

The Tooth, the Whole Tooth and Nothing But the Tooth: How Belief in the Tooth Fairy Can Engender False Memories[†]

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SUMMARY

To examine how children's fantasy beliefs can affect memory for their experiences, 5- and 6-year-olds with differing levels of belief in the reality of the Tooth Fairy were prompted to recall their most recent primary tooth loss in either a truthful or fun manner. Many of the children who fully believed in the existence of the Tooth Fairy reported supernatural experiences consistent with the myth under both sets of recall instructions, whereas those who realized the fictionality of the myth recalled mainly realistic experiences. However, those children with equivocal beliefs evidenced a different pattern under each set of instructions, recalling mainly realistic experiences when asked to be truthful and reporting many fantastical experiences when prompted to relate the tooth loss in a fun manner. These findings suggest that children's beliefs in the reality of fantastic phenomena can give rise to genuine constructive memory errors in line with their fantasies. Copyright © 2007 John Wiley & Sons, Ltd.

In everyday life, most adults know better than to believe everything that children say. Otherwise, it might be easy to conclude that monsters live in children's closets, that elves at the North Pole build toys or that a fairy exchanges baby teeth for money. But if adults let children get away with such allegations, then what should be made of equally outlandish claims of a preschool teacher who turns children into mice or who takes them on trips to outer space? Clearly such occurrences could not have happened in reality, but these allegations were made by children in the widely publicized Wee Care Nursery School and Little Rascals Day Care child abuse cases, respectively (Pendergrast, 1995; Rabinowitz, 1990), and are characteristic of the sorts of fantastic charges occasionally made by young witnesses (for additional examples, see Ceci and Bruck, 1995). For the judicial system to function effectively, however, witnesses must be able to separate memories for real events from those based on fantasy. The purpose of the present study, therefore, is to explore factors that might promote fantasy–reality confusions and lead children to report fantastic events as real.

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One factor that might bring about reports of fantastic events is pretence. Pretence is a central form of thinking and social interaction during the preschool and early elementary school years (Harris & Kavanaugh, 1993). Given children's proclivity towards pretence, when relating the past, they may at times slip into a pretend mode and improvise a fantastic story. Although invented accounts are harmless in everyday life, they could have dire consequences during a forensic interview if the move into pretence is not recognized by the interrogator. Further, questions about strange occurrences, such as spreading peanut butter on a preschool teacher, playing the piano while nude or eating a cake made of faeces (questions asked by police interrogators in the Wee Care Nursery School case, see Ceci & Bruck, 1995), may be viewed by children as an invitation to fabricate a pretend story, particularly if the occurrences in question never really happened. Similarly, the increased rate of inaccurate reports in studies using anatomically correct dolls (Bruck, Ceci, & Francouer, 2000; Bruck, Ceci, Francouer, & Renick, 1995) indicates that some children may treat the dolls as pretend play objects, demonstrating and describing whatever the dolls and accompanying props afford rather than using these as aids to enact a real past experience.

The likelihood that pretence can lead to fantastic accounts notwithstanding, some children may report fantastic events because they truly believe that they have experienced them. This process is distinct from false reports arising from pretend play. When children are pretending, they know that their improvised statements are not veridical. This claim is supported by numerous studies that show that children as young as 2 and 3 generally understand that imagined objects and events are not real (Estes, Wellman, & Woolley, 1989; Wellman & Estes, 1986; Woolley & Phelps, 1994). In contrast, when children believe that they have experienced something fantastic, they are unaware that their memories are false and regard them as they do their real or true memories of experienced events.

Central to the question of whether children's reports of fantastic experiences might at times reflect genuine false memories rather than pretence is the issue of whether they ever truly believe in the reality of entities that exist only in fantasy, or only act as if they believe as part of their pretend play. A large body of work on children's understanding of fantasy provides compelling evidence that the majority of young children truly accept a range of fantastic figures and processes as real. Between the ages of 3 and 8, for instance, many children use magic as a means to explain occurrences that they do not understand and many believe that wishing can cause supernatural events to happen (Johnson & Harris, 1994; Rosengren & Hickling, 1994; Subbotsky, 1994; Vikan & Clausen, 1993). Further, the majority of children in this age range believe in the existence of popular fantasy figures, such as ghosts, unicorns and monsters (Clark, 1995; Rosengren & Hickling, 1994; Sharon & Woolley, 2004), and in the reality of common event related entities, such as Santa Claus, the Easter Bunny and the Tooth Fairy (Clark, 1995; Harris, Brown, Marriott, Whittall, & Harmer, 1991).

Supporting children's credulity in their fantasies is their immersion in a culture that encourages their fantastic thinking. For instance, many families endorse the reality of fantastic phenomena when they carry out certain rituals, such as blowing out birthday candles to make a wish, crossing fingers to increase the likelihood of a wanted event or turning on a nightlight to scare away monsters. Similarly, many parents engineer seemingly observable evidence of the existence of various fantastic beings when they fashion tooth marks on carrots left out for the Easter Bunny or prepare a mix of oatmeal and glitter to feed Santa's reindeer. Likewise, the community at large perpetuates children's fantasies when

local television stations use Doppler radar to track Santa's progress on Christmas Eve or when dentists give children special boxes to place their lost teeth for the Tooth Fairy's collection. Moreover, many common childhood fantasies are presented with strong demands to believe (e.g. no Christmas presents for disbelievers). Admittedly, the supernatural powers of fantasy figures might seem to discredit their existence to children. But supernatural powers do not lead to automatic disbelief. Consider, for example, that most Christian children believe that God is omniscient and not constrained to a life cycle (Giménez-Dasi, Guerrero, & Harris, 2005). Further, even many adults harbour belief in the reality of various supernatural phenomena, such as ghosts, aliens, prayer and astrology (Gallup & Newport, 1991).

Despite children's ubiquitous fantasy beliefs, little is known about whether these beliefs can affect memory in the same constructive manner as beliefs about the real world. Indeed, a rich body of work demonstrates that beliefs about the real world can both enhance and hinder the accuracy of memory for events, depending on the consistency between one's beliefs and the event in question (Bartlett, 1932). Generally, when children's beliefs are consistent with their experiences, remembering is facilitated (e.g. Ornstein, Baker-Ward, Gordon, Pephrey, Tyler, & Gramzow, 2006). However, when beliefs are inconsistent with what takes place during a certain experience, children are prone to revise their memories in the direction of their beliefs, sometimes recollecting details that never occurred but that nonetheless are in line with their beliefs. To illustrate, in Ornstein, Merritt, Baker-Ward, Furtado, Gordon, and Principe's (1998) study of children's memory for a paediatric examination, many children wrongly recalled expected, but non-experienced, medical procedures. Similarly, Leichtman and Ceci (1995) have shown that children's beliefs about a person's typical behaviours can increase their vulnerability to be misled by false suggestions that are consistent with their beliefs. Given that there should be no divide between fantasy beliefs and those pertaining to the real world among children who truly believe, there is every reason to suspect that fantasy beliefs would similarly shape memory.

In the first study to investigate this possibility, Principe and Smith (in press) interviewed children with varying degrees of belief in the Tooth Fairy about their memory for losing their last primary tooth. Those children who no longer or only partially believed in the reality of the Tooth Fairy generally constrained their reports to mundane descriptions of their tooth loss and non-supernatural accounts of common Tooth Fairy rituals. In contrast, those children who fully believed in the Tooth Fairy provided quite fantastic reports, generously embellished with descriptions of events that could not occur in reality but nonetheless were consistent with the Tooth Fairy myth. For instance, some of the children described how the Tooth Fairy sprinkled fairy dust on their windowsills and others recounted how she flew around their bedrooms. Surprisingly, the majority of the full believers reported actually hearing or seeing the Tooth Fairy in their homes. Further, the full believers provided the most voluminous and complex accounts, revealing that a fantastic frame can affect not only the content but also the structure of children's accounts of a past event.

Considering the potency of existing beliefs about the real world to impact perception and memory, the pattern of results in Principe and Smith's (in press) study suggests that at least some of the children's reports of fantastic experiences were the result of genuine memory errors. Given findings in both the child (Sluzenski, Newcombe, & Ottinger, 2000) and adult (Johnson, Suengas, Foley, & Raye, 1988; Schooler, Gerhard, & Loftus, 1986) literatures demonstrating that event reports based on real memories tend to include sensory information, the frequent claims of actually hearing and seeing the Tooth Fairy among the

full believers are in support of the interpretation that these children truly believed that they were reporting real memories. Moreover, the boost in volume and complexity of the full believers' accounts supports the conclusion that the children's fantasy beliefs gave rise to genuine constructive embellishments that went beyond the literal tooth loss and resulted in a significantly more elaborate representation relative to those without a strong belief in the Tooth Fairy. However, other data suggest that at least some of the fantastic reports were due to deliberate pretence. For example 17 per cent of the disbelievers—those who were fully aware of the fictionality of the Tooth Fairy—made at least one fantastic claim. Further, considering that the children were told only once at the beginning of the interview not to 'make anything up', some unwittingly may have slipped into a pretend mode as the questioning progressed.

In addition to its theoretical relevance, distinguishing those situations in which fantastic reports might reflect genuine memory errors *versus* deliberate pretence is needed to effectively inform legal professionals who deal with young witnesses. Indeed, children must be able to access and make use of the original memory of the event in question in order to provide an accurate account. However, if children's fantasies can intrude into or otherwise alter the underlying memory, then there is likely little that forensic interviewers can do to help children recover the original memory. But if fantastic reports reflect deliberate pretence, interviewing procedures designed to eliminate demands to engage in pretence (e.g. truth–lie discussions) may serve to boost accuracy.

The purpose of the present study is to begin to tease apart these two alternatives by altering the demands of Principe and Smith's (in press) memory interview and instructing some of the children to provide an exactly true account and telling others to give a fun account. This manipulation is based on work demonstrating that when children are placed in situations that require a truthful response, many refrain from indulging in pretence and show an understanding that their fantasies are not real (Sjöberg, 2001; Woolley and Phelps, 1994). However, when a pretend frame is encouraged, many children act as if their imaginings (e.g. a pretend pencil, meeting a ghost) are real. Thus, considering that children often are encouraged to interpret a tooth loss and the subsequent money exchange in terms of a pretend fairy, perhaps some of the children in Principe and Smith's study construed the interview as a request to engage in pretence and consequently reported their fantasies as real. Applying this rationale to the present study, directions to tell the truth about the tooth loss should reduce demands to engage in pretend play and consequently lead to a drop in fantastic reports of the Tooth Fairy that are driven by pretence. However, fantastic reports based on genuine memory errors should not be reduced by prompts to tell the truth because these children already believe that they are telling the truth. Further, if belief in the Tooth Fairy can give rise to genuine false memories, then any reduction in fantastic claims under truth instructions relative to fun instructions may be greater among those who partially believe or disbelieve than those who fully believe.

Given Principe and Smith's (in press) finding that the full believers provided the most voluminous and complex accounts of their tooth loss, also of interest is the extent to which the believers will retain their advantage in these narrative structure variables when asked to refrain from pretence and presumably report only what they believe to be true. It is well known that certain factors such as age (Fivush, Haden, & Adam, 1995) and culture (e.g. Han, Leichtman, & Wang, 1998) are associated with changes in the volume and complexity of children's reports of their experiences, but the present study should provide some insight into the conditions under which fantastic expectations also can affect the structure of children's accounts. This issue has forensic relevance as several studies suggest that even

though false reports induced by external suggestions often are more voluminous and complex than true reports (Bruck, Ceci, & Hembrooke, 2002; Principe, Kanaya, Ceci, & Singh, 2006), finders-of-fact consider high volume and complexity as indicative of accuracy (Ceci, Loftus, Leichtman, & Bruck, 1994; Leichtman & Ceci, 1995).

METHOD

Participants

Participants were 180 5- to 6-year-old children ($M = 67$ months, range = 60–83 months) recruited from suburban preschools, afterschool programmes and summer day camps in southeastern Pennsylvania. Approximately half of the children were females (56 per cent). Reflecting the population of these programmes, 86 per cent of the children were European American, 7 per cent were Asian American and 7 per cent were African American. All of the children had lost at least one primary tooth and had parents who engaged them in common Tooth Fairy rituals.

Experimental design

Based on the children's responses on a sorting task (described below), the children were placed in equal numbers into three level-of-belief groups: Believers, Uncertains and Disbelievers. Because uneven numbers of children in these three categories were encountered, the first 60 children encountered who fit into each level-of-belief group were used. Within each level-of-belief group, the children were split on the basis of recall instructions: half of the children were assigned to the True Story condition and half were assigned to the Fun Story condition. Recall instruction condition was quasi-randomly assigned (allowing for equal numbers of children in each level-of-belief group).

Procedures

After the children's parents had completed a questionnaire that had been sent home by the schools, all of the children were administered a sorting task and a memory interview. The order of these two tasks was counterbalanced, so that half of the children first received the sorting task and the other half first were given the memory interview. These tasks were videotaped and carried out in a quiet room at the children's schools.

Parental questionnaires

The parents were asked a set of questions to index the degree to which they encouraged their children's belief in the Tooth Fairy. First, parents were asked whether they had paraphrased any of nine statements to their child (e.g. 'The Tooth Fairy replaces lost teeth for money or prizes', 'The Tooth Fairy can fly', 'The Tooth Fairy comes in through children's bedroom windows'). Then, parents were asked whether they had engaged in any of nine common rituals associated with the myth (e.g. replaced a tooth with money or a prize, sprinkled Tooth Fairy 'dust', left a 'note' from the Tooth Fairy) and to elaborate on the details of each ritual. Parents also were asked to write a narrative that described in detail their children's most recent tooth loss.

Sorting task

To assess belief in the reality of the Tooth Fairy, the children were given a two part card sorting task. The task, developed by Principe and Smith (in press) and modelled after Morison and Gardner (1978), was made up of 18 black-and-white line drawings printed onto blank index cards. Twelve of the cards depicted fantasy figures (e.g. Tooth Fairy, Scooby Doo, ghost), and six of the cards showed real entities (e.g. dog, man).

First, the children were given a three-card free sorting task. Six sets of three cards each were placed in front of the children in a randomly determined triangular pattern. Each set consisted of two fantasy figures (e.g. Mickey Mouse and Scooby Doo) and one real entity (e.g. mouse) that could be classified with one of the fantasy figures. Thus, for each set, the children could pair the cards on the basis of a real category (e.g. Mickey Mouse and mouse) or on the basis of a fantasy status (e.g. Mickey Mouse and Scooby Doo). For each set, the children were given two opportunities to make pairings and to offer explanations for their pairings. The children were asked, 'Which two pictures go together?' and 'Why?' and then 'Can you think of two different pictures that go together?' and, 'Why do you think these two go together?' The cards designed to elucidate belief in the Tooth Fairy depicted the Tooth Fairy, the Easter Bunny and a dentist.

Because Morrison and Gardner's (1978) study indicated that children infrequently sort on the basis of fantasy unless explicitly asked to do so, the free sorting task was complemented with a task in which direct instructions were given to sort each item in terms of its status as real or pretend. In this second part of the task, the children were asked to name each of the 18 pictures and put each into a 'real' or 'pretend' pile. Errors in naming were infrequent and not corrected. Next, the experimenter shuffled the cards and flipped over each card one at a time and said, 'You put _____ in the real/pretend pile. Are you very sure or not very sure that _____ is/are real/pretend?' Half of the children were asked this question with the 'very sure' alternative first, whereas the other half were asked the 'not very sure' alternative first.

True Story/Fun Story training procedure

Before beginning the memory interview, the children were given one of two different training procedures by a new examiner to ensure that they would later understand the instructions to tell a True or Fun Story about what happened when they lost their last tooth (see Appendix A for girl version; boy version with names Kyle and Gabe). First, the children were read a brief story about a child who took a trip either to the zoo or to the park. Half of the children within each recall instruction group received the zoo story and half received the park story. Each story was illustrated with four black-and-white line drawings. The first drawing depicted the child in the story and each of the remaining three drawings illustrated the child and one target detail about which the children later would be asked. Following the story, the children were presented with three pairs of illustrations. Each pair referred to one of the three illustrated target details and consisted of two identical drawings of the child with two speech bubbles that differed only in the text contained in the bubble. In the True Story condition, one of the speech bubbles contained a true statement about a target detail and a false statement about the same target detail. Each true statement occurred in the story and was highly consistent with children's scripts of going to the zoo or the park, whereas each false statement was highly inconsistent with children's typical trips to the zoo or the park. For example one of the true options of the zoo story was, 'I saw a lion

at the zoo', whereas the corresponding false option was, 'I saw a dinosaur at the zoo'. In the Fun Story condition, the children were asked to choose between speech bubbles that contained statements that were fun or not as fun. For each of the three target details, the not as fun statement was worded the same as the true statement option in the True Story condition. The other option contained a more entertaining description of the same target detail. For example one of the fun options for the true statement in the park story 'I built a sandcastle' was 'My sandcastle had giant towers and a secret tunnel'. The experimenter read the text contained in the speech bubbles aloud and then asked the children to point to the true or not true statement in the True Story condition, or the fun or not as fun statement in the Fun Story condition. Errors were infrequent and corrected by the experimenter.

Memory interview

First, the children were read either the True Story or Fun Story instructions. Then, at predetermined points throughout the interview, the children were reminded to tell either a 'true' or 'fun' story. The instructions for the children in the Fun Story condition were:

I am going to ask you some questions about what happened when you lost your last baby tooth. I like children who tell really fun stories. I want you to tell me everything that happened when you lost your last baby tooth. Pretend that you're telling the story to your mom and dad and you really want them to pay attention to you. Start with the very first thing that happened and tell me everything you can, even things that you don't think are very important. Remember, I like children who tell really fun stories.

The instructions for the children in the True Story condition were:

I am going to ask you some questions about what happened when you lost your last baby tooth. I like children who tell exactly true stories. I want you to tell me everything that happened when you lost your last baby tooth. Pretend that you're telling the story to a policeman who needs to know exactly what happened. Start with the very first thing that happened and tell me everything you can, even things that you don't think are very important. Remember, I like children who tell exactly true stories.

Next, the children's memory about what happened when they lost their last tooth was probed using the interview developed by Principe and Smith (in press). Information from the parental questionnaires was used to direct the children to this occurrence (e.g. 'Remember the tooth that you lost at the beach?'). Additional open-ended probes were used (e.g. 'Tell me more'. 'What else happened?') until free recall was exhausted. Then, the children were asked to report everything that they *saw* or *heard* when they lost their tooth: 'Sometimes we remember a lot about what we saw. Tell me all of the things that you saw when you lost your tooth'. 'Sometimes we remember a lot about sounds, or things that people said. Tell me all of the things that you heard when you lost your tooth'. These two prompts hereafter are referred to as the looked and heard prompts.

Once the children said that they could remember no more, they were asked a series of six specific questions consistent with the Tooth Fairy myth (e.g. 'Did the Tooth Fairy leave a prize under your pillow?') and six specific questions inconsistent with the myth, three of which were consistent with the Santa Claus myth (e.g. 'Did the Tooth Fairy fill your stockings with toys?') and three of which were consistent with a routine dental visit (e.g. 'Did the Tooth Fairy check your teeth for cavities?'). After responding to each question, the

children were encouraged to elaborate by using only general prompts (e.g. 'Tell me more'). Two interview protocols were used that differed only in the order of the looked and heard prompts and the specific questions, and one half of the participants received each version of the interview.

Coding of the sorting task

Based on the children's sorts and their explanations for their sorts, they were divided into three *post-hoc* groups indicating their level-of-belief in the reality of the Tooth Fairy: Disbelievers, Uncertains and Believers. The children were scored as Believers if they sorted the Tooth Fairy card with the 'real' figure (i.e. the dentist) and provided an explanation that supported the reality of the Tooth Fairy (e.g. 'The dentist and the Tooth Fairy work together'. 'Both give me prizes'.), placed the Tooth Fairy in the 'real' category and said that they were 'very sure' that the Tooth Fairy was real. The children who sorted the Tooth Fairy card with the 'fantasy' figure (i.e. the Easter Bunny) and gave a rationale that explicitly stated that the Tooth Fairy is fantasy (e.g. 'The Easter Bunny and the Tooth Fairy are not real' and 'Both are my parents'), placed the Tooth Fairy in the 'pretend' category and said that they were 'very sure' that the Tooth Fairy was pretend were rated as Disbelievers. Uncertain was scored for those children whose explanations for their sorts suggested that they wavered between belief and disbelief or who said that they were 'not very sure' that the Tooth Fairy was either real or pretend. Twenty per cent of the sorting tasks were coded by two independent raters and agreement was .97 for level-of-belief group.

Coding of the memory interview

The videotaped interviews were transcribed and the children's narrative responses to open-ended, looked and heard, and specific questions were parsed into subject-verb propositions. Examples of propositions included, 'My mommy pulled it [the tooth] out', 'I heard her in my room' and 'I got a buck' (in response to the specific question, 'Did the Tooth Fairy leave a prize under your pillow?'). Propositions that had been mentioned previously by either the interviewer or the child and propositions that were not relevant to losing a tooth or the Tooth Fairy myth were not coded.

Structure coding

First, as an index of the volume of the children's narratives, the total number of propositions reported was counted. Then, as an attempt to gauge the complexity of each unit of thought expressed by the children, the ratio of words per proposition was calculated for each child.

Content coding

Next, to explore the content of the children's narrative accounts, each proposition was classified into one of three categories: Realistic, Ritual or Fantastic. Realistic propositions described mundane occurrences that were consistent with losing a primary tooth and not related to the Tooth Fairy myth. Examples included getting a tooth stuck in a piece of food, wiggling a tooth until it came out and pulling out a tooth. Ritual propositions referred to common Tooth Fairy rituals that were described without reference to any supernatural phenomena. For example statements describing putting a tooth under the pillow, receiving

a prize under the pillow or leaving the window open were scored as Ritual. In contrast, statements coded as Fantastic involved descriptions of occurrences that could not have happened in reality but are consistent with the Tooth Fairy myth. Statements such as, 'She [the Tooth Fairy] flied in the window', 'The Tooth Fairy left a state quarter under my pillow' and 'My cat got her stinking fairy dust all over her fur' were coded as Fantastic.

Finally, within the subset of Fantastic propositions, coders noted which, if any, statements included explicit accounts of hearing or seeing the Tooth Fairy. For example 'I *heard* her close my window' and 'She *told* me to go back to sleep' were coded as reports of hearing the Tooth Fairy. 'I *sawed* her tippie-toed into my room' and 'She *looked* like a tiny little princess' were coded as reports of seeing the Tooth Fairy.

Coding was done by two raters who independently scored 20 per cent of the interview transcripts. Interrater agreement was calculated as the ratio of the number of agreements over the total number of codes given. Reliability ranged from .89 to .97. Disagreements were resolved by discussion among the coders.

RESULTS

Preliminary analyses

Preliminary analyses indicated that the children within each of the six groups formed by the combination of level-of-belief and recall instructions were comparable in terms of gender, age in months, birth order, the number of siblings, the number of teeth lost and the delay interval between the last tooth loss and the memory interview. Further, none of these variables, the order of the sort task/memory interview, the order of questioning during the interview, the interviewers or the schools, were associated with any of the dependent measures discussed below. Accordingly, the data were collapsed over these variables.

Parental questionnaire

Examination of the parental questionnaire revealed that the level of parental encouragement for belief in the Tooth Fairy myth was quite high—81 per cent of the parents assented to at least half of the verbalizations and behaviours on the questionnaire. A parental encouragement score calculated as the number of 'yes' responses indicated that the mean score was 11 and the range was 4–19. This score was not associated with the children's age in months, sex, birth order, number of siblings, the number of teeth lost or the delay interval between the last tooth loss and the memory interview. Consistent with prior work (Prentice & Gordon, 1987; Principe & Smith, in press), this score was not associated with the children's level-of-belief in the Tooth Fairy.

Memory interview

Structure of children's reports

To examine differences in the volume and complexity of the children's accounts as a function of their level-of-belief in the Tooth Fairy and recall instructions, a series of analyses of variance (ANOVAs) were carried out with recall instructions (True Story *vs.* Fun Story) and level-of-belief (Believers *vs.* Uncertains *vs.* Disbelievers) as between subjects factors. For each child, the total number of propositions reported about his or her

Table 1. Mean number of propositions and words per proposition (and standard deviations) as a function of level-of-belief and recall instructions

	Propositions	Words per proposition
Fun Story		
Believers	41.97 (14.04)	7.02 (0.73)
Uncertains	35.83 (11.25)	6.24 (0.80)
Disbelievers	24.03 (11.28)	6.67 (0.90)
True Story		
Believers	33.30 (12.25)	6.44 (0.88)
Uncertains	15.46 (9.01)	5.54 (1.02)
Disbelievers	8.57 (5.89)	5.47 (0.84)

tooth loss and the ratio of words per proposition were determined. As indicated in the first column on Table 1, recall instructions affected the number of propositions provided by the children, such that those in the Fun Story ($M = 33.94$) condition reported a greater number of propositions than those in the True Story condition ($M = 19.11$), $F(1, 179) = 82.89$, $p < .0001$, $\emptyset = .25$. Further, level-of-belief affected the provision of propositions, $F(2, 179) = 57.44$, $p < .0001$, $\emptyset = .32$. Follow-up contrasts indicated that the Believers ($M = 37.63$) provided a greater number of propositions than the Uncertains ($M = 25.65$), who in turn, provided a greater number of propositions than the Disbelievers ($M = 16.30$), $F_s(1, 179) \geq 21.96$, $ps \leq .0001$, $\emptyset_s \geq .11$.

Explored next were group differences in the ratio of words per propositions, which was considered an index of the level of detail of children's accounts of their tooth loss. As can be inferred from the data presented in the second column in Table 1, there was a main effect of recall instructions. The children in the Fun Story condition ($M = 6.65$) provided a larger ratio of words per proposition than those in the True Story ($M = 5.82$) condition, $F(1, 179) = 41.46$, $p < .0001$, $\emptyset = .19$. There also was a main effect of level-of-belief, $F(2, 179) = 15.79$, $p < .0001$, $\emptyset = .08$. The Believers ($M = 6.73$) provided a larger ratio of words to proposition than did either the Uncertains ($M = 5.89$) or the Disbelievers ($M = 6.07$), $F_s(1, 87) \geq 17.69$, $ps < .0001$, $\emptyset_s \geq .09$.

Content of children's reports

First, the proportions of the total number of propositions scored as Realistic, Ritual and Fantastic was calculated for each child and averaged across level-of-belief and recall instruction group. These data are displayed in Table 2 and examined using a series of 2 (recall instructions: True Story vs. Fun Story) \times 3 (level-of-belief: Believers vs. Uncertains vs. Disbelievers) ANOVAs. Analyses of Realistic propositions revealed a main effect of level-of-belief, $F(2, 179) = 27.54$, $p < .0001$, $\emptyset = .14$, that was qualified by a significant level-of-belief \times recall instructions interaction, $F(2, 179) = 4.89$, $p < .01$, $\emptyset = .03$. Follow-up analyses indicated a level-of-belief effect under both sets of recall instructions, $F_s(1, 89) \geq 20.81$, $ps < .0001$, $\emptyset_s \geq .19$. In the Fun Story condition, the Disbelievers reported proportionally more Realistic propositions than either the Believers or the Uncertains, $F_s(1, 89) \geq 22.93$, $ps < .001$, $\emptyset_s \geq .21$. However, in the True Story condition, both the Uncertains and the Disbelievers reported a greater proportion of Realistic propositions than the Believers, $F_s(1, 87) \geq 13.01$, $ps < .001$, $\emptyset_s \geq .13$. Within the level-of-belief groups, there was an effect of recall instructions only among the Uncertains,

Table 2. Mean proportions (and standard deviations) of realistic, ritual and fantastic proportions as a function of level-of-belief and recall instructions

	Realistic	Ritual	Fantastic
Fun Story			
Believers	.37 (0.19)	.15 (0.08)	.48 (0.20)
Uncertains	.44 (0.25)	.15 (0.10)	.41 (0.28)
Disbelievers	.71 (0.19)	.18 (0.11)	.12 (0.21)
True Story			
Believers	.43 (0.21)	.14 (0.07)	.43 (0.24)
Uncertains	.61 (0.20)	.29 (0.19)	.10 (0.17)
Disbelievers	.64 (0.17)	.34 (0.18)	.01 (0.05)

$F(1, 58) = 8.34, p < .01, \emptyset = .13$, in which those in the True Story condition reported a higher proportion of Realistic propositions than those in the Fun Story condition.

An examination of Ritual propositions revealed that all of the children recalled at least one Tooth Fairy ritual, indicating that even those who no longer believed in the myth participated in common rituals. As can be inferred by the data presented in the second column on Table 2, the main effects of level-of-belief, $F(2, 179) = 11.50, p < .0001, \emptyset = .06$, and recall instructions, $F(1, 179) = 26.36, p < .0001, \emptyset = .13$, were qualified by a significant interaction, $F(2, 179) = 7.95, p < .001, \emptyset = .04$. Follow-up analyses indicated an effect of level-of-belief only in the True Story condition, $F(2, 89) = 13.12, p < .0001, \emptyset = .13$, in which both the Uncertains and the Disbelievers reported a higher proportion of Ritual propositions than the Believers, $F_s(1, 89) \geq 12.51, p_s < .001, \emptyset_s \geq .13$. Within the level-of-belief groups, there were recall instruction differences only among the Uncertains and the Disbelievers, such that these children reported proportionally more Ritual propositions in the True Story condition than in the Fun Story condition, $F_s(1, 59) \geq 11.89, p_s < .01, \emptyset_s \geq .17$.

Group differences also were seen in the children's reports of Fantastic propositions. The main effects of level-of-belief, $F(2, 179) = 25.33, p < .0001, \emptyset = .13$ and recall instructions, $F(1, 179) = 53.68, p < .0001, \emptyset = .24$ were qualified by a significant interaction, $F(2, 179) = 6.30, p < .01, \emptyset = .04$. Follow-up analyses indicated level-of-belief effects in both recall instruction conditions, $F_s(2, 89) \geq 19.84, p_s < .0001, \emptyset_s \geq .31$. When instructed to tell a Fun Story, both the Believers and the Uncertains produced a higher proportion of Fantastic propositions than the Disbelievers, $F_s(1, 59) = 22.51, p_s < .0001, \emptyset_s \geq .21$. In contrast, when instructed to tell a True Story, the Believers reported proportionally more Fantastic propositions than the Uncertains, who in turn reported proportionally more Fantastic propositions than the Disbelievers, $F_s(1, 89) = 4.05, p_s < .05, \emptyset_s \geq .05$. Within the level-of-belief groups, only the Uncertains and the Disbelievers produced a higher proportion of Fantastic propositions in the Fun Story condition than in the True Story condition, $F_s(1, 59) = 7.27, p_s < .01, \emptyset_s \geq .11$.

Next, the numbers of children who reported at least one instance of actually hearing or actually seeing the Tooth Fairy were calculated. These data are displayed in Table 3. To examine differences as a function of level-of-belief and recall instructions, a series of logistic regressions were conducted to predict the children's reports of hearing and seeing the Tooth Fairy. Results indicated that the Believers were more likely than the Uncertains to report hearing the Tooth Fairy, $\chi^2(1, N = 180) = 16.05, p < .0001, \emptyset = .13$, who in turn, were more likely than the Disbelievers to report hearing the Tooth Fairy, $\chi^2(1, N = 90) = 5.52, p < .05, \emptyset = .05$. Further, with the Believers coded as the baseline, there

Table 3. Proportions (and counts) of children who reported hearing and seeing the Tooth Fairy as a function of level-of-belief

	Hearing the Tooth Fairy	Seeing the Tooth Fairy
Fun Story		
Believers	.83 (25)	.80 (24)
Uncertains	.73 (22)	.73 (22)
Disbelievers	.13 (4)	.20 (6)
True Story		
Believers	.90 (27)	.70 (21)
Uncertains	.33 (10)	.10 (3)
Disbelievers	.07 (2)	.07 (2)

was a significant interaction with the Uncertains and recall instructions, $\chi^2(1, N = 180) = 5.65, p < .05, \phi = .05$. To explore this interaction, separate follow-up analyses were carried out within each recall instruction condition. Differences emerged only in the True Story condition, such that the Believers were more likely than the Uncertains to report hearing the Tooth Fairy, $\chi^2(1, N = 180) = 16.05, p < .0001, \phi = .13$. Parallel analyses were carried out for reports of seeing the Tooth Fairy. The Believers were more likely than the Uncertains and the Disbelievers to recall actually seeing the Tooth Fairy, χ^2 s (1, $N = 180$) $\geq 17.50, ps < .0001, \phi$ s $\geq .15$. With the Believers coded as the baseline, there was an interaction with the Uncertains as a function of recall instructions, $\chi^2(1, N = 180) = 7.85, p < .01, \phi = .07$. The Believers were more likely than the Uncertains to report seeing the Tooth Fairy only in the True Story condition, $\chi^2(1, N = 180) = 17.52, p < .0001, \phi = .15$.

DISCUSSION

The results of this investigation demonstrate that children's beliefs in the reality of fantastic figures can have a profound effect on the way that they interpret and remember certain types of experiences. Much in the same way that beliefs about the real world lead children to distort their memories of a past event in ways consistent with their beliefs (Ornstein et al., 1998; Sutherland, Pipe, Schick, Murray, & Gobbo, 2003), the findings suggest that fantasy beliefs can similarly shape children's recollections of events that could be construed in supernatural terms. In particular, those children who firmly believed in the existence of the Tooth Fairy generated more voluminous and complex accounts of losing their last primary tooth than those with uncertain or no beliefs. This boost in elaborateness, however, came at the cost of accuracy. Those with firm Tooth Fairy beliefs were prone to recount occurrences that could only occur in fantasy and to recall actually hearing and seeing the Tooth Fairy, even when they were trying to be veridical in their retellings. In contrast, even though those with partial or no beliefs provided less voluminous and complex accounts than the full believers, these children tended to relate fantastic content only when probed to tell a Fun Story about their tooth loss.

Fantasy beliefs and the structure of children's reports

The boost in both the volume and complexity of the children's accounts across the belief groups following instructions to relate the tooth loss in a fun rather than a truthful manner indicates that all of the children appropriately added detail when asked to tell a Fun Story.

The more voluminous and complex accounts of the Believers relative to the Uncertains and the Disbelievers under both sets of recall instructions extend Principe and Smith's (in press) findings by demonstrating the potency of fantasy beliefs to enhance narrative structure not only when children are free to embellish but also when they are trying to be exactly veridical. Despite this rise in volume and complexity, the increased fictionality of the Believers' recounts relative to the Uncertains' and the Disbelievers' reveals that improvements in narrative structure are not always concomitant with increases in accuracy, as might be expected from the autobiographic memory literature that shows that both narrative structure and accuracy tend to increase with age (Fivush et al., 1995; Ornstein et al., 2006). This result, however, is consistent with studies showing that false reports brought about external suggestions can be more voluminous and complex than accurate reports (Bruck et al., 2002; Poole & Lindsay, 2001; Principe & Ceci, 2002; Principe et al., 2006), but extends this work by revealing an internal source that can increase the volume and complexity of false reports, even when children are pushed to tell the truth. Admittedly, the children's beliefs in the Tooth Fairy presumably stemmed from the suggestions of their parents and others in the community, but the lack of a relationship between parental encouragement and the children's level-of-belief in the Tooth Fairy suggests that the driving force behind the children's false reports was their generalized fantasy beliefs rather than specific parental suggestions.

Fantasy beliefs and the content of children's reports

In recounting their most recent tooth loss, the children who disbelieved in the reality of the Tooth Fairy described mainly the routine or mundane events associated with losing a tooth regardless of whether they were prompted to tell the truth or relate their experiences in a fun manner. The Disbelievers' tendency to focus on the real notwithstanding, there was a slight increase in the proportion of fantastic propositions in the Fun Story relative to the True Story condition, showing that a few of these children moved into pretence when asked to relate their experiences in a fun manner. The Disbelievers' tendency to exclude fantastical references to the Tooth Fairy was not due to a lack of participating in rituals associated with this myth. In line with earlier studies (Prentice & Gordon, 1987; Principe & Smith, in press; Prentice, Manosevitz, & Hubbs, 1978), parental reports indicated an equivalent level of ritual participation among the children in the three belief groups. In contrast to the Disbelievers, the Uncertains performed very differently under the two sets of recall instructions. When asked to tell the truth, they generally refrained from describing fantastic occurrences. However, when asked to tell a Fun Story, the Uncertains indulged in their fantasies and reported as much fantastic content as the Believers, who relayed equally high levels of fantastic occurrences under both sets of recall instructions. Thus, when pressured to relate their tooth loss in truthful manner, only the Believers were unable to moderate the fantastic content of their reports.

Reports of perceptual experiences

Consistent with Principe and Smith's (in press) findings, belief level was associated with claims of actually seeing and actually hearing the Tooth Fairy. With Fun Story recall instructions, the Believers and the Uncertains reported seeing and hearing the Tooth Fairy at evenly high rates. When asked to tell a Fun Story, over 70 per cent of the children in both groups claimed to have seen or heard the Tooth Fairy. However, when asked to relate the

truth, only the Uncertains evidenced a drop in reports of seeing and hearing the Tooth Fairy. The drop was quite significant among the Uncertains, for instance, from 73 to 10 per cent in reports of seeing the Tooth Fairy in the fun *versus* true condition. The Believers retained equally high rates of reports of seeing and hearing the Tooth Fairy regardless of whether they were to Tell a True or Fun Story. Only a few of the Disbelievers reported either seeing or hearing the Tooth Fairy under either set of recall instructions, demonstrating that these children were not as willing as the Uncertains to claim a perceptual experience with the Tooth Fairy even when prompted to be as fun as possible in relating their tooth loss.

Pretend stories or real memories?

Taken together, these findings provide important insights regarding when children's fantastic claims might reflect deliberate pretence and when they might reflect genuine memory errors. Importantly, the boost in the volume and complexity of the children's reports in the Fun Story compared to the True Story condition was associated with a change in content only for the Uncertains and the Disbelievers. With instructions to tell a Fun Story, the children in these two groups exhibited a decrease in the proportions of realistic and ritual propositions and an increase in the proportions of fantastic propositions, indicating that these children had some control over whether they described their tooth loss in fantastic terms and deliberately choose to pad their reports with pretend content to make their stories more fun. In contrast, the lack of an increase in fantastic content despite an increase in volume and complexity among the Believers in the Fun Story condition indicates that these children were not deliberately embellishing their fun stories with made-up content but rather viewed the supernatural portions of their report no differently from the realistic and ritual portions. In fact, the stable proportions of the three content categories even following the boost in volume and complexity in the fun condition suggest that the Believers' fantasy beliefs worked to consolidate their memory for the entire tooth loss event, not simply the fantasy portions.

This pattern of responses indicates that children who were *certain* that the Tooth Fairy existed generally were unaware of their memory errors. However, those whose *certainty was wavering* were somewhat able to switch control from the make-believe to the real when motivated to do so. This suggests that when young witnesses truly believe in the reality of their fantastic memories, there might be little that an interviewer can do to help them remember the past correctly. In contrast, how well children with equivocal beliefs manage the boundaries between fantasy and reality may be driven by the demands of the recall context. These children may be less prone to indulge in their wavering fantasies when they perceive the situation as requiring an accurate response than when they view it as an opportunity to engage in pretence. Thus, children with shaky fantasy beliefs may be the most likely group to benefit from techniques to increase demands to tell the truth (e.g. truth/lie discussions).

In terms of processes that may have led to constructive changes in the children's accounts, there are at least two possibilities. Constructivist accounts hold that beliefs can affect memory at any point during information processing, that is during interpretation, encoding, storage or retrieval (Baker-Ward, Ornstein, & Principe, 1997). Thus, one possibility is that the Believers' expectations about the Tooth Fairy's typical behaviours led them to interpret and encode real experiences in a fantastical manner. For instance, they may have attributed a real shadow in their room to the Tooth Fairy or a real noise outside their window to the Tooth Fairy, and then later recalled these interpretations as evidence of

seeing or hearing the Tooth Fairy. Alternately, some portion of the Believers' errors may have been due to source monitoring errors that took place during retrieval. Thus, even though the children might have resisted encoding any of the events following their tooth loss in a fantastic manner, some later may have confused their expectations, wishes or dreams about the Tooth Fairy myth with real perceptions. Further, because some of the Uncertains and a few of the Disbelievers reported fantastic experiences even when prompted to tell the truth, the possibility remains that some of these children also made unwitting source errors.

Most adults view children's fantastic stories as an endearing tendency of the early years. In legal settings, however, when children's fantastic stories mix with real memories, unintentional but serious consequences are possible. The current results suggest that fantastic stories might emerge when forensic interviewers inadvertently put children into a pretend frame. Given the subtlety with which young children move in and out of pretence, the danger is that interrogators who are intent on gathering only factual information may not always detect the slip into a pretend mode. The results of the present study also reveal that some children may truly believe they have experienced their fantastic stories, particularly if they construe the event in question in fantastic terms. Clearly, there are many events other than a tooth loss open to supernatural interpretations by children. Consider, for instance, that children typically use magic to explain events that seem to violate their understanding of the physical world (Johnson & Harris, 1994; Phelps & Woolley, 1994) and often confuse frightening or scary fantasies, such as monsters or ghosts, with reality (Harris et al., 1991). Thus, a child might describe his preschool teacher as a witch if she uses magnets to make metal objects 'magically' move towards her. Likewise, a child caught up in a custody dispute might recount an overnight visit at her father's house as scary or upsetting if she believes that a ghost lives under her bed. The suggestibility literature provides ample evidence that these sorts of fantastic memories can be brought about by suggestive interviewing (see Ceci & Bruck, 1995). However, these data reveal that when children believe in the reality of their fantasies, even prompts to tell the truth, the whole truth and nothing but the truth do not guarantee accuracy.

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APPENDIX A: TRUTH/FUN DISCUSSION

Truth discussion

'Hi, my name is [interviewer's name]. I want to ask you some questions about what happened when you lost your last tooth. But first, let me ask you a few questions. Do you know the difference between a telling a true story and telling not a true story about something you did? Well, I'd like to ask you some questions about what it means to tell a true story and what it means to tell not a true story. I'm going to read you a story about a girl named Kate/Grace and then you tell me whether she is telling the truth or not the truth about what happened'.

Zoo story

'Kate is a young girl your age. Kate and her father took a train to the zoo. At the zoo, they saw giraffes and elephants and monkeys and lions. The lions were Kate's favourite. On their way home, Kate's father bought her an ice-cream cone to eat'.

'Now I'm going to show you some things that Kate said about her trip to the zoo, and I want you to tell me which is the truth and which is not the truth'.

'I took a train to the zoo'

'I saw a lion at the zoo'

'I ate ice-cream on the way home'

'I took a jet to the zoo'

'I saw a dinosaur at the zoo'

'I ate broccoli on the way home'

Park story

'Grace is a young girl your age. Grace and her father went to the park. At the park, Grace swung on the swings and slid down the slide. Grace and a new friend built a sandcastle in the sand box. On their way home, Grace and her father visited the ducks swimming the pond'.

'Now I'm going to show you some things that Grace said about her trip to the park, and I want you to tell me which is the truth and which is not the truth'.

'I slid down the slide'

'I built a sandcastle'

'I saw the ducks in the pond'

'I slid down the mountain'

'I coloured a picture'

'I saw the whales in the pond'

Fun discussion

'Now, I'd like to ask you some questions about what it means to a fun story about something you did. I'm going to read you a story about a girl named Kate/Grace and then you tell me whether she is telling a fun story about what she did'.

Zoo story

'Kate is a young girl your age. Kate and her father took a train to the zoo. At the zoo, they saw giraffes and elephants and monkeys and lions. The lions were Kate's favourite. On their way home, Kate's father bought her an ice-cream cone to eat'.

'Now I'm going to show you some things that Kate said about her trip to the zoo, and I want you to tell me which description sounds really fun and which sounds not as much fun'.

'I took a train to the zoo'

'I saw a lion at the zoo'

'I ate ice-cream on the way home'

'The train zoomed up and down the mountains and through the tunnel'

'The lion's roar was so loud that it scared all of the other animals'

'I ate a giant chocolate and vanilla ice-cream cone with colored sprinkles.'

Park story

'Grace is a young girl your age. Grace and her father went to the park. At the park, Grace swung on the swings and slid down the slide. Grace and a new friend built a sandcastle in the sand box. On their way home, Grace and her father visited the ducks swimming the pond'.

'Now I'm going to show you some things that Grace said about her trip to the park, and I want you to tell me which description sounds really fun and which sounds not as much fun'.

'I swung on the swing'

'I built a sandcastle'

'I saw the ducks in the pond'

'I swung as high as the birds and almost touched the top of a tree'

'My sandcastle had giant towers and a secret tunnel'

'The ducks came out of the water and tried to follow us home'
