect the nature of misinformation delivery in such a manner that it incites the receiver in to engage in a more or less co-constructive spinning of the past that has implications for later accuracy. Taken together, these patterns show that it is not misinformation *per se* that affects children's autobiographical remembering, but rather how it is encountered and shared with others.

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Highlights

We review our own recent research on one factor that has much potential to induce errors in children's event recall, namely natural memory sharing conversations with peers and parents.

Not only can the content of conversations about the past intrude into children's later memory but such exchanges can prompt the generation of entirely false narratives that are more detailed than true accounts of experienced events.

Deeper and more creative participation in memory sharing dialogues can boost the damaging effects of conversationally conveyed misinformation on children's recollections.

Implications of this collection of findings for children's testimony are discussed.

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Table 1

Mean Percentages Target Activities Reported as Actually Occurring at the Final Interview as a Function of Experimental Group and Degree of Prompting

	Open-Ended	Specific	Total
Witness/Neutral Interview	34	47	81
Classmate/Neutral Interview	16	15	31
Control/Neutral Interview	0	0	0
Witness/Suggestive Interview	68	23	91
Classmate/Suggestive Interview	50	36	86
Control/Suggestive Interview	23	33	57

Table 2

Percentages of Children Who Reported the Target Activity as Actually Occurring at the Final Interview as a Function of Experimental Group and Degree of Prompting

Group	Open-Ended	Specific	Total
Witness/Neutral Interview	90	.10	100
Overheard/Neutral Interview	86	10	95
Classmate/Neutral Interview	86	14	100
Control/Neutral Interview	0	10	10
Witness/Suggestive Interview	87	13	100
Overheard/Suggestive Interview	87	13	100
Classmate/Suggestive Interview	91	9	100
Control/Suggestive Interview	9	50	59