

Research Article

Believing Is Seeing

How Rumors Can Engender False Memories in Preschoolers

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ABSTRACT—*This study examined how an erroneous rumor circulated among preschoolers can influence their memory. One fourth of the children overheard a rumor from an adult conversation in which it was alleged that an event the children had not experienced themselves had occurred. A second fourth were the classmates of those who overheard the rumor. A third group had no exposure to the rumor. The remaining children actually experienced the event suggested by the rumor. One week later, the children were interviewed in either a neutral or a suggestive manner. Results from a second interview after a 2-week delay revealed that under both interview conditions, children who overheard the rumor, either from the adult conversation or during naturally occurring interactions with classmates, were as likely to report experiencing the rumored but nonexperienced event as were those who actually experienced it. Most reports of the rumored but nonexperienced event were in children's free recall and were accompanied by high levels of fictitious elaboration.*

Increased reliance on the testimony of young witnesses in the legal system has motivated much of the recent research, methodology, and theorizing about children's memory and suggestibility (Ceci & Bruck, 1993, 1995). Researchers have shown that when exposed to highly suggestive questioning techniques, children can be led to fabricate accounts of fictitious events that are as spontaneous, elaborate, and coherent as reports of experienced events (e.g., Bruck, Ceci, & Hembrooke, 2002; Garven, Wood, Shaw, & Malpass, 1997). Unfortunately, the absence of highly suggestive questioning techniques does not ensure accurate recall. Even when memory is assessed in a neutral manner (e.g., free rather than prompted reports), some children will fabricate accounts of fictitious events (e.g., Myers et al., 2003). As a result, investigators have begun to explore factors

outside of the formal interview environment that have the potential to interfere with accuracy.

One potentially important extra-interview factor is peer conversations. At times, children's reports may be tainted under optimal conditions as a result of prior peer conversations. In the only study to examine this possibility (Principe & Ceci, 2002), we had some preschoolers witness events that their classmates did not. Results from a delayed interview showed that naturally occurring exposure to peer witnesses substantially elevated false claims of actually seeing, as opposed to merely hearing about, nonwitnessed events. These findings suggest that, at least under some conditions, conversations with age-mates can infiltrate not only children's reports of their experiences, but also their beliefs about what happened.

The purpose of the present investigation was to determine whether peer conversations can influence the reports of children even when none of them actually witnessed the event in question. Of particular interest was the degree to which an erroneous rumor circulated among peers may subsequently leak into their classmates' recollections of a personal experience. The extent to which children in the present study reported having seen events that their peers had only heard about is a considerably more extreme demonstration of peer-generated suggestibility than that provided by our prior study (Principe & Ceci, 2002), given that none of the children in the current investigation witnessed the event in question.

SOCIAL AND FORENSIC ASPECTS OF RUMOR TRANSMISSION

Rumors are public communications that have no definite factual basis (Rosnow, 2001). A compelling reason for examining the influence of rumors on remembering concerns the social nature of autobiographical memory—people share their memories through conversation. Typically, what is exchanged from person to person is not corroborated, nor is it scrutinized for veracity. Indeed, a large literature in social psychology demonstrates that people hold a correspondence bias and tend to accept others' personal memories as true (e.g., Gilbert, 1995). In fact, even

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when adults are warned that a speaker might misinform them, most tend to believe their conversational partner's account (DePaulo, Stone, & Lassiter, 1985; Fleming, Darley, Hilton, & Kojetin, 1990). Because memory is constructive (Bartlett, 1932), false rumors may arise and find their way into personal recollections. Young children may be especially prone to confuse rumor with fact because they are more vulnerable than older children and adults to reporting errors arising from memory distortions and source misattributions (Ceci & Bruck, 1995).

Examining rumor transmission is also relevant for efforts to understand children's testimony in forensic contexts. A substantial literature in social psychology indicates that rumors often are perpetuated in situations that are personally relevant and anxiety producing, and in which what actually happened is unknown by the general public (for a review, see Rosnow, 1991). These conditions could at times resemble those in some legal cases in which children are the victims of and the only witnesses to alleged sexual abuse. Often, children lack corroborating witnesses or physical evidence, and rumors may emerge in attempts to fill in the gaps of missing information or to impose an explanation on unsettling allegations.

With these issues in mind, the goal of this investigation was to explore the effects of rumor transmission on children's memory for a personal experience. Rosnow (1991) described a set of conditions that foster rumor transmission. First, rumors emerge to explain events in which the true facts are unknown by the general population; they arise from *general uncertainty*. Second, rumors thrive in situations that people care about or find important; in other words, they typically involve *outcome-relevant information*. Third, rumors travel quickly when they can give expression to or legitimize feelings of *personal anxiety* regarding a situation. Finally, the degree of a rumor's circulation depends on the extent to which it is perceived as plausible or trustworthy, that is, on its *credibility*.

To increase the likelihood of rumor transmission in the present study, we utilized Rosnow's (1991) framework in formulating the rumor and the conditions surrounding its generation. Of interest was the extent to which an erroneous rumor that was circulated, both directly and indirectly, among peers might subsequently leak into their recollections of an earlier event, and the degree to which the interfering effects of the rumor might be exacerbated when it was paired with suggestive interviews that were consistent with it.

METHOD

Overview

Four groups of preschoolers participated in a magic show at their child-care centers. During the show, the magician failed at pulling a rabbit out of his hat. Immediately following the show, the children in the *overheard* condition overheard a scripted conversation in which an adult confederate alleged that the magician failed because the rabbit was loose in the school rather

than in his hat. The children in the *classmate* condition were the classmates of those in the *overheard* condition, but did not overhear the adult conversation about the escaped rabbit. It was expected that some of these children would receive indirect information about the alleged lost rabbit through naturally occurring conversations with their classmates who actually did overhear the rumor. The children in the *control* condition were not the classmates of those who overheard the rumor, nor did they overhear the rumor themselves. This group was included to provide a baseline against which the effects of rumor transmission could be assessed by providing the likelihood that the rumor would be reported by a random child without any exposure to peers who overheard the rumor. The remaining children, those in the *witness* condition, experienced an event suggested by the rumor and denoted as the target event, namely, seeing a live rabbit loose in their classroom. These children did not overhear the rumor, nor did they have any interaction with children in the other three conditions. This group served as a means to contrast the characteristics of true reports based on an actual experience with the characteristics of false reports generated by an overheard rumor.

After 1 week, the children were questioned in either a neutral or a suggestive manner about what happened during the magic show. Two weeks after the show, all children received a second interview by a new examiner.

Participants

One hundred seventy-five 3- to 5-year-old children (mean age = 55 months, range = 44–66 months) were recruited from child-care centers in rural and metropolitan areas of the northeast United States.

Experimental Design

The children were assigned to four groups that differed in the level of exposure to the rumor (*overheard* vs. *classmate* vs. *control* vs. *witness*). Within each of these groups, there were two conditions that differed in the type of intervening interview (*suggestive* vs. *neutral*).

Procedure

The children were seen during three sessions that took place at their child-care centers and were separated by 1-week intervals.

The To-Be-Remembered Event

During the first session, the children participated in a magic show in which Magic Mumfry failed to pull a rabbit out of his hat. Immediately following the show, children in the *overheard* condition overheard the following dialogue between a teacher and an unfamiliar adult confederate:

Confederate: I heard that Magic Mumfry messed up during his show and couldn't pull his rabbit out of his hat.

Teacher: That's right. When Mumfry reached into his hat, the rabbit wasn't there!

Confederate: Well, I heard that the rabbit got loose in the school and is eating carrots in [name of the children's classroom].

The children in the witness condition saw a live rabbit eating carrots in their classroom following the magic show. In this way, they were exposed to an experience consistent with the rumor. The confederate labeled the rabbit as Mumfry's rabbit.

Intervening Interview

Both the neutral and the suggestive interviews followed a structured format and began with an open-ended question: "Tell me everything that you remember about the day that Magic Mumfry visited your school . . . Don't guess or make anything up. Just tell me what you did or saw the time that Magic Mumfry came to your school." After additional open-ended probing (e.g., "What else happened?"), the interviewer asked a specific question if the loose rabbit had not yet been mentioned: "Did anything happen to Mumfry's rabbit?" Children were asked to elaborate if they mentioned the target event in response to either the open-ended or the specific questioning.

Once recall was exhausted, children in the suggestive-interview condition were asked four forced-choice questions that suggested the target event had occurred (e.g., "What did Mumfry's rabbit eat when he got loose in your school? Did he eat carrots or lettuce?"). These suggestions were consistent with what the children in the witness condition actually experienced, but were misleading for the remaining three groups. One quarter of the participants received each of four comparable protocols that differed only in the order of the suggestive questions and the forced-choice responses.

Final Interview

In the final interview, as during the intervening interview, once open-ended recall was exhausted the interviewer asked a specific question about the target event if it had not yet been mentioned: "Did anything happen to Mumfry's rabbit?" For each relevant detail mentioned, the children were asked to elaborate. The subset of children who reported the target event in response to either open-ended or specific probing were also asked whether they had merely heard about the target event or actually saw it occur (e.g., "Did you see the rabbit eating carrots in your classroom with your own eyes, or did you hear about it from someone?"). We refer to this query as the *source question*.

Coding of the Interviews

The videotaped interviews were transcribed and coded by raters who were unaware of the conditions to which the children were assigned. The data were coded for the type of probe needed to elicit reports of the target event and for whether the children recalled either seeing or hearing about the target event. Each

narrative response was coded for the number of syntactic units, that is, the number of meaningful pieces of information that had not been mentioned previously by either the interviewer or the child. Utterances that did not concern the rumor were not coded (see Poole & White, 1991).

Of the 175 final interviews coded, 10% ($n = 18$) were coded independently by two judges. Interrater agreement as measured by kappa was excellent for the level of recall of the target event (i.e., open-ended vs. specific) and children's responses to the source question ($\kappa = .94$ – 1.00). Interrater agreement was also strong for the number of syntactic units ($r = 1.00$, $p < .0001$).

RESULTS

Reporting the Target Event

Total Recall

The proportions (and counts) of children who reported the target event at the final interview are shown in the first set of columns in Table 1. A series of logistic regression analyses was conducted to predict children's total recall. As anticipated, children in the control condition were less likely to report the target event (36%) than were those in the witness condition (100%), $\chi^2(1, N = 175) = 41.23$, $p < .001$, $\phi = .69$. However, only 1 child in the overheard (98%) and classmate (100%) conditions combined failed to "recall" the target event. Thus, the children in the overheard and classmate conditions were as likely to report the target event as were those in the witness condition, despite not having personally witnessed it. The children's reports also varied by interview condition, with children in the suggestive-interview condition (90%) more likely to report the target event than those in the neutral-interview condition (77%), $\chi^2(1, N = 175) = 5.58$, $p = .05$, $\phi = .18$.

Open-Ended Recall

We were interested in examining whether the experimental groups differed in their open-ended reports of the target event, given that free recall is often regarded as more accurate than prompted recall. As shown in Table 1, there was an effect of rumor condition, with the children in the control condition less likely to spontaneously report the target event (5%) than those in the witness condition (89%), $\chi^2(1, N = 175) = 60.60$, $p < .001$, $\phi = .84$. Again, the children in the overheard (86%) and classmate (89%) conditions did not differ from those in the witness condition. In contrast to the results found with total recall, type of intervening interview did not influence the children's open-ended recall. Exposure to the rumor was more powerful than exposure to suggestive questioning in producing spontaneous fabrications.

Seeing the Target Event

The extent to which children reported actually witnessing (as opposed to hearing about) the target event when asked

TABLE 1

Proportions of Children Who Reported the Target Event as Actually Occurring and Who Reported Seeing the Target Event and Mean Number of Syntactic Units Reported

Rumor and interview condition	Reported the target event ^a			Reported seeing the target event ^a			Syntactic units			
	<i>n</i>	Open-ended questioning	Specific questioning	Total	<i>n</i>	Open-ended questioning	Specific questioning	Total	<i>n</i>	Number ^b
Neutral interview										
Witness	20	.90 (18)	.10 (2)	1.0 (20)	20	.90 (18)	.10 (2)	1.0 (20)	20	29.80 (21.21)
Overheard	21	.86 (18)	.10 (2)	.95 (20)	21	.29 (6)	.10 (2)	.38 (8)	20	54.15 (49.77)
Classmate	22	.86 (19)	.14 (3)	1.0 (22)	22	.55 (12)	.14 (3)	.68 (15)	22	88.91 (70.44)
Control	20	0 (0)	.10 (2)	.10 (2)	20	0 (0)	0 (0)	0 (0)	2	3.00 (2.83)
Suggestive interview										
Witness	24	.87 (21)	.13 (3)	1.0 (24)	24	.79 (19)	.14 (3)	.92 (22)	24	37.00 (28.04)
Overheard	23	.87 (20)	.13 (3)	1.0 (23)	23	.61 (14)	.09 (2)	.70 (16)	23	59.09 (43.60)
Classmate	23	.91 (21)	.09 (2)	1.0 (23)	23	.70 (16)	.09 (2)	.78 (18)	23	67.39 (54.94)
Control	22	.09 (2)	.50 (11)	.59 (13)	22	0 (0)	.23 (5)	.23 (5)	13	7.54 (5.62)

^aCounts of children are in parentheses. ^bNumbers in parentheses are standard deviations.

the source question is shown in the second set of columns in Table 1.

Total Recall

As the table shows, a substantial number of children in the nonwitness conditions reported actually witnessing the target event. To examine group differences, we conducted a series of logistic regression analyses, with level of rumor exposure and type of intervening interview as predictors. With the witness and neutral-interview conditions coded as the baseline, children in the overheard (55%), classmate (73%), and control (12%) conditions were less likely to report witnessing the target event compared with children in the witness condition (95%), $\chi^2_s(1, N = 175) \geq 6.48, ps \leq .01, \phi_s \geq .27$. In addition, children in the suggestive-interview groups were more likely to recall witnessing the target event (66%) than were those in the neutral-interview groups (52%), $\chi^2(1, N = 175) = 5.47, p < .05, \phi = .18$. However, when the analysis was run with the overheard condition as the baseline, the children in that condition were more likely than the control children to report witnessing the target event, $\chi^2(1, N = 175) = 15.50, p < .001, \phi = .42$. Likewise, with the classmate groups as the baseline, the children in this condition were more likely than the control children to recall witnessing the target event, $\chi^2(1, N = 175) = 27.37, p < .001, \phi = .56$. The difference between the children in the overheard and classmate conditions was insignificant.

Open-Ended Recall

Inspection of Table 1 also indicates group differences in the proportion of children who reported witnessing the target event during open-ended questioning. A logistic regression, with the witness and neutral-interview conditions as the baseline, indicated that the children in the witness condition (84%) were more likely than those in the overheard (45%) and classmate (62%)

conditions to recall witnessing the target event, $\chi^2_s(1, N = 175) \geq 5.05, ps \leq .05, \phi_s \geq .24$. The control children were removed from this analysis because, as expected, none of them reported seeing the target event during the open-ended questioning. All other comparisons among rumor conditions were insignificant. Further, there was no effect of interview condition, suggesting that the driving force behind children's reports of seeing versus hearing about the target event during open-ended questioning was exposure to the rumor, rather than suggestive questioning by interviewers.

Narrative Length of Reports of the Target Event

The third set of columns in Table 1 shows the average number of syntactic units by experimental group, accompanied by the *ns* on which each mean is based. The control children were eliminated from the analysis of syntactic units because of the small number of children in this group who reported the target event. A 2 (interview condition: neutral vs. suggestive) \times 3 (rumor condition: witness vs. overheard vs. classmate) analysis of variance (ANOVA) confirmed a main effect of rumor condition, $F(2, 126) = 9.77, p < .001, \eta_p^2 = .13$. Follow-up contrasts indicated that children in the classmate condition reported more syntactic units ($M = 77.91$) than those in the overheard condition ($M = 56.79$), who in turn reported more syntactic units than those in the witness condition ($M = 33.73$), $F_s(1, 126) \geq 4.48, ps \leq .05, \eta_p^2_s \geq .03$. There was no main effect of interview condition.

We also examined whether the subset of children in the overheard, classmate, and control conditions who believed they witnessed the target event provided more elaborate narratives than those who reported only hearing about it. As expected, children who reported actually seeing the target event ($n = 62$) produced more syntactic units ($M = 69.56, SD = 59.13$) than those who reported only hearing about it from someone ($n = 41, M = 42.41, SD = 47.66$). A one-way ANOVA confirmed that this

difference was significant, $F(1, 101) = 6.04, p < .05, \eta_p^2 = .06$. Further, the difference between narrative length in the overheard and classmate conditions disappeared when only those children who believed that they actually saw the rabbit were considered ($n = 24, M = 63.46, SD = 44.73$ vs. $n = 33, M = 79.91, SD = 65.24$), indicating that the driving force behind children's narrative length was not the source of the rumor (i.e., adult vs. classmate), but rather whether or not they actually believed that they had witnessed the target event with their own eyes.

DISCUSSION

The present findings reveal that, at least under some conditions, young children readily incorporate overheard fictitious rumors into their own recollections, even in the absence of direct exposure to an adult source or to suggestive questioning. Because the children in the overheard condition were never instructed to share the rumor with their classmates, these results also show that even preschoolers may spontaneously propagate overheard information among their peers, and that the circulation of such information can lead to serious errors in memory.

Reporting the Target Event

Admittedly, it is not surprising that the children in the overheard condition freely shared the rumor with their classmates. Quite striking, however, is the near-ceiling level of "recall" of the target event in the overheard and classmate conditions. These children were as likely as those in the witness condition, who actually saw a loose rabbit, to report that the target event occurred. Further, the source of the rumor had no impact on children's reports; those children who heard the rumor from an adult confederate were as likely to recall the target event as those who heard the rumor from other preschoolers.

In addition, the children's reports of an escaped rabbit, especially in the overheard and classmate conditions, were embellished with many elaborative details. The children in the classmate condition reported almost 50% more syntactic units than those in the overheard condition, and more than twice as many syntactic units as those in the witness condition. This is strong evidence that narrative detail is not diagnostic of accuracy when children have been exposed to sources of hearsay and is in line with recent studies demonstrating that false accounts can be more elaborate and compelling than true accounts (Bruck et al., 2002; Poole & Lindsay, 2001; Principe & Ceci, 2002; Scullin, Kanaya, & Ceci, 2002). It also is consistent with the literature on rumor transmission in adults (e.g., Rosnow, 2001), which shows that rumor communication is not always a one-way transmission of information resulting only in new knowledge for the receiver.

A critical finding to emerge from this research is that the majority of reports of the lost rabbit appeared in response to open-ended queries rather than cued probes or suggestions.

Why were the children so easily swayed by information that was overheard? One clue comes from research showing that adults feel little need to seek external corroboration (DePaulo et al., 1985; Grice, 1975). If adults show an inclination to trust communicators, then it seems likely that children also would be biased toward believing the accuracy of other people's claims, especially (as is the case with many preschool-aged children) if they do not yet understand that another person can hold a belief that is false (Welch-Ross, 1999).

Further, the critical role that conversations with other people play in the development of event memory during the preschool years may augment young children's vulnerability to false information transmitted via rumor. As suggested by Nelson and her colleagues (e.g., Fivush, 1993; Nelson, 1993), young children are dependent on the retrieval cues provided by their conversational partners. Consequently, much of their past is interpreted for them by whoever is collaborating with them on "remembering." Hence, a bias toward believing other people's accounts, an immature understanding of false belief, and the familiarity of remembering past events with other people may make young children especially prone to incorporating into their recollections information heard during everyday conversations.

Seeing the Target Event

Perhaps the most important result to emerge from this study is that the children in the overheard and classmate conditions were substantially more likely than the control children to state that they saw the lost rabbit. This result demonstrates that overheard rumors discussed among peers can bias not only preschoolers' reports of an event, but also their beliefs about what they experienced. In addition, the fact that children's open-ended reports of seeing the rabbit were not augmented by exposure to suggestive interviewing demonstrates the powerful impact of naturally propagated rumors on children's memory.

Another intriguing finding is that in the overheard, classmate, and control conditions, the children who reported seeing the target event produced more elaborate narratives than those who reported only hearing about it. This suggests that when thoughts or images of a nonexperienced event are recalled with rich detail, children might be inclined to regard that event as witnessed rather than as something heard about or imagined. This interpretation is consistent with Johnson's proposal that source-monitoring judgments are based on the qualities of the memory, and that elaborate recollections tend to be attributed to actual experiences (e.g., Johnson, Hashtroudi, & Lindsay, 1993). Further, to the extent that rumormongering leads to greater discussion and rehearsal of the content than the source of the rumor, children may create increasingly elaborate representations that put them at risk for source errors.

Caveats and Conclusions

The present study demonstrates that conversations with age-mates can lead children to report seeing events that those

agemates merely heard rumors about. These data suggest that children will report seeing such events in response to open-ended prompts—not only following specific probes or suggestions. In evaluating the implications of this study, however, it is important to keep in mind that the rumor and the circumstances surrounding its transmission were designed to promote the circulation of the rumor among peers. It is possible that rumors that run counter to information supplied by trusted sources (e.g., parents, teachers) have far less impact than rumors, such as the one in the present investigation, that have no bearing on what trusted sources claim. Nonetheless, these results underscore the importance of examining the conditions under which rumors are likely to intrude into children's memory reports, a task for future research in this new field of inquiry.

In addition, an original finding in this study is that children who heard the rumor from peers produced more elaborate fabrications than those who heard it from an adult. This suggests that children may be more likely to embellish information gleaned during conversations with agemates than information picked up from adults. However, this finding may be an artifact of the study design, as children in the overheard condition were not given an opportunity to engage the adult confederate in conversation about the rabbit, whereas those in the classmate condition were free to discuss, or even distort, the rumor with their peer informants.

The extent to which false rumors can lead to fabrications also has legal relevance. Rumors can be a powerful source of suggestibility not readily eliminated by the procedures currently used to minimize errors (e.g., avoiding the use of suggestive techniques, videotaping interviews). Because many situations involving children as alleged victims or witnesses are analogous to those documented by Rosnow (1991) as fertile grounds for rumor transmission, these findings should alert people who work with children in the legal system to the potentially baleful consequences of false rumors.

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