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False Rumors and True Belief: Memory Processes Underlying Children's Errant Reports of Rumored Events

Gabrielle F. Principe, **Brooke Haines**, **Amber Adkins**, and **Stephanie Guiliano**
Department of Psychology, Ursinus College

Abstract

Previous research has shown that overhearing an errant rumor—either from an adult or peers—about an earlier experience can lead children to make detailed false reports. This study investigates the extent to which such accounts are driven by changes in children's memory representations or merely social demands that encourage the reporting of rumored information. This was accomplished by a) using a warning manipulation that eliminated social pressures to report an earlier-heard rumor and b) examining the qualitative characteristics of children's false narratives of a rumored-but-nonexperienced event. Findings indicated that overheard rumors can induce sensory and contextual characteristics in memory that can lead children to develop genuine false beliefs in seeing rumored-but-nonexperienced occurrences. Such constructive tendencies were especially likely among 3- and 4-year-olds (relative to 5- and 6-year-olds) and when rumors were picked up from peers during natural social interactions than when they were planted by adults.

Keywords

Memory; Suggestibility; Rumor; Children; Source Monitoring; Eyewitness Testimony

Several decades of research on memory and suggestibility has established that children's reports of their experiences can be contaminated by errant postevent information contained in a range of sources, such as co-witness reports (e.g., Candel, Memon, & Al-Harazi, 2007; Principe & Ceci, 2002), storybooks (Poole & Lindsay, 2001; 2002), and interview questions (e.g., Bruck, Ceci, & Hebrooke, 2002; Roberts & Powell, 2006). A growing body of work shows that rumors also can taint children's accounts of the past, inducing high levels of false reports of rumored-but-nonexperienced events. For instance, Principe, Kanaya, Ceci, and Singh (2006) had some preschoolers within the same classrooms overhear an adult allege a fictitious rumor that a certain event occurred in their school. The remaining children in each classroom did not overhear the adult, but instead interacted freely with their classmates who did. A third group, who had no contact with the first two groups, actually experienced the event suggested by the rumor. When later questioned, those children who were exposed to the rumor, either directly from the adult or secondhand from their classmates, were as likely to report experiencing the rumored occurrence as those who actually did. Further, most reports of the rumored event were generated by open-ended prompts and embellished with rich elaborative detail. Related studies have demonstrated that rumors that conflict with the past (Principe,

Correspondence concerning this article should be addressed to Gabrielle F. Principe, Department of Psychology, Ursinus College, PO Box 1000, Collegeville, PA 19426-1000; Phone: 610-409-3670; Fax: 610-409-3633; gprincipe@ursinus.edu.

Tinguely, & Dobkowski, 2007) and rumors generated by children's own inferences (Principe, Guiliano, & Root, 2008) also can engender high levels of elaborate false accounts.

These findings of the potency of rumor notwithstanding, existing experiments have not explored the extent to which false claims following rumor are driven by a genuine belief that the rumored information was seen. In addition to its theoretical significance, this issue is relevant to discussions of children's testimony. If rumor can bring about errant beliefs about witnessing events that only were overheard, there is little that forensic interviewers can do to mitigate its effects. In contrast, if reports of rumored occurrences merely are driven by compliance to social pressures, such effects may be reduced by protocols that enhance 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 Larsson & Lamb, 2009). The primary aim of the current study, therefore, was to examine the degree to which reports of rumored-but-nonexperienced events occur because children have come to believe they have seen the suggested occurrences, or simply reflect social demands to relay overheard information. Given the marked improvements made in source monitoring (Lindsay, Johnson, & Kwon, 1991; Roberts, 2002) and resistance to postevent misinformation (Bruck & Ceci, 1999; Holiday, Reyna, & Hayes, 2002) during the preschool years, a second aim was to explore whether older children (5- and 6-year-olds) are more resistant than younger children (3- to 4-year-olds) to developing beliefs that they have seen occurrences that only were rumored.

The issue of whether postevent misinformation can bring about genuine memories of seeing nonexperienced events has been examined in varied suggestive contexts, such as misleading statements posed by interviewers (Leichtman & Ceci, 1995), storybooks read by parents (Poole & Lindsay, 2001, 2002), and interactions with co-witnesses (Principe & Ceci, 2002). Generally, this work has probed children for the source of their memories of suggested events. For instance, Principe and Ceci (2002) asked children who recalled events seen only by their classmates whether they themselves had *seen* these occurrences take place or merely had *heard* about them from someone else. When charged with this question, some reported only hearing about the occurrences, but others claimed seeing them with their own eyes. Similarly, when Leichtman and Ceci (1995) asked children who reported events suggested in earlier interviews whether they had seen or heard about the events, some maintained they had seen them. Principe and colleagues (2006) found the same trend among children who reported rumored occurrences. In addition to these demonstrations that postevent suggestions can lead to claims of seeing nonexperienced events, there is also evidence that younger children are especially susceptible to make such false claims. Specifically, both Poole and Lindsay, and Leichtman and Ceci, found that 3- and 4-year-olds were more likely than older children to recall seeing suggested events.

Reports of seeing, however, do not conclusively establish that children have come to believe they witnessed events that only were suggested. Considering the tendency to assume that information exchanged during everyday interactions is accurate (see Grice, 1975), children may presume that most postevent suggestions are true. Consequently, even children who can correctly identify the source of the suggestions nonetheless may report seeing them merely to demonstrate their knowledge of everything they believed happened (for a similar account in the misinformation paradigm, see McCloskey & Zaragoza, 1985).

To preclude such demand characteristic interpretations, Lindsay (1990) developed a warning procedure that puts the tendency to report postevent suggestions in opposition to the ability to remember their source. Lindsay's participants heard a narrative that contained false suggestions about an earlier-seen slide sequence. When later questioned about the slides, participants who were warned that any information in the narrative was wrong (i.e., "There is no question on

this test for which the correct answer was in the story", p. 1080) made fewer reports of suggested information than those who were not warned. Lindsay interpreted these findings as evidence that suggestibility effects are not entirely driven by social demands. Less direct warnings, such as cautions that the postevent information *may have been* inaccurate or that a *few* of the postevent details were wrong, have not reduced suggestibility in either adults (e.g., Christiaansen & Ochalek, 1983; Greene, Flynn, & Loftus, 1982) or children (e.g., Erdmann, Volbert, & Böhm, 2004), indicating that a direct warning likely is necessary to inhibit false reports due to demand characteristics.

The Present Study

In the current study, we adapted Lindsay's (1990) warning technique to investigate the extent to which 3- to 6-year-olds' false reports of rumored events were due to a genuine belief in having seen overheard-but-nonoccurring rumors take place. In line with Principe and colleagues' (2006) rumor procedure, children watched a magic show in their schools. Then, one-third of the children overheard an adult allege a false rumor about the show. A second third did not hear the adult rumor but rather interacted freely with their classmates who did. Based on Principe and colleagues' findings, we expected that these children would hear the rumored information through natural interactions with their classmates. The remaining children, who did not overhear the adult or interact with those who did, served as an index of whether children without exposure to the rumor would later report rumored occurrences.

One week later, all of the children were interviewed about the show. Following Lindsay's (1990) instructions, social demands to report the rumor were eliminated among some of the children by warning them that any information overheard after the show was wrong and therefore should not be reported. Thus, if children are able to discern the correct source of the rumor (that is, that they heard about it from another person), there are no social pressures to relay it. Given that older children generally are more skilled than younger children at distinguishing source (see Roberts, 2002, for a review), we expected that the warning would be more effective at reducing false claims among the 5- and 6-year-olds than the 3- and 4-year-olds. Even though the warning was designed as a means to reduce socially-driven reports of the rumor, it also might affect source-monitoring processes. It might cue children who usually relay any memory without regard to source to consider source, or it might lead others to adopt stricter criteria for identifying memories as experienced or to source monitor with increased effort. To determine whether the warning had such source-monitoring consequences, we contrasted the warned and nonwarned children's reports of the experienced magic show. If the warning induced more effective source monitoring, it should decrease not only children's reports of rumor, but also their reports of other happenings during the show (for a similar account in the misinformation paradigm see Echterhoff, Hirst, & Hussy, 2005)

Reports of the rumor following the warning do not necessarily indicate that children believe the rumored occurrence was seen, but only that they do not remember hearing about the rumored information. Thus, false reports may persist among warned children if they cannot distinguish any source or if they report their memories without regard to source. To tease apart the extent to which reports of the rumor following the warning were due to such source issues or driven by a genuine belief in seeing, we asked children to specify the source of their memory, that is, whether they remembered actually seeing or merely hearing about the rumored occurrence.

Such decisions about source are thought to be made by evaluating certain characteristics of the memory representation at retrieval. According to Johnson and colleagues' source-monitoring framework (Johnson, Hashtroudi, & Lindsay, 1993), experienced events are represented in memory with more perceptual (e.g., color and sound), contextual (e.g., spatial location and

temporal order), semantic, and affective information than imagined, suggested, or otherwise nonexperienced events. The different profiles of experienced and nonexperienced sources serve as cues to discriminate between them. Research showing that both children and adults retrieve higher levels of detail characteristic of experienced events (e.g., perceptual and contextual information) when describing real than fabricated events (e.g., Alonso-Quecuty, 1995; Barnier, Sharman, McCay, & Sporer, 2005; Santtila, Roppola, & Niemi, 1999; Sporer & Sharman, 2006; Virj, Akehurst, Soukara, & Bull, 2004) supports this process.

There is growing evidence that this usually-successful source-monitoring process can go awry when representations of nonexperienced events develop memory characteristics typical of experienced events. The generation of qualities characteristic of experienced events in representations of suggested events presumably can lead individuals to misattribute them to an experienced source. For instance, both children and adults who report being convinced about experiencing suggested events describe them with as much perceptual and contextual detail as they do experienced events (Blandon-Gitlin, Pezdek, Lindsay, & Hagen, 2009; Erdmann et al., 2004). This is not the case, however, for descriptions of suggested events for which individuals believe happened but deny any memory of experiencing. Thus, this pattern suggests that the quality of representations of postevent suggestions can play some role in developing false beliefs of experiencing.

In the current work, we explored whether these same sorts of representational changes underlie claims of seeing the rumored occurrence versus mere reports of the rumor without accompanying claims of seeing. Considering Principe and colleagues' (2006) findings of ceiling levels of false reports among children who were classmates of those who overheard the rumor, considerable rumor mongering must go on in the classrooms following exposure to the errant rumor. It seems likely that such natural peer interactions might lead to the generation of perceptual, contextual, and affective images that, if remembered during the interview, might lead some children to make errant attributions of seeing. Indeed, there is evidence that postevent rumination can boost the retrieval of perceptual and affective information of forgotten events (Hyman, Gilstrap, Decker, & Wilkinson, 1998), demonstrating that postevent processing can transform the memory characteristics of existing representations in the direction of those typical of attributions of an experienced source. Further, prior studies using this rumor paradigm have shown more voluminous narratives describing rumored-but-nonoccurring events among children who claimed seeing versus those who reported other sources (Principe et al., 2006, 2007, 2008). These findings are consistent with the hypothesis that representational differences drive false reports of seeing, but only in terms of the volume of the representation. Existing experiments have not yet linked claims of seeing rumored or otherwise suggested events to the retrieval of memory characteristics. To explore such associations, we examined not only narrative length as a function of reported source (i.e., saw or heard about), but also whether claims of seeing following the warning were associated with higher levels of perceptual, contextual, and affective narrative detail than reports nominating other sources.

As noted above, we expected that the 3- and 4-year-olds would be more likely than the 5- and 6-year-olds to show evidence of false beliefs of seeing the rumor. Considering the growing evidence that the generation of memory characteristics typical of experienced events in representations of suggested nonevents can lead to false beliefs (Blandon-Gitlin et al., 2009; Erdmann et al., 2004), we explored the possibility that the younger children, who were expected to be especially prone to report seeing, would describe the rumored event with higher levels of perceptual, contextual, and affective detail than the older children. Indeed, such a tendency among younger children would hinder their ability to make distinctions between the rumored and the real.

Method

Participants

Participants were 216 children divided into two age groups: younger children (3- and 4-year-olds) and older children (5- and 6-year-olds). There were 112 younger children (mean age = 52 months, range = 40 – 59, 61 females and 51 males) and 104 older children (mean age = 72 months, range = 60 – 79, 55 females and 49 males). Children were recruited from suburban preschools and summer day camps in southeastern Pennsylvania. Reflecting the population of these programs, 90% of the children were European American. Written consent and verbal assent were obtained from parents and children, respectively.

Experimental Design

The 112 younger children and the 104 older children were assigned to one of three groups that differed in the level of exposure to the escaped rabbit rumor: Overheard versus Classmate versus Control. Within the Overheard and Classmate groups, children were assigned to one of two conditions that differed in terms of whether they received a warning that the rumor was wrong: Warned versus Nonwarned. The warning manipulation was not used in the Control condition be cause these children were not exposed to the rumor. The ten groups formed by the combination of rumor exposure, warning, and age ranged in size from 20 to 24, with the number of females in each group ranging from 10 to 13. Each school (N =10) was randomly assigned to rumor condition (i.e., Overheard/Classmate or Control), and the children within the classrooms in each experimental school were randomly assigned to rumor and warning conditions.

Procedure

The children were seen during two sessions, each of which took place at their schools. The sessions occurred approximately 1 week apart (mean = 7 days, range = 6–8 days) and 96% of the children were interviewed exactly 7 days after the show. Both sessions were videotaped.

The to-be-remembered event—This session was identical to Principe et al.'s (2006) initial session. Each school was visited by a magician named Magic Mumfry. After performing ten scripted tricks (two orders of tricks were used, counterbalanced across conditions), Mumfry announced that he was going to pull a live rabbit out of his hat. After several unsuccessful tries, Mumfry gave up and apologized. Immediately after the show, one third of the children, those in the Overheard condition, overheard a scripted conversation in which an unfamiliar adult told a teacher that Mumfry's trick failed because the rabbit got loose in the school and was in their classroom eating carrots. Attention to the rumor was ensured by having children stand quietly in a line awaiting a stricker during the conversation. A second third of the children, those in the Classmate condition, were the classmates of those in the Overheard condition. The remaining Control condition did not overhear the rumor nor did they have any contact with those who did.

Memory interview—One week after the show, all children were questioned by an unfamiliar interviewer about Mumfry's show. Before beginning the interview, the subset of children in the Warned conditions received an emphatic warning that the rumor was false. The Overheard children were told: "Remember when Mumfry tried to pull a rabbit out of his hat, but his trick didn't work and he couldn't find his rabbit. Remember that? Well, I know that an adult told one of your teachers about what she thought happened to the rabbit. You might have heard what the adult said. But I know she was wrong. Anything that you heard from an adult about Mumfry's rabbit was wrong because I know what really happened to the rabbit." The Classmate children received a parallel warning that anything they had heard from "the kids in your class" was wrong. The Warned children were reminded that the rumor was bogus and should be

ignored (e.g., “Remember that anything that you heard from an adult [or kids in your class] about what happened to Mumfry’s rabbit was wrong.”) throughout the interview and when probed for additional open-ended recall, prompted for elaboration, and asked specific and source questions (see below).

At the start of the interview, all children were told to report “only things that you remembering happening to you—things that you really did or remember seeing with your own eyes” and not to “guess or make anything up.” Replicating Principe and colleagues (2006), the interview was hierarchically organized and involved three levels of questioning: open-ended, specific, and source. After the initial question: “Tell me everything that you remember about the day that Magic Mumfry visited your school,” children were given additional open-ended prompts (e.g., “What else happened?”) until free recall was exhausted. Next, children were asked a specific question (i.e., “Did anything happen to Mumfry’s rabbit?”) if they had not yet mentioned the loose rabbit (heretofore referred to as the target activity). General prompts (e.g., “Tell me more.”) were used to encourage elaboration. Children who reported the target activity were posed a question to determine the source of their memory: “Did you see (action vis-à-vis the loose rabbit, as noted by the child; e.g., the rabbit in your school) with your own eyes, or did you hear about it from someone?” The order of the source options was counterbalanced. We probed for source simultaneously rather than sequentially (e.g., “Did you see the loose rabbit?” “Did you hear about the loose rabbit?”) because independent consideration of source options can produce a “source in question” or “yes” bias (e.g., Bright-Paul, Jarrold, & Wright 2005). Finally, to identify whether children who reported hearing about the target activity could distinguish a certain source, they were asked: “Who told you about (action vis-à-vis the rabbit, as noted by the child)?”

Coding of the Interviews

Coding was carried out on the verbatim transcriptions of the interviews. The initial set of codes characterized children’s false reports of the target activity. First, the interviews were scored to indicate whether the target activity was reported and the specificity of questioning that elicited the information (i.e., open-ended or specific). Then, when asked, children’s responses to the source question were coded. Next, the number of propositions reported in response to open-ended and specific questions about the target activity was counted among children who reported a loose rabbit. Following Principe and colleagues (2006), a proposition was defined as a statement containing a subject and a verb, either explicit or implied, that had not been mentioned previously by either the interviewer or the child. Examples of propositions describing the target activity included, “The bunny was sleeping in the nap room” and “I heard the rabbit munching his carrots in Mrs. M’s office.”

Next, propositions describing the target activity were characterized in two different manners. First, to measure the extent to which children’s false narratives went above and beyond the overheard rumor but yet remained believable, propositions about the target activity were parsed as Verbatim, Constructive, or Fantastic. Propositions that literally repeated information in the adult-planted rumor were coded as Verbatim (e.g., “The bunny was running in the school”). Constructive propositions were statements that were consistent with the theme of the rumor but went beyond its literal content (e.g., “We saw him peeking out of the corner,” “He bited my finger”). Fantastic statements were claims about the loose rabbit that could not have happened in reality (e.g., “The bunny was screaming, ‘I want carrots, I want carrots’,” “He was hiding at the top of the tree”)

The second set of proposition codes were derived from Johnson et al.’s (1993) source monitoring theory to measure the degree to which children’s reports contained memory characteristics typical of an experienced source. Each proposition reported about the target activity was scored as Perceptual, Contextual, Semantic, Affective, or Other. At times, definite

lines among these different categories were difficult to draw. For instance, descriptions of perceptual images could contain semantic information and semantic descriptions could contain perceptual details. To handle this overlap, we followed Sluzenski, Newcombe, and Ottinger (2004) and defined each category narrowly. Perceptual propositions were statements containing visual, auditory, or tactile perceptions referring to details such as color, shape, size, texture, and sound (e.g., "He [Mumfry's rabbit] had teeth right here that were bright white," "I heard him crunching carrots," "He felted fluffy"). Statements that contained temporal or spatial details, such as the order of events or the locations of things, were scored as Contextual (e.g., "When the rabbit first saw us he was a little scared," "He hid under the pumpkins in our garden"). Semantic propositions transmitted meaningful information about the target activity that did not include perceptual or contextual detail (e.g., The bunny made a mess," "The bunny was trying to run away"). Affective propositions referred to emotional reactions (e.g., "I was so excited the bunny was lost," "I didn't like his germs"). Other propositions were those that did not fit into any of the above categories, the majority of which were statements about what classmates had said (e.g., "Sophie told me we are never going to find him").

The final set of codes characterized the children's free reports of the scripted magic show. After parsing children's narrative accounts describing this actually-experienced event into propositions, each was coded as Accurate, Inaccurate, or Ambiguous. Accurate propositions described occurrences that took place during the show. Inaccurate propositions relayed occurrences that did not happen during the show. Ambiguous propositions were too vague to be coded for accuracy.

Of the 216 interviews, 15% (33) were scored independently by two condition-unaware coders and checked for inter-rater reliability. Inter-rater agreement as measured by kappa ranged from . 94 to 1 for all codes. The few coding discrepancies were resolved through discussion.

Results

Preliminary Analyses

A series of preliminary analyses indicated no main effects in the dependent variables discussed below as a function of the confederate who played "Mumfry," the interviewer, the delay interval between the magic show and interview, classroom size, or child gender.

The interviewers were unaware of the hypotheses of the study, but nonetheless carried out the warning manipulation. As such, it seemed possible that the provision of warning itself may have biased the interviewers' manner of questioning. To address this issue, the number of open-ended prompts (e.g., "Did anything else happen?" "What else do you remember?") posed during each interview was counted. A t-test confirmed that there were no differences in the degree of open-ended probing as a function of warning group (M = 8.48; SD = 3.69 for the Warned children; M = 9.60; SD = 3.98 for the Nonwarned children). An additional analysis confirmed that the number of warnings provided to the Warned children did not differ as a function of age or rumor group.

Reporting the Target Activity

The proportions and counts of children (N = 2166 who reported the target activity (i.e., that Mumfry's rabbit was loose in the school) during the interview are shown in Table 1 by age, experimental group, and the level of questioning that elicited the report: open-ended, specific, or total (open-ended + specific). To examine group differences statistically, a series of logistic regressions were done to predict children's reports of the target activity. In these analyses, experimental and age group were used as predictors. The Control group was excluded from these analyses because only one child in this condition reported the target activity.

Open-ended recall—Given that children's open-ended accounts often are regarded as more accurate than their prompted statements (see Ceci, Kulkofsky, Klemfuss, Sweeney, & Bruck, 2007), the initial analyses focused on children's open-ended reports of the target activity. As displayed in Table 1 and replicating prior work (e.g., Principe et al., 2006), a substantial number of Overheard and Classmate children reported a loose rabbit in response to open-ended probes. Following the warning, however, open-ended reports of the target activity were depressed at a marginally significant level among those in the Overheard group, (70% versus 37%), χ^2 (1, N = 173) = 3.48, p =.06, Ø =.20. In the Classmate condition, there was a significant interaction between warning condition and age, χ^2 (1, N = 173) = 5.45, p <.05, Ø =.25. Separate follow-up analyses carried out within each age group indicated a significant difference only among the older children, such that those older Classmate children who were warned were less likely than those older Classmate children who were not warned to report the target activity following open-ended probes, χ^2 (1, N = 82) = 7.62, p <.01, Ø =.42.

Total recall—To examine whether the inclusion of a specific questioning attenuated the effect of the warning, total recall of the target activity was assessed. These data are presented in the rightmost column on Table 1. In line with Principe and colleagues' (2006) findings, when open-ended and specific questioning were combined, nearby all Overheard and Classmate children who were not warned reported a loose rabbit. However, those Overheard children who were warned were less likely than those Overheard children who were not warned to report the target activity, (93% versus 61%), χ^2 (1, N = 173) = 4.24, p <.05, Ø =.22. Paralleling the results with open-end recall, there was a significant interaction with the Classmate children who were warned and age, χ^2 (1, N = 173) = 3.65, p <.05, Ø =.20. Follow-up analyses indicated that among the older children, but not the younger children, those Classmate children who warned were less likely than those who were not warned to report the target activity, χ^2 (1, N = 82) = 4.55, p <.05, Ø =.32.

Seeing the Target Activity

Investigated next was whether the warning influenced children's claims of actually seeing, as opposed to merely hearing about, the target activity when posed the source question. These data are displayed in Table 2. Despite the effectiveness of the warning in reducing false reports of the target activity, the warning had no further effect on children's claims of actually seeing the loose rabbit. Collapsing across warning condition, however, there was an effect of rumor condition, such that the Classmate children were more likely to recall seeing the loose rabbit than the Overheard children (59% versus 32%), χ^2 (1, N = 173) = 6.85, p <.01, Ø =.20. There also was an effect of age, with the younger children more likely to recall seeing the target activity than the older children, (54% versus 29%), χ^2 (1, N = 173) = 4.08, p <.05, Ø =.15.

Manipulation Check

To assess whether warning was effective in reducing claims of the loose rabbit when the children correctly remembered the source of this information, the number of Warned children who reported the loose rabbit following an open-ended or specific probe but failed to claim to have seen it when posed the source question was calculated. Then, within this subset of children, the number who reported the source implied in the warning (i.e., an unfamiliar or nondescript adult in the Overheard condition or a classmate in the Classmate condition) when asked "Who told you about (action vis-à-vis the rabbit, as noted by the child, inserted here)?" were counted. Of the 56 Warned children who reported the loose rabbit but failed to claim to have seen it, only four (7 percent) reported the source stated in the warning, indicating that the majority (93%) of Warned children who reported the loose rabbit but did not claim to have seen it also failed to remember the correct source. Half of these children (N = 26) replied "I don't know" or gave no response when asked who told them about the loose rabbit, and the remaining half (N = 26) reported a source other than an adult (in the Overheard condition) or

another child (in the Classmate condition). The most common reported source among these children was a parent. Thus, as expected, when children remembered the correct source of the rumor, the warning nearly eliminated false reports.

Describing the Target Activity

The first set of analyses characterizing the children's narrative accounts of the target activity centered on the total number propositions reported. Narratives were coded only for those children who reported the target activity in response to an open-ended or specific question. Data from the Control children were excluded from narrative analyses because only one child in this group reported the target activity.

The final column on Table 3 shows the average number of total propositions broken down by age and experimental group, accompanied by the *ns* on which each mean is based. Consistent with extant work (e.g., Principe et al., 2006), the children constructed quite voluminous narratives about the nonoccurring target activity. A 2 (Age: Younger versus Older) × 2 (Rumor Condition: Overheard versus Classmate) × 2 (Warning Condition: Warned versus Nonwarned) analysis of variance (ANOVA) performed on the total number of propositions indicated a main effect of age, $F(1, 140) = 19.32$, $p < .0001$, Ø =.12, with the older children ($M = 13.62$, $SD = 9.34$) providing more voluminous narratives than the younger children ($M = 8.28$, $SD = 5.20$). Consistent with Principe et al. (2006), there also was a main effect of rumor condition on the provision of propositions, $F(1, 140) = 9.53$, $p < .01$, Ø =.06, such that those in the Classmate ($M = 12.59$, $SD = 8.84$) condition generated a higher number of propositions than those in the Overheard condition ($M = 8.60$, $SD = 5.85$). The effect of warning condition was not statistically significant, p =.13.

The next set of analyses explored the degree to which the children's accounts of the target activity went above and beyond the literal rumor. The mean numbers of propositions scored as Verbatim, Constructive, and Fantastic are displayed in Table 3. An ANOVA performed on the numbers of Verbatim propositions indicated no effects of age, rumor condition, or warning instructions. Analyses of Constructive propositions, however, revealed a main effect of age, such that the older children ($M = 10.44$, $SD = 9.15$) provided more Constructive propositions than did the younger children ($M = 5.09$, $SD = 5.07$), $F(1, 140) = 22.12$, $p < .0001$, Ø =.13. There also was a main effect of rumor condition, $F(1, 140) = 10.74$, $p < .01$, Ø =.06, such that those in the Classmate group ($M = 9.49$, $SD = 8.43$) reported more Constructive propositions than those in the Overheard group ($M = 5.32$, $SD = 6.03$), and a main effect of warning condition, with those who were Warned ($M = 9.00$, $SD = 8.07$) providing more Constructive propositions than those in the Nonwarned condition ($M = 6.29$, $SD = 7.11$), $F(1, 140) = 10.74$, $p < .01$, Ø =.06. With Fantastic propositions, there was a main effect warning condition, $F(1, 140) = 4.69$, $p < .05$, Ø =.03, with the provision of a warning resulting in a decrease in Fantastic propositions ($M = 1.71$, $SD = 2.62$ versus $M = 0.92$, $SD = 1.46$).

Explored next were the children's narrative accounts of the target activity parsed in terms of memory characteristics thought to distinguish source. Table 4 displays the proportions of propositions scored as Perceptual, Contextual, Semantic, Affective, and Other averaged across age and experimental group. These analyses focused on proportions rather than frequencies because Johnson et al. (1993) proposed that differences in average rather than absolute values among memory characteristics drive source judgments. As can be seen, children's false reports contained a good deal of detail considered to be diagnostic of memories for experienced events.

An ANOVA on Perceptual propositions indicated a main effect of age, such that the younger children ($M = .24$, $SD = .22$) provided a higher proportion of Perceptual proposition in their accounts of the target activity than the older children ($M = .13$, $SD = .14$), $F(1, 140) = 10.74$, $p < .01$, Ø =.07. There also was a main effect of rumor condition, such that the Classmate

children (*M* =.22, *SD* =.18) reported a higher proportion of Perceptual propositions compared to the Overheard Children (*M* =.15, *SD* =.20), *F*(1, 140) = 4.38, *p* <.05, Ø =.03. Analyses of Contextual propositions revealed a main effect on rumor condition, with the Classmate children (*M* =.32, *SD* =.19) reporting a higher proportion of Contextual proposition than the Overheard children (*M* =.24, *SD* =.22), *F*(1, 140) = 4.05, *p* <.05, Ø =.03. With Semantic propositions there was a main effect of age, such that the older children provided a higher proportion of Semantic propositions (*M* =.53, *SD* =.26) than the younger children (*M* =.41, *SD* =.30), *F*(1, 140) = 7.39, *p* <.01, Ø =.05. The rumor condition effect on Semantic propositions also was significant, with the Overheard children (*M* =.55, *SD* =.29) including a higher proportion of Semantic propositions in their accounts than the Classmate children (*M* =.38, *SD* =.26), *F*(1, 140) = 14.13, *p* <.001, Ø =.09. There were no differences as a function of age or experimental group in Affective or Other propositions.

We also examined whether those children who recalled seeing the loose rabbit described this rumored happening differently from those who reported another or no source. Consistent with Principe et al. (2006), a one-way ANOVA on the total number of propositions indicated that those children who recalled seeing the target activity (*n* = 73) provided more voluminous narratives (*M* = 12.19, *SD* = 7.92) than those who reported another or no source (*n* = 68, *M* = 9.03, *SD* = 7.34), *F*(1, 140) = 14.13 *p* <.05, Ø =.04. Of interest next was whether this post-hoc group difference was accompanied by differences in the relative inclusion of source monitoring characteristics in children's narratives. A series of one-way ANOVAs revealed that those children who recalled seeing the loose rabbit reported proportionally more Perceptual (*M* =.27, *SD* =.21 versus *M* =.11, *SD* =.15) and Contextual propositions (*M* =.36, *SD* =.18 versus *M* =.19, *SD* =.19) than those who did not report seeing it, *F*s(1, 140) ≥ 29.64, *p*s <.0001, $Ø_s$ ≥ .18. Alternatively, those children who did not report seeing the loose rabbit (*M* =.63, *SD* =.25) reported a higher proportion of Semantic propositions compared to those who recalled seeing it (*M* =.30, *SD* =.23), *F* (1, 140) = 65.61, *p* <.0001, Ø =.32.

Reporting the Magic Show

First explored was the number of propositions reported about the actually-experienced magic show. As seen on Table 5, the older children (*M* = 19.92, *SD* = 13.35) provided a greater number of propositions than the younger children(*M* = 11.97, *SD* = 8.30), *F*(1, 140) = 15.90, *p* <.0001, Ø =.10. Also, the Nonwarned children (*M* = 17.35, *SD* = 12.45) uttered more propositions than the Warned children (*M* = 13.19, *SD* = 9.79), *F*(1, 140) = 3.95, *p* <.05, Ø =.03), indicating that the provision of the warning reduced the length of children's narratives of the show.

As also indicated in Table 5, children's reports of the show were highly accurate. Older children's reports (*M* =.85, *SD* =.20) were proportionally more accurate than younger children's (*M* =.70, *SD* =.30), *F*(1, 140) = 12.38, *p* <.001, Ø =.08. Older children (*M* =.06, *SD* =.13) also included proportionately less inaccurate propositions in their accounts compared to younger children (*M* =.13, *SD* =.19), *F*(1, 140) = 6.26, *p* <.05, Ø =.04. Although there were no differences in accuracy as a function of the warning, Warned children (*M* =.06, *SD* =.13), evidenced a lower proportion of inaccurate propositions relative to Nonwarned children (*M* =.12, *SD* =.19), *F*(1, 140) = 5.52, *p* <.05, Ø =.04.

Discussion

Earlier work has shown that overheard rumors can lead children to make high levels of false reports of rumored events (e.g., Principe et al., 2006, 2007). The present investigation made use of a warning procedure to explore the extent to which such accounts reflect a genuine belief that the rumored-but-nonoccurring events actually were seen. One week after overhearing an errant rumor about an earlier experience from either an adult or their peers, 3- to 6-year-olds were asked to recall the event. When the rumor was planted by an adult, a warning that any

overheard information was wrong reduced false reports in line with the rumor. In contrast, when the rumor was picked up from peers, the warning reduced false reports among 5- and 6-year-olds, but not 3- and 4-year-olds. Despite the effectiveness of the warning in decreasing false reports, it did not reduce children's claims of seeing the rumored occurrence. Reports of seeing were affected by the mode of transmission, with children who learned about the rumor from their peers more likely than those who heard it from an adult to recall seeing events consistent with rumor. Three- and 4-year-olds also were more likely than the older children to report seeing. Moreover, those children who recalled seeing the rumor provided more voluminous false narratives infused with proportionately more sensory and contextual details than those who reported the rumor but refrained from claiming to have seen it. Collectively, the findings suggest that overheard rumors about a past experience can induce sensory and contextual characteristics in memory that can lead children to develop genuine false beliefs in seeing rumored-but-nonexperienced occurrences, and that such constructive tendencies are especially likely among 3- and 4-year-olds and when rumors are propagated and picked up among peers.

Social versus Cognitive Suggestibility

The reduction in reports of rumored information following the warning indicates that compliance to social pressures can lead to false claims. However, this does not mean that all of the extra reports of the rumor among the nonwarned relative to the warned children were driven solely by social demands. The warning was designed to eliminate false claims due to demand characteristics, but the instructions to ignore evidence from a particular source also may have brought about changes in children's usual source-monitoring processes. For instance, the warning might have stimulated children who typically report anything in memory without regard to source to consider source. It might have induced others to apply greater-than-usual effort towards a source decision or to adopt a stricter-than-usual criterion for identifying memories as experienced. To gain some insight into these different possibilities, we assessed the effect of the warning on children's accounts of the magic show. We reasoned that if the reduction in claims of the loose rabbit following the warning solely was due to the elimination of demand characteristics to report the rumor, then it would be unlikely that the warning would have any effect on children's recollections of the actually-experienced magic show. In contrast, if the warning led to changes in usual source monitoring, then children also should exhibit a decrease in their accounts of details of the magician's visit other than the rumored occurrence. Supporting the latter possibility, we found that the warning led to a reduction of the volume of the children's accounts of the show and the provision of inaccuracies about this event. Thus, it seems that the warning induced at least some of the children to make more strategic or effortful discriminations about what took place and report only those things that were above a certain decision criterion.

Despite the effectiveness of the warning in attenuating reports of the rumored occurrence, it did not eliminate such false claims. Over half of the warned children in both age and experimental groups made false reports. Follow-up questioning revealed that the majority of these children heeded the instructions to refrain from reporting the rumor if they remembered its source. Thus most false claims involved a failure to distinguish the correct source of the rumored information. Some children wrongly recalled hearing about the loose rabbit from someone who was not at the show (most often this was a parent) and others were unable to determine any source. Importantly, a substantial number of children recalled actually seeing the rabbit loose in their school, the likelihood of which was not attenuated by the provision of the warning. The lack of an effect of the warning suggests that demand characteristics had little or nothing to do with children's claims of seeing the rumored occurrence.

Seeing Things Said

Considering this evidence that children's claims of seeing generally were not due to social demands, to what extent do they reflect a genuine belief in having seen the rumored event? Analyses of children's narratives provide some insight. Replicating Principe and colleagues' (2006, 2007, 2008) findings, 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. Extending this work are the current findings that 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 and contextual detail than those who claimed another or no source. Considering that perceptual and contextual information typically serve as cues to an experienced source (Johnson et al., 1993), it is possible that the inclusion of such qualities in children's recollections of the rumored occurrence hindered the usual source-judgment process and consequently led some to misattribute it to a witnessed source. In contrast, compared to those who reported seeing the loose rabbit, those who never admitted to seeing it uttered relatively more semantic detail—a characteristic in and of itself that would not indicate a perceptual source. Taken together, these findings suggest rumored events can come to be represented similarly to experienced events and that such representational changes put children at risk for developing false beliefs of seeing events that were only rumored. 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. These results are in line with other work showing that suggested events retrieved with much perceptual and contextual detail are likely to be attributed to an experienced source (Blandon-Gitlin et al., 2009; Erdmann et al., 2004. However, future work is needed to more fully explore our interpretation and whether the sorts of natural interactions that likely took place among peers following exposure to the rumor are a necessary component in the establishment of high levels of nonexperienced perceptual and contextual detail and consequent reports of seeing. It also seems fruitful to explore the conditions under which perceptual and conceptual cues may be generated as the result of other sorts of suggestive postevent influences.

The current results also are suggestive of development improvements in children's vulnerability to developing false beliefs of seeing rumored events. As expected on the basis of similar work (Leichtman & Ceci, 1995; Poole & Lindsay, 2001), the 3- and 4-year-olds were more likely than the 5- and 6-year-olds to re call seeing the rumor. Common explanations of these sorts of more frequent source errors among younger children are their immaturities in theory-of-mind understanding, representational ability, and the strategy of using memory characteristics to determine source (see e.g., Roberts, 2002; Sluzenski et al., 2004). Our findings of more abundant perceptual detail in the false accounts of the younger versus older children raise an additional possibility. They suggest that younger 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. Future work is needed to explore whether this sort of tendency might be limited to conditions similar to the current study where postevent suggestions can be easily and vividly imagined. Why might younger children be particularly likely to infuse perceptual information in representations of suggested events? Perhaps because younger children have a limited understanding of the link between perceptual information and consequent memories (e.g., Wimmer, Hoegrefe, & Perner, 1988) they may not realize that perceptual knowledge can be accessed only through actual experience and not via postevent suggestion. Older children, who have a more mature understanding of the causal connection between perceptual information and knowledge, may be more resistant to blending perceptual images generated by postevent suggestions with their representations of experience. Indeed, these speculations need fleshing out in further research.

Further supporting the notion that the postevent suggestions can have differential effects on younger versus older children's representations is the finding that compared to the younger children, the older children described the rumored occurrence with proportionately more semantic content. This age trend is consistent with older children's tendency to recall scripted details, even when these details have not been experienced (e.g., Brainerd, Reyna, & Forrest, 2002; Ornstein, Merritt Baker-Ward, Furtado, Gordon, & Principe, 1998). However because semantic information in and of itself is not diagnostic of experience, this in creased semantic content likely had no effect on older children's source decisions.

Peer Generated Misinformation

Consistent with findings by Principe and colleagues' (2006)[1], the Classmate children's more frequent reports of seeing and their more lengthy descriptions of the rumored occurrence relative to the Overheard children demonstrate that peer generated suggestions can be especially damaging to memory. These findings of heightened peer suggestibility contrast with extant work showing that children more often comply with suggestions made by adult than peers (e.g., Ceci, Toglia, & Ross, 1990). An important variable that might underlie these different findings concerns the manners by which suggestions were delivered by peers. In Ceci and colleagues' study, unfamiliar children made scripted suggestions during a formal interview. In the current work, familiar children transmitted freely varying suggestions—without being instructed to do so. Thus, it may be the naturalness of the reception context in the present paradigm that made peer suggestions particularly powerful.

Our examination of children's narratives provides some insight into why the rumor was especially potent among those who encountered it from their peers. For instance, the Classmate children's accounts contained more constructive embellishments that were consistent with the content of the rumor compared to Overheard children, indicating that the more lengthy descriptions offered by the Classmate children were not driven by an in crease in fantastic or idiosyncratic embellishments, but mainly due to a rise in detail consistent with the rumor overheard by their classmates. In addition, the Classmate children reported proportionately more perceptual and contextual detail than the Overheard children, who reported proportionately more semantic information. These differential profiles as a function of reception context suggest 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 constructions in children's representations of overheard events.

Implications and Conclusions

The effectiveness of the warning in reducing false claims of a rumored event 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. Even though the warning de creased the volume of children's accounts of the actually-experienced event, it selectively reduced errors but not ac curate information about this event. This finding indicates that legal professionals need not be concerned that warnings will reduce false detail at the expense of true information. Given, however, that the warning was associated with an increase in the provision of constructive details and corresponding decrease in reports of fantastic details about the rumored occurrence, false accounts of rumored-but-nonexperienced events that persist following a warning might appear particularly believable and compelling. Despite the effectiveness of the warning, considering that the ability to discriminate between related

[1]A re-analyses of data from Principe et al. (2006) shows that among those children who were interviewed in a neutral manner during the 1 week delay, at the 2 week delay, the Classmate children were more likely than the Overheard children to report actually seeing the loose rabbit χ^2 (1, N = 43) = 3.78, p =.05.

memories becomes increasingly difficult over time (e.g., Schacter, Harbluk, & McLachlan, 1984), warnings to ignore rumored information may be not effective over long delays.

This collection of findings also provides unique insight into why rumor can be such a potent source of suggestibility and, at least at times, induce greater damage to memory when the rumored information is transmitted by peers than when it is planted by adults. Not only can rumor induce an abundance of perceptual and contextual detail in memory that children are prone to judge as indicative of an authentic witnessed experience, but these tendencies are especially likely to occur when children glean rumored information from their peers and among younger children. Consistent current conceptualizations of memory (e.g., Ceci, Papierno, & Kulkofsky, 2007; Elischberger, 2004), these results highlight the notion that individual and developmental differences in underlying representations play an important role in children's suggestibility.

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Table 1

Proportions (and Counts) of Children Who Reported the Target Activity as a Function of Age and Experimental Group

3–4 year olds	***n***	**Open-ended**	**Specific**	**Total**
Overheard/nonwarned	24	.67 (16)	.25 (6)	.92 (22)
Classmate/nonwarned	21	.76 (16)	.14 (3)	.91 (19)
Overheard/warned	23	.39 (9)	.26(6)	.65 (15)
Classmate warned	23	.83 (19)	.13 (3)	.96 (22)
Control	21	0 (0)	0 (0)	0 (0)
5–6 year olds				
Overheard/nonwarned	20	.75 (15)	.20 (4)	.95 (19)
Classmate/nonwarned	20	.85 (17)	.10 (2)	.95 (19)
Overheard/warned	20	.35 (7)	20 (4)	.55 (11)
Classmate warned	22	.41 (9)	.23 (5)	.64 (14)
Control	22	.05 (1)	0 (0)	.05 (1)

Table 2

Proportions (and Counts) of Children Who Reported Actually Seeing the Target Activity with Their Own Eyes

	n	Proportion
3-4 year olds		
Overheard/nonwanred	24	.42 (10)
Classmate/nonwanred	21	.71 (15)
Overheard/warned	23	.39 (0)
Classmate/warned	23	.65 (15)
Control	21	0
5-6 year olds		
Overheard/nonwarned	20	.20 (4)
Classmate/nonwarned	20	.45 (9)
Overheard/warned	20	.20 (4)
Classmate/warned	22	.32 (7)
Control	22	.05 (1)

Table 3

Mean Numbers (and Standard Deviations) of Verbatim, Constructive, and Fantastic Propositions Describing the Target Activity as a Function of Age and Experimental Group

	n	Verbatim	Constructive	Fantastic	Total
3–4 year olds					
Overheard/nonwarned	23	2.13 (0.81)	2.04 (3.08)	1.96 (2.31)	6.13 (4.48)
Classmate/nonwanred	18	1.50 (0.62)	656 (5.31)	1.17 (1.69)	9.22 (5.99)
Overheard/warned	15	1.73 (0.80)	5.00 (5.39)	1.07 (1.58)	7.93 (4.95)
Classmate/warned	22	1.82 (0.73)	7.14 (5.08)	1.23 (1.72)	10.18 (5.03)
5–6 year olds					
Overheard/nonwarned	18^	1.83 (0.79)	6.33 (6.58)	1.50 (2.79)	9.67 (6.64)
Classmate/nonwarned	20	2.00 (1.52)	10.90 (9.39)	2.10 (3.46)	15.00 (10.09)
Overheard/warned	11	1.73 (0.91)	10.55 (7.05)	0.36 (1.21)	12.64 (6.31)
Overheard/warned	14	1.43 (0.65)	15.00 (11.37)	0.79 (1.05)	17.21 (11.78)

Table 4

Mean Proportion (and Standard Deviations) of Perceptual, Contextual, Semantic, Affective, and Other Propositions Describing the Target Activity as a Function of Age and Experimental Group

	Perceptual	Contextual	Semantic	Affective	Other
3–4 year olds					
Overheard/nonwarned	.23 (.27)	.17 (.21)	.55 (.35)	.01 (.04)	.03 (.08)
Classmate/nonwanred	.30 (.22)	.31 (.19)	.28 (.25)	.05 (.12)	.05 (.12)
Overheard/warned	.17 (.18)	.32 (.27)	.46 (.26)	.04 (.11)	0
Classmate/warned.	.24 (.18)	.36 (.22)	.35 (.24)	.01 (.04)	.01 (.04)
5–6 year olds					
Overheard/nonwarned	.11 (.17)	.27 (.23)	.58 (.30)	.02 (.05)	.02 (.07)
Classmate/nonwarned	.13 (.13)	.30 (.19)	.49 (.299	.04 (.066	.02 (.04)
Overheard/warned	.07 (.08)	.25 (.12)	.65 (.17)	.02 (.044	.02 (.04)
Overheard/warned.	.19 (.15)	.31 (.18)	.42 (.18)	.06 (.099	.02 (.04)

Table 5

Mean Numbers (and Standard Deviations) of Accurate, Inaccurate, and Ambiguous Propositions Describing the Actually Experienced Event as a Function of Age and Experimental Group

	n	Accurate	Inaccurate	Ambiguous	Total
3–4 year olds					
Overheard/nonwarned	23	.67 (.29)	.21 (.25)	.12. (.21)	13.61 (10.17)
Classmate/nonwanred	18	.77 (.30)	.10 (.16)	.14 (.22)	12.28 (7.50)
Overheard/warned	15	.66 (.32)	.10 (.16)	.24 (.30)	10.60 (7.55)
Classmate/warned	22	.71 (.32)	.09 (.16)	.20 (.27)	10.95 (7.43)
5–6 year olds					
Overheard/nonwarned	18	.81 (.29)	.11 (.19)	.08 (.15)	20.90 (13.47)
Classmate/nonwarned	20	.81 (.16)	.07 (.10)	.12 (.12)	23.16 (14.79)
Overheard/warned	11	.95 (.07)	.01 (.02)	.04 (.07)	16.4 (14.43)
Overheard/warned	14	.88 (.11)	.02. (.05)	.10 (.10)	1679 (9.96)