

Effects of Context on Judgments Concerning the Reality Status of Novel Entities

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Three studies examined the effects of context on decisions about the reality status of novel entities. In Experiment 1 (144, 3- to 5-year-olds), participants less often claimed that novel entities were real when they were introduced in a fantastical than in a scientific context. Experiment 2 (61, 4- to 5-year-olds) revealed that defining novel entities with reference to scientific entities had a stronger effect on reality status judgments than did hearing scientifically oriented stories before encountering the novel entities. The results from Experiment 3 (192, 3- to 6-year-olds) indicated that definitions that support inferences facilitate reality status judgments more than do definitions that simply associate novel and familiar entities. These findings demonstrate that children share with adults an important means of assessing reality status.

Children are frequently exposed to new information. Much new knowledge results from firsthand experience with the world. For example, young children often acquire knowledge about animals through interacting with their family pet. However, children are also exposed to unfamiliar concepts for which firsthand experience is not available. Children may hear about new things by conversing with others, reading storybooks, or watching television, and must assimilate these concepts without direct experience. Much of this sort of information is veridical, and represents entities that truly exist (e.g., the planets). Yet some information is not and represents nonexistent entities (e.g., the Easter Bunny). Often the new information that children encounter contains a mix of real and fantastical. For example, Elmo, a muppet monster, teaches children about science, and Harry Potter, a boy, performs magic spells. A critical task of childhood is to separate the real from the unreal and to assign entities and events to their proper (real or not real) categories.

The ability to differentiate between what is real and what is not is basic to human cognition, yet children have traditionally been viewed as confused about it. The traditional view of young children is that they are credulous and effortlessly believe most of what adults tell them (Dawkins, 1995; Gilbert, 1991; Piaget, 1930). Piaget (1930) first painted this picture of the child as a credulous being, who, with age, develops into a skeptical, rational thinker. Gilbert (1991) used the presumed credulity of children to support his Spinozan model of belief formation, in which information is first accepted automatically and only later evaluated critically. Researchers outside of psychology have also accepted and endorsed the view of young children as credulous, some even proposing that it might be adaptive to be so (Dawkins, 1995). This credulity is purported to lead to a range of errors about what is real and what is not, as reflected, for example, in beliefs in the existence of fantastical entities like Santa Claus and the Tooth Fairy.

There is evidence, however, that children are not entirely credulous and that the ability to distinguish reality from nonreality develops significantly during the preschool years. Research has shown that children as young as age 3 distinguish between real things and toys, between real things and pictures, and between real and pretend entities (DeLoache, Pierroutsakos, Uttal, Rosengren, & Gottlieb, 1998; Flavell, Flavell, & Green, 1989; Woolley & Wellman, 1990). Other research has addressed children's ability to differentiate mental states, like imagination, from reality (Estes, Wellman, & Woolley, 1989; Harris, Brown, Marriott, Whittall, & Harmer, 1991;

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Johnson & Harris, 1994, Woolley & Phelps, 1994; Woolley & Wellman, 1993). This research shows that, by age 3, children assign real, physical objects different properties than they attribute to mental entities. Finally, and most relevant to the present studies, researchers have addressed whether and when children differentiate fantasy from reality (Morison & Gardner, 1978; Sharon & Woolley, 2004; Woolley, Boerger, & Markman, 2004), primarily by soliciting judgments about whether various entities are “real” or “pretend.” This research shows that, although children make the proper assignment of certain entities (e.g., ghosts) to “real” or “pretend” categories by age 3, most preschoolers still consider some entities in which adults encourage belief (e.g., Santa Claus) to be real. These same children understand, however, that these entities differ from real entities in terms of the properties and abilities they possess (Sharon & Woolley, 2004).

Although this body of research is important, it is primarily descriptive and does not address how children make reality status decisions when they encounter new information. Some research indicates that there are various sorts of cues young children can use to evaluate new information. For example, Koenig, Clément, and Harris (2004) showed that 3- and 4-year-old children use the past reliability of an informant to decide whether to reject or accept a label for a novel entity. Children were presented with two speakers: one who labeled a number of objects correctly and one who labeled them incorrectly. Children who were able to differentiate accurately from inaccurate labelers used this information to decide whether to accept or reject new information—a label for a novel object—from these speakers. Research by Jaswal (2005) indicated that 3-year-olds are more likely to reject a label when a speaker acts absent-minded or distracted when the label is offered. Lee, Cameron, Doucette, and Talwar (2002) demonstrated that 5- and 6-year-olds reject information that is inconsistent with their beliefs about the world. In their research, adults made implausible claims, for example, that a chair had come alive and broken a glass. By age 5, children rejected this claim, presumably using their knowledge about how the world really works. Thus, children have been shown to use both aspects of the source of new information and awareness of their own knowledge to evaluate information.

Another cue that is important in judging the reality status of new information is the context in which the information is encountered. Although children often encounter new information in different contexts, researchers have not systematically

addressed how these different contexts affect children’s ability to distinguish between reality and nonreality. Context can be conceptualized in two ways. One, which we will term the local context, involves the words or statements that surround a novel word, as in a passage of text. The second, which we will term the global context, concerns the circumstances under which an entity or event is encountered. Although there is no existing research on whether children can use either of these types of context to make reality status decisions specifically, some research indicates that they can use both sorts of context to make related kinds of decisions.

Gutheil, Vera, and Keil (1998), for example, taught 4-year-old children about a variety of properties of humans and asked children to generalize these properties to other entities. Importantly, they varied the specific local context in which the properties were presented to children. For example, children either heard “This person eats because he needs food to grow . . .” (biological context) or “This person eats because he loves to be at meals with his family and friends . . .” (psychological context) (p. 37). Whether properties were presented in a biological or a psychological context affected how children generalized these properties to other entities. When properties were presented in a psychological context, children generalized based on similarity to humans, whereas when presented in a biological context, they generalized widely to all animals. These findings indicate that children are able to use the local context within which information is presented to draw important conclusions, suggesting that they may also be able to use context to judge reality status.

There is also research showing that the context in which new information is encountered appears to affect whether children will change their beliefs. Chandler and Lalonde (1994) presented 9- to 13-year-old children with events that violated principles of conservation. Children were given false feedback about a physical transformation by an experimenter dressed as a magician, a psychologist, or a priest. A week later, children who experienced the violation performed by the magician responded in line with their original beliefs in conservation, whereas the majority of the children who had experienced the transformation in the presence of the priest or the psychologist appeared to have lost their earlier convictions about the laws of conservation. Although Chandler and Lalonde do not discuss their findings in terms of context, one interpretation is that the presence of the different experimenters created different global contexts in which the information was situated, which affected children’s beliefs.

Research by Subbotsky (1994) indicates that an experimenter's expressed credulity toward magic may create a context in which children perceive magic to be legitimized. Subbotsky told 4- to 6-year-olds a story about a girl who found a magic box that violated certain aspects of permeability. Most children denied that such a box could exist in reality. A few minutes later, the experimenter produced a box that resembled the one in the story, and suggested to children that it might be a magic box like the one in the story. When children were left alone in a room with the box, many children proceeded to try to perform magical actions on it, suggesting that they believed it indeed had magical powers. Other work indicates that the simple absence of an adult in the room with a child can create such a context. Harris et al. (1991) asked 4- and 5-year-old children to imagine either a bunny or a monster inside a box. Although most children had initially told the experimenter that the box was empty, when the experimenter left the room they acted as if what they had imagined was actually real. When other researchers used a similar procedure with the simple change that the experimenter remained in the room with the children, very few children behaved in this manner (Golomb & Galasso, 1995). Thus, the simple absence of an adult seemed to create a context in which fantastical thinking was encouraged. Finally, Woolley and Phelps (1994) suggest that when children are placed in a "practical" context, in which their actions have real-world implications, they will be more likely to manifest beliefs that imagination cannot affect reality than when they are placed in more facilitative contexts. In their studies, when children were alone with an experimenter they responded in line with the belief that their imagination could create reality, but when suddenly placed in a situation in which an unfamiliar person needed their help, they responded in a more adult-like manner.

Taken together, these studies suggest that context influences children's beliefs, reasoning, and behavior in important ways. Thus, it seems reasonable to speculate that context may also affect children's judgments about the reality status of novel entities. This paper describes three studies in which children made decisions concerning the reality status of novel entities. In each study we assessed whether the context in which children encountered the novel entities affected their decisions. We also probed the effects of different types of context, as well as the potential mechanisms by which context may exert an effect on children's decisions about an entity's reality status. Our goal is to begin to explore and elucidate the processes by which children develop the ability to distinguish fantasy from reality.

Experiment 1

In Experiment 1 we used two context manipulations, one global and one local, and observed the effects on children's judgments about the reality status of novel entities. Our global context manipulation involved reading children different types of stories before they judged the entities. Johnson and Harris (1994) proposed that mental availability may affect reality status judgments, and suggested that "reading a fairy tale, watching a cartoon, or participating in a religious ceremony" may all affect how children decide whether something is real. Thus, children heard scientific, fantastical, or everyday stories before encountering the novel entities. Our local context manipulation involved introducing the novel entities with reference to either a known fantastical, scientific, or everyday entity. Based in part on Gutheil et al.'s (1998) findings, we expected that a novel entity might be more likely to be judged as real if it were defined with reference to scientists, for example, than if it were defined with reference to an entity that the child knew to be pretend. Because we were not certain whether children would use context at all in making reality status judgments, we began our investigation by using both manipulations simultaneously.

Method

Participants. Participants were forty-eight 3-year-olds (range 3 years 1 month–3 years 11 months), forty-eight 4-year-olds (range 4 years 1 month–4 years 11 months), and forty-eight 5-year-olds (range 5 years 1 month–5 years 11 months), with approximately equal numbers of girls and boys. All children who participated were solicited by mail and phone from a database maintained by the University Children's Research Lab. The sample was drawn from a large southwestern city, and was made up of primarily middle-class children. Most participants were Caucasian, but a range of ethnicities was represented, including Hispanic American and Asian American.

Materials. There were three conditions: fantastical context, scientific context, and everyday context. Three books were used, one for each condition. Children in the fantastical context condition were read *The Paper Bag Princess*, in which a princess outwits a dragon by getting him to perform various impossible feats, ultimately exhausting him. Children in the scientific context condition were read *The Day of the Dinosaur*, a book that introduces children to dinosaurs and discusses how scientists learn about them through studying fossils. Children in the

everyday context condition were read *Salt Hands*, a book about a girl who feeds salt to some deer. The books were chosen based on an informal analysis of content, length, and illustration type. All books were approximately the same length and had similar types of illustrations (colorful sketches).

For the judgment task, in which children were asked about the reality status of various entities, the materials were colored, laminated cards, each with the name of an entity written on it, and a paper bag containing the cards. For the certainty ratings, children were shown a card with three line drawings of children (Figure 1).

Procedure. Children were randomly assigned to the fantastical, scientific, or everyday context condition. Children first heard one of the three storybooks, according to condition. Next, children were given the judgment task, in which they were asked to judge the reality status of the entities (see Appendix A for exact wording). For each entity, children were asked whether they thought that the entity was real or pretend, with the order of options (real, pretend) alternating within participants.

Children were given two warm-up trials to familiarize them with the test question format ("Are (entities) real or pretend?") and to communicate that both "real" and "pretend" answers were valued; the entities used were a "grown-up" and a "monster." Children received feedback on these trials (e.g., "That's right/Actually, grown-ups are real/monsters are pretend"). (Children were 92% correct on the grown-up item and 74% correct on the monster.) On each test trial, the experimenter pulled a card from the bag, read the name of the entity, gave a short description, and then asked the test question. Each child judged 9 entities: 3 real (a scientist, a cat, and a child), 3 fantastical (Barney, a dragon, and a ghost), and 3 novel (a surnit, a trag, and a kimp; see Appendix B). These were presented in one of 16 semi-random orders, with the scientist and dragon in either first or second position and the novel entities in positions 3, 5, and 8.

Descriptions of the novel entities always contained a reference to a scientist, a dragon, or a child, de-

pending on the child's condition. For example, for one novel entity, a surnit, children in the fantastical context condition were told that "dragons like to try to catch them . . . dragons collect surnits," whereas children in the scientific context condition were told that ". . . scientists like to try to catch them . . . scientists collect surnits." Children in the everyday context condition were told, ". . . children like to try to catch them . . . children collect surnits." Children were also given one piece of neutral information about each novel entity in order to resemble more closely the descriptions of the other entities (e.g., "surnits are usually medium-sized"; see Appendix A). For children in the scientific context condition who indicated that a scientist was not real, a grown-up was substituted, and for children in the fantastical context condition who claimed that a dragon was real, a monster was substituted. Ten children (five 3-year-olds and five 4-year-olds) in the fantastical context condition said that both a monster and a dragon were real, and two children (two 3-year-olds) in the scientific context condition said that both a grown-up and a scientist were not real. Analyses were run with and without these participants. The same pattern of results were obtained; thus, the analyses reported include the full set of participants.

After making their reality status judgments, children were asked to gauge the certainty of their responses for the novel entities. To do this, children were shown a picture scale with three drawings (see Figure 1): one of a child looking quizzical (labeled "not so sure"), one of a child looking like he was thinking (labeled "a little sure"), and one with a child raising his finger in the air and looking confident (labeled "really sure"). Children were reminded of their judgments (e.g., "Remember the surnit, the medium-sized things that scientists/dragons/children collect? You said that a surnit was real/pretend") and asked, "How sure are you that a surnit is real/pretend—are you really sure, a little sure, or not so sure?" The researcher pointed to each picture as s/he stated each option. Children could point to one of the pictures or verbalize their answer (the exact wording of the task is included in Appendix B).

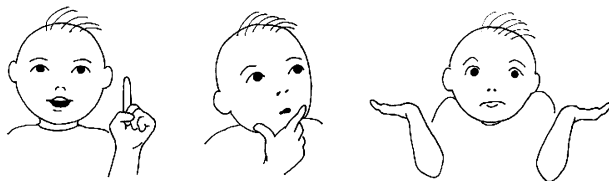


Figure 1. Certainty scale. (Note: This figure originally appeared in "A visit from the Candy Witch: Factors influencing young children's belief in a novel fantastical being," *Developmental Science*.)

Results

Reality status judgments. The focal question is whether context affected children's judgments about the reality status of the novel entities. Preliminary analyses conducted on the proportion of novel entities judged as real (across the three trials) determined that there were no main effects or interactions involving sex, so it was not included in the main

analyses. There were also no significant item effects for the novel entities (surnit, trag, and kimp), so they were combined for all analyses. We then conducted $3(\text{age}) \times 3(\text{condition})$ analysis of variance (ANOVA) on these scores. There was no main effect of age, 3- ($M = .46$, $SD = .34$), 4- ($M = .46$, $SD = .41$), and 5-year-old ($M = .53$, $SD = .41$) children judged similar proportions of novel entities as real. There was a significant main effect of condition, $F(2, 134) = 11.41$, $p < .001$, which was qualified by an interaction between age and condition, $F(4, 134) = 2.92$, $p < .05$. Simple effects analyses on each age group revealed that the 3-year-olds' scores were not affected significantly by the context manipulation (see Figure 2). There was a trend toward a main effect of condition in the 4-year-olds, $F(2, 45) = 2.877$, $p = .07$. Post hoc Fisher's PLSD tests indicated that 4-year-olds in the scientific context condition judged significantly more of the novel entities as real ($M = .64$, $SD = .43$) than did 4-year-olds in the fantastical context condition ($M = .31$, $SD = .31$; $p < .05$). There was a main effect of condition in the 5-year-old group, $F(2, 42) = 14.39$, $p < .001$, with 5-year-olds in both the scientific ($M = .60$, $SD = .40$) and everyday ($M = .80$, $SD = .30$) context conditions judging more novel entities as real than 5-year-olds in the fantastical context condition ($M = .30$, $SD = .28$), $p < .001$ by Fisher's PLSD.

We also analyzed children's responses regarding the fantastical and real entities. Because these were familiar entities, we did not expect context to affect judgments, and it did not. The majority of children correctly claimed that the fantastical entities were not real, but there was a main effect of age. Five-year-olds were least likely to claim that these entities were real ($M = .06$, $SD = .13$), 4-year-olds slightly more likely ($M = .23$, $SD = .32$), and 3-year-olds most likely

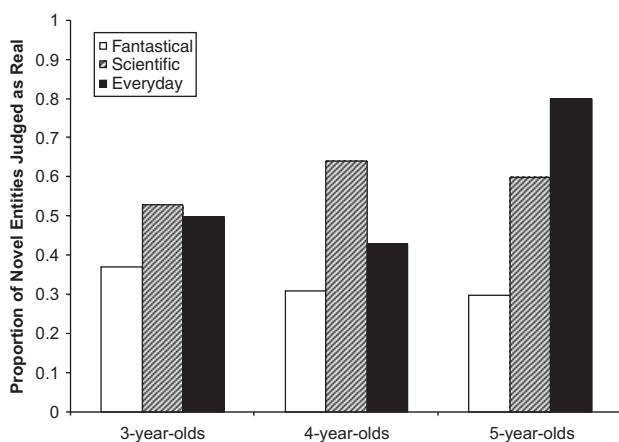


Figure 2. Experiment 1: Proportion novel entities judged as real.

($M = .46$, $SD = .37$), $F(2, 132) = 19.76$, $p < .001$ (all ages were significantly different from one another by Fisher's PLSD, $p < .01$). Item analyses indicated that there were no significant differences among the various fantastical entities. There was also an age effect for the real entities, with 5-year-olds ($M = .96$, $SD = .11$) and 4-year-olds ($M = .92$, $SD = .20$) correctly judging these entities as real more often than 3-year-olds ($M = .76$, $SD = .30$), $F(2, 134) = 11.34$, $p < .001$, Fisher's PLSD, $p < .001$. Item analyses indicated that this pattern was due to 3-year-olds being less likely to claim that scientists were real ($M = .59$, $SD = .50$) than that children ($M = .86$, $SD = .35$) and cats ($M = .80$, $SD = .40$) were real. Despite these age differences in the overall level of response, children of all ages judged real and fantastical entities differently (all p 's $< .01$).

Theoretically, providing a fantastical context for a novel entity should cause children to treat the entity as if it were pretend, and providing a scientific or everyday context should result in increased judgments that novel entities are real. Thus, we also compared judgments about the novel entities with judgments about the fantastical and real entities. Children in the fantastical context condition judged novel entities ($M = .28$, $SD = .30$) almost identically to how they judged the fantastical entities ($M = .26$, $SD = .34$), $t(44) = .57$, *ns*, and very differently from how they judged the real entities ($M = .91$, $SD = .18$), $t(46) = -12.41$, $p < .001$. The scientific context, however, did not result in children judging the novel entities as real ($M = .59$, $SD = .39$) as often as they judged the real entities as real ($M = .86$, $SD = .27$), $t(48) = -4.24$, $p < .001$, but they were judged as real more often than the fantastical entities ($M = .27$, $SD = .36$), $t(48) = 4.68$, $p < .001$. Similarly, in the everyday context condition, children did not judge novel entities ($M = .57$, $SD = .38$) as real as often as they judged real entities ($M = .86$, $SD = .25$) as real, $t(47) = 4.99$, $p < .001$, but they did judge novel entities as real more often than fantastical ones ($M = .25$, $SD = .33$), $t(47) = 4.60$, $p < .001$.

Certainty ratings. To obtain a measure of the strength of children's beliefs about the existence of the novel entities, we created a summary score that took into account both children's judgments and their certainty ratings. This summary score was formed as follows: Children who claimed that an entity was real and claimed they were "really sure" received a score of 6, children who were "a little sure" received a 5, and children who were "not so sure" received a 4. Children who responded "don't know" to the reality status question were given a 3. Children who claimed that the entity was pretend

but were “not so sure” received a 2, children who were “a little sure” received a 1, and children who were “really sure” received a 0. Scores thus ranged from 0 to 6, with 0 indicating that the child was *really sure* that the entity was *pretend*, and 6 indicating that s/he was *really sure* the entity was *real*.

Preliminary analyses revealed no main effects of sex or individual item; thus, these factors were collapsed in the analyses. A 3 (age) \times 3 (condition) ANOVA revealed a main effect of condition, $F(2, 416) = 34.73$, $p < .001$, as well as an age by condition interaction, $F(4, 416) = 8.10$, $p < .001$. Again, there was no main effect of age; 3- ($M = 3.37$ out of 6, $SD = 1.75$), 4- ($M = 3.42$, $SD = 1.95$), and 5-year-olds' ($M = 3.59$, $SD = 1.99$) summary scores did not differ. As with the previous analysis, context did not significantly affect 3-year-olds' scores. Four-year-olds in the scientific context condition ($M = 4.3$, $SD = 1.92$) had the highest scores (i.e., judged the entity as real and had a high degree of certainty), children in the everyday context condition had the next highest ($M = 3.4$, $SD = 1.89$), and children in the fantastical context condition had the lowest scores ($M = 2.6$, $SD = 1.70$), $F(2, 141) = 10.04$, $p < .001$ (all comparisons significant by Fisher's PLSD, $p < .03$). For the 5-year-olds, children in both the everyday ($M = 4.73$, $SD = 1.51$) and scientific context ($M = 4.18$, $SD = 1.79$) conditions had higher scores than did children in the fantastical context condition ($M = 1.87$, $SD = 1.33$), $F(2, 132) = 43.10$, $p < .001$. Scientific and everyday context conditions were significantly different from the fantastical context condition, $p < .001$, but not from one another, by Fisher's PLSD.

Individual participant analyses. To further examine the patterns within each age group, we computed the number of children who rated 0–3 novel entities as real. As is evident in Table 1, 3-year-olds were fairly inconsistent in all three conditions. Whereas 4-year-olds responded inconsistently in the everyday context condition, the majority in the fantastical context condition responded either that no entities were real or that only 1 entity was real, whereas the majority in the scientific context condition responded either that 2 or that 3 entities were real. In contrast to the 3- and 4-year-olds' patterns in the everyday context condition, the majority of the 5-year-olds in this condition consistently claimed that all the novel entities were real (binomial probability, $p < .05$). This condition seems to have been perceived very differently by the 5-year-olds. The fantastical context also had the strongest effect in the 5-year-old group, with 11 of the 16 children in that condition consistently rejecting the reality status of all three novel entities ($p < .05$).

Table 1
Experiment 1: Individual Participant Patterns

Condition	Number of children judging 0, 1, 2, or 3 novel entities as real			
	0 ^a	1	2	3 ^a
Everyday				
3-year-olds	3	5	4	3
4-year-olds	6	4	3	4
5-year-olds	1	1	4	9
Fantastical				
3-year-olds	5	6	4	1
4-year-olds	6	6	4	1
5-year-olds	11	2	3	0
Scientific				
3-year-olds	3	7	4	5
4-year-olds	4	1	2	8
5-year-olds	3	2	5	5

Note. ^aFrequencies with a binomial probability of $p < .05$.

Discussion

The results of this experiment demonstrate that children are able to use context to determine whether something is real or not. Overall, children were somewhat skeptical regarding the reality status of the novel entities. Of the three novel entities to which children were introduced, the average number judged as real was 1.44 (out of 3). Thus, children did not simply assume that, because an adult was telling them about a novel entity, it was necessarily real. In contrast, the results indicate that, by the age of 4, children use contextual cues to make inferences about the reality status of novel entities. The summary scores of both 4- and 5-year-olds reveal that these children were significantly less likely to claim that a novel entity was real and be certain that it was so, when it was encountered in a fantastical context than when it was encountered in either a scientific or an everyday context.

Given that context appeared to affect children's judgments, the question remains as to which context manipulation was driving the effect. We conducted a follow-up experiment to determine which of the context manipulations used in Experiment 1, the global context manipulation involving the stories, or the local context manipulation involving the descriptions of the entities, is more powerful in influencing beliefs about novel entities. Additionally, although we have felt safe presuming that adults use context to make reality status judgments, an empirical demonstration thereof seemed warranted. Thus,

we included an adult version of the experiment, using a slightly modified design.

Experiment 2

Method

Participants. Sixty-one preschool-aged children and 58 adults participated. Because context did not affect the responses of the 3-year-olds in Experiment 1, we focused our efforts on 4- and 5-year-olds. Thus, the sample of children included twenty-nine 4-year-olds ($M = 54.3$ months, range = 49–59, 14 girls and 15 boys) and thirty-two 5-year-olds ($M = 64.6$ months; range = 60–71, 17 girls and 15 boys). Children were recruited from the same database as in Experiment 1. Adults were undergraduate students enrolled in an Introductory Psychology course. The group was representative of the general college population, and participation partially fulfilled a course requirement.

Materials. Materials were the same as in Experiment 1, with a few exceptions. Because the scientific/fantastical contrast was significant for both 4- and 5-year-olds in Experiment 1, whereas the everyday/fantastical contrast was not, we simplified the design to include just the scientific and fantastical conditions. Children in the scientific global context condition were read a book about doctors called *A Trip to the Hospital*. Although a book about doctors and hospitals may not seem scientific from an adult perspective, it was important to us to have the book focus on entities and events from a domain that at least concerns science, which medicine certainly does, and was also familiar enough to children that its reality status would be clear. Children in the fantastical global context condition were read a book about ghosts, *Gus was a Christmas Ghost*. Because some of the youngest children in Experiment 1 seemed uncertain of the reality status of scientists, the focal scientific entity in this study was changed to a doctor. Similarly, because ghosts received the lowest reality status rating in Experiment 1, we used ghosts as the focal entity in the fantastical condition. Books were chosen to correspond to these focal entities. For the certainty assessment, the same pictures were used, but rather than pointing to a picture, children indicated their certainty by moving a red ball across a wooden scale that was aligned with the pictures. We reasoned that this might be more engaging for the children, and might provide more precise information.

For the adults, a list of 10 novel items, intermixed with 10 real and 10 fantastical items, was given to

each participant in a different random order. The novel items were nonsense words generated by one of the authors (e.g., tragelle, isanage). The real words included, for example, astronaut, virus, and surgeon; sample fantastical words were dragon, mermaid, and unicorn. For participants in the local context conditions, the list included definitions for all the items, either scientifically oriented or fantasy oriented, according to condition. For example, participants in the fantastical local context condition read that “a tragelle is an artifact collected by a gnome,” whereas participants in the scientific local context condition read that “a tragelle is an artifact collected by a genetic researcher.” Definitions for the real and the fantastical items came from *Webster’s 21st Century Dictionary*; one of the authors wrote definitions for the novel entities.

For the global context manipulation, rather than hearing a story, adults completed a find-the-word puzzle before receiving the list. (Herr (1989) has used a similar method successfully in a study of thematic priming in adults.) The puzzle used only words relating to either science or fantasy that had been previously rated as highly scientific or highly fantastical by an independent set of adults. Participants in the global context conditions received the same list of items as did participants in the local context condition, but without definitions.

Procedure for children. Children were randomly assigned to one of four conditions: scientific global context, fantastical global context, scientific local context, or fantastical local context. As in Experiment 1, our global context manipulation involved reading children two different types of stories. These children did not hear definitions of the entities but were simply told the name of the entity. Our local context manipulation involved describing the novel entities with reference to scientific or fantastical entities. Children were tested in a quiet room at the University Children’s Research Lab. The method was similar to that in Experiment 1, with a few exceptions. First, children in the global context conditions were read a scientific or fantastical story before judging the entities, whereas children in the local context conditions began with the judgment task. Second, children judged 15 rather than 9 entities. The known entities used in the local context conditions were changed from Experiment 1; in the scientific local context condition, a doctor was used instead of a scientist, and in the fantastical local context condition, rather than a dragon, a ghost was used. All children said that a doctor was real and all but six children, a monster was substituted).

Although children appeared to understand how to produce the certainty judgments asked of them in Experiment 1, because this is a somewhat new procedure, we incorporated some modifications into the task that we felt might make it more robust. First, children made certainty ratings for each item immediately after they had judged it, rather than making these ratings at the end of the session. Also, in addition to the introduction used in Experiment 1, experimenters administered a short training. Children were asked three questions intended to tap all three levels of certainty: (1) What's your name? (very sure), (2) Did you have a dream last night? (a little sure), and (3) What month do you think I was born in? (not sure). Children were asked to rate the certainty of their answers to each of these questions and were given feedback. If children's initial responses did not utilize the full scale, they were given additional questions until they had utilized both ends appropriately along with one midpoint.

Procedure for adults. Participants were randomly assigned to one of four conditions: scientific global context, fantastical global context, scientific local context, or fantastical local context. Each participant was given a set of materials and individual verbal instructions. Participants in the global context conditions were instructed to work on the puzzle first. They were given 10 min to complete the puzzle and then told to rate the list of items as real or not real. Participants in the local context conditions were only given instructions concerning the list of items.

Results

Children's reality status judgments. Scores for each entity type (novel, real, pretend) were calculated by computing the proportion of entities children judged as real. Preliminary analyses revealed no differences between boys and girls or between the ratings of the 4- and 5-year-olds, nor any interactions involving age or sex, so sex and age were not considered in these analyses.

A 2 (context type: scientific, fantastical) \times 2 (context manipulation: global, local) ANOVA was performed on each of the three scores. There were no effects of condition on judgments about the real or fantastical entities. For the novel entities, there was a main effect of context type; as in Experiment 1, both 4- and 5-year-olds in the scientific context conditions ($M = .41$, $SD = .39$) judged significantly more of the entities as real than did children in the fantastical context conditions ($M = .25$, $SD = .29$), $F(1, 57) = 4.06$, $p < .05$. There was also a main effect of type of context manipulation; children in the local context condi-

tions ($M = .42$, $SD = .29$) judged significantly more of the novel entities as real than did children in the global context conditions ($M = .24$, $SD = .51$), $F(1, 57) = 4.83$, $p < .05$. However, both of these main effects were qualified by a significant interaction between context type and manipulation type, $F(1, 57) = 5.57$, $p < .05$. Children in the scientific local context condition ($M = .60$, $SD = .37$) judged more novel entities as real than did children in any other condition (overall $M = .25$); the other three conditions did not differ.

The global context manipulation appeared to have had no effect on children's judgments of the novel entities. Thus, although we did not include a control condition in which children encountered the novel entities in the absence of any contextual information, we can use the data from the global context condition as a proxy for such a control group. Against this, we can measure children's responses to the two types of context in the definitions provided to children in the local context conditions. The results suggest that exposure to the scientific descriptions served to increase judgments that these entities were real rather than exposure to the fantastical descriptions serving to decrease such claims. For all conditions except the scientific local context condition, $t(14) = 2.91$, $p < .05$, ratings of novel entities were not significantly different from ratings of fantastical entities. Thus, it seems that in the absence of the scientific descriptions children treated novel entities as if they were pretend.

Children's certainty ratings. As in Experiment 1, we calculated a summary score for each child, which reflected a combination of their reality status judgment and their certainty rating for the novel entities. These scores ranged from 0 (*pretend, very sure*) to 6 (*real, very sure*). Preliminary analyses of these scores revealed no significant effects of age, sex, or item-type, or any interactions involving these, so these variables were not included in the remaining analyses. A 2 (context manipulation: local vs. global) \times 2 (context type: scientific vs. fantastical) ANOVA on the mean scores across items revealed the main effects of context manipulation, $F(1, 300) = 13.41$, $p < .001$, and context type, $F(1, 300) = 26.15$, $p < .001$. These were subsumed by a context manipulation \times context-type interaction, $F(1, 300) = 10.39$, $p < .01$. Simple effects analyses revealed that children who heard the scientific descriptions ($M = 4.17$ out of 6, $SD = 1.90$) rated the novel entities as real with more certainty than did children who heard the scientific story ($M = 2.71$, $SD = 1.77$), $F(1, 152) = 24.54$, $p < .001$, and that children who heard the scientific descriptions rated the novel entities as real with more

certainty than did children exposed to the fantastical description ($M = 2.40$, $SD = 2.02$), $F(1, 148) = 30.60$, $p < .001$. The means in the fantastical global context ($M = 2.31$, $SD = 1.72$) and scientific global context conditions did not differ, and the two types of context manipulation did not differ for the fantastical context. Ratings in the scientific local context condition were significantly higher than those in any other condition. These findings are consistent with those from the analysis of children's reality status judgments.

Individual participant patterns. The individual participant patterns shown in Table 2 are consistent with the patterns shown in the group means. The majority of children in both of the global context conditions and in the fantastical local context condition judged 0 or 1 of the entities as real ($p < .05$, binomial probability). In contrast, the majority of children in the scientific local context condition judged 4 or 5 of the novel entities as real ($p < .05$).

Adults' reality status judgments. Scores for adults were calculated in the same manner as the children's scores. A 2 (context type: scientific vs. fantastical) \times 2 (context manipulation: global vs. local) (ANOVA) was conducted for each of these scores. For the novel entities, there was a significant main effect of context type, $F(1, 54) = 9.30$, $p < .01$, which was qualified by a significant interaction between context type and context manipulation, $F(1, 54) = 16.56$, $p < .001$. A one-way ANOVA revealed that participants in the scientific local context condition rated a greater proportion of novel entities as real ($M = .53$, $SD = .24$) than did participants in the fantastical local context condition ($M = .07$, $SD = .11$), $F(1, 27) = 44.14$, $p < .001$; there was no effect of context in the global context conditions. As with the child data, because there was no effect of context in the global context conditions, these conditions can be treated as control conditions. Participants in the fantastical local context condition rated fewer entities as real than did participants in the global context conditions,

$t(42) = -3.65$, $p < .001$. Additionally, participants in the scientific local context condition tended to rate more entities as real than did participants in the global context conditions, $t(41) = 1.95$, $p = .06$.

There were no significant effects of context on adults' judgments of the real items. There was, however, a main effect of context on adults' ratings of the fantastical items. Adults in the local context conditions classified the fantastical items more accurately (as less real) than did adults in the global context conditions, $F(1, 54) = 5.29$, $p < .05$. These items were all things we assumed adults would classify as pretend. Apparently, there was some degree of uncertainty among the adults about the reality status of these items, which our descriptions may have helped resolve.

Discussion

The results of this experiment offer additional support for the findings from Experiment 1 that preschool-age children use context to guide judgments about the reality status of novel entities. The primary outcome is that describing the entities with reference to known entities is the effective manipulation for both children and adults; reading participants stories or having them complete puzzles beforehand did not affect judgments of the novel entities. Possible reasons for the lack of a global context effect will be advanced in the General Discussion.

Some children in Experiments 1 and 2 gave us potential clues to their evolving thought processes. One 5-year-old, for the first novel entity he encountered, responded, "I don't know, I've never seen one. This is a hard one." Then, in response to the second novel entity, he said decisively, "Real, because scientists collect them" and to the third, "All scientists are real so I can tell." Another 5-year-old asserted that "If a scientist is real then a surnit must be real," and continued to assert this logic for the rest of the novel entities. These sorts of comments suggested to us that children were making inferences about the novel entities based on the information we gave them. To assess this, in the following experiment we solicited explanations more systematically and analyzed them more fully.

Experiment 3

The primary purpose of Experiment 3 was to explore the effects of two different types of descriptions on children's judgments, with the aim of better understanding how children use local contextual

Table 2

Experiment 2: Individual Participant Patterns

Condition	Number of children judging 0–5 novel entities as real		
	0 or 1 ^a	2 or 3	4 or 5 ^a
Fantastical global context	11	2	2
Scientific global context	12	2	2
Fantastical local context	11	3	1
Scientific local context	4	3	8

Note. ^aFrequencies with a binomial probability of $p < .05$.

information to make their decisions. From our informal analysis of children's explanations in Experiments 1 and 2, it appeared that children were making inferences about the novel entities based on the context we provided. It is also possible that the results are due to a simple localized priming or association effect. Children may have simply linked the words "scientist" and "surnit," for example, without really engaging in inferential reasoning. To attempt to determine which of these possibilities best characterized children's thought processes, we included two types of descriptions in this experiment. One type of trial involved statements that supported an inference and one involved statements that simply associated the novel and familiar entities in a nonmeaningful way. We expected that, although children might sometimes use the simple associations to make reality status decisions in the absence of other information, use of context would be greater when an inference was supported. In addition to making reality status judgments in these two situations, children provided explanations for their decisions. We also made a number of methodological changes aimed at improving the ecological validity and interpretability of the findings from the previous two studies, as detailed in the following section. Finally, to provide a broader picture of development, we tested children ranging in age from 3 to 6.

Method

Participants. Participants were forty-seven 3-year-olds (range 3 years 1 month–3 years 10 months, $M = 3$ years 6 months, 24 girls and 23 boys), forty-six 4-year-olds (range 4 years 1 month–4 years 11 months, $M = 4$ years 6 months, 25 girls and 21 boys), fifty-two 5-year-olds (range 5 years 1 month–5 years 11 months, $M = 5$ years 7 months, 24 girls and 28 boys), and forty-seven 6-year-olds (range 6 years 1 month–6 years 10 months, $M = 6$ years 7 months, 18 girls and 29 boys). All children were recruited from the University Children's Research Lab database. The sample was drawn from a large southwestern city. Most participants were Caucasian, but a range of ethnicities was represented, including Hispanic American and Asian American.

Materials. Materials consisted of a decorative paper bag containing a set of cards made of colored construction paper and laminated. On each card was written the name of an entity. There were 6 cards with novel entities: a wug, polef, surnit, trag, ranif, and herc. There were also 3 fantastical (ghost, magic carpet, dragon) and 3 real (cat, child, doctor) entity cards.

Procedure. The procedure was similar to that used in the local context conditions of Experiment 2, with one important modification. Because each child received some association and some inference trials, we could not use the same familiar entity across all trials, as we did in Experiments 1 and 2. Thus, each novel entity was associated with or described with reference to a different familiar entity. A set of 6 scientific, 6 everyday, and 6 fantastical entities was chosen based on reality status judgments in Experiments 1 and 2 and in published work (Sharon & Woolley, 2004). Each of these familiar entities was paired with one novel entity.

Children first received two warm-up trials: one (teacher) for which *real* was the correct answer and one (monster) for which *pretend* was correct. Corrective feedback was given on these trials but not on the subsequent test trials. All children received 12 test trials, three on which they were asked about real entities, three about fantastical entities, and 6 about novel entities. The entities were presented to children in 16 random orders. Children were randomly assigned to one of three conditions: fantastical, scientific, or everyday context. In the fantastical context condition, each novel entity was described with reference to one of 6 fantastical entities: ghost, monster, magic carpet, witch, dragon, and fairy dust. In the everyday context condition, each novel entity was described with reference to one of six everyday entities: child, teacher, car, cat, grandmother, or salt. In the scientific condition, each novel entity was described with reference to one of 6 scientific entities: doctor, dentist, helicopter, airplane pilot, snake, medicine. At the end of the session, children were asked to tell a puppet the reality status of any familiar entity for which a reality status judgment was not solicited during either the warm-up or the focal task. These included 3 of the everyday entities (grandmothers, salt, and cars), 5 of the scientific entities (dentists, medicine, helicopters, snakes, and pilots), and 2 of the fantastical entities (witches and fairy dust).

To investigate whether different types of statements differentially affected reality status judgments, two types of novel entity statements were used. Of the 6 novel entity trials, three were constructed so as to support a meaningful inference (*Inference* trials) and 3 were constructed to simply associate the novel word with a real word (*Association* trials). The Inference trials were similar to those used in Experiments 1 and 2. A herc, for example, would be defined as such: "Hercs are white. Hercs are used to make salt (everyday condition)/medicine (scientific condition)/fairy dust (fantastical condition)." The aim of the Association trials was to link

the novel word and the real word in discourse but with no meaningful inferential support. So, for example, a surnit would be discussed as such: "Surnits are round. Helicopter starts with h and surnit starts with s." All entities and descriptions are listed in Appendix C.

One additional change was made from Experiments 1 and 2 with the aim of increasing the ecological validity of the study. In both of these studies, children were told that their job was to figure out whether the entities were real or pretend. One might argue that, because in real life children are rarely told ahead of time that their job is to figure such things out, the results of these experiments have limited real-world relevance. Although we believe that the data from Experiment 1 and 2 have identified a cue that children indeed do use in their everyday lives, we changed Experiment 3 to try to make it more similar to children's everyday experiences. Instead of being told that their job was to determine whether the entities were real or pretend, they were simply told that they would be asked some questions about each entity. We reasoned that if children were only and repeatedly asked about the reality status of each entity, the purpose of the experiment would be transparent and would thus render if equivalent to simply telling children that their "job" was to judge reality status. Thus, for each entity, children were asked three questions. The first two questions concerned various properties of the entity (e.g., "Do you think surnits are soft or hard?"), and the third concerned reality status, "Do you think surnits are real or pretend?"

Finally, to explore more fully how children were using context in their judgments, we solicited an explanation for each novel entity trial. Because we included 12 trials, 6 with explanation requests, we did not solicit certainty judgments in this study.

Results

Reality status judgments. The focal question is whether context affected children's judgments about the reality status of the novel entities. Preliminary analyses determined that there were no main effects or interactions involving sex, so it was not included in the main analyses. There were also no item effects among the 6 novel entities, so they were combined for these analyses. Judgments that the entity was real were coded as 1, and pretend judgments were coded as 0. We first conducted a 3 (age) \times 3 (condition) ANOVA on the proportion of novel entities judged as real. This analysis revealed significant main effects of age, $F(3,377) = 3.37$, $p < .05$, and condition,

$F(2,377) = 24.14$, $p < .01$, as well as an age \times condition interaction, $F(6,377) = 3.58$, $p < .01$ (see Figure 3). Because of the interaction, we conducted separate one-way ANOVAs to assess the effects of condition in each age group. These analyses revealed that context did not significantly affect the reality status judgments of the 3-year-olds, with children in the fantastical context condition ($M = .43$, $SD = .40$) judging the novel entities as real equally as often as children in both the everyday ($M = .41$, $SD = .37$) and scientific ($M = .53$, $SD = .53$) context conditions. This replicates the finding from Experiment 1 that 3-year-olds did not use contextual cues to make reality status judgments.

Analyses of the 4-year-old data revealed a trend for 4-year-olds to use contextual cues in making reality status judgments, $F(2,91) = 2.43$, $p = .09$. Four-year-olds in the scientific context condition ($M = .69$, $SD = .34$) judged novel entities as real significantly more often than did 4-year-olds in the fantastical context condition ($M = .49$, $SD = .35$), $p < .05$; however, neither condition was significantly different from the everyday context condition. This pattern of findings replicates that from Experiment 1. A one-way ANOVA on the 5-year-old data revealed a significant main effect of context on children's judgments, $F(2,100) = 19.65$, $p < .01$. As in Experiment 1, 5-year-olds in both the scientific ($M = .66$, $SD = .40$) and everyday ($M = .62$, $SD = .31$) context conditions judged more novel entities as real than did 5-year-olds in the fantastical context condition ($M = .21$, $SD = .30$), both p 's $< .01$. A main effect of condition was also obtained for the 6-year-olds, $F(2,93) = 16.8$, $p < .01$, with children in both the scientific ($M = .74$, $SD = .30$) and everyday ($M = .72$, $SD = .36$) context conditions judging novel entities as

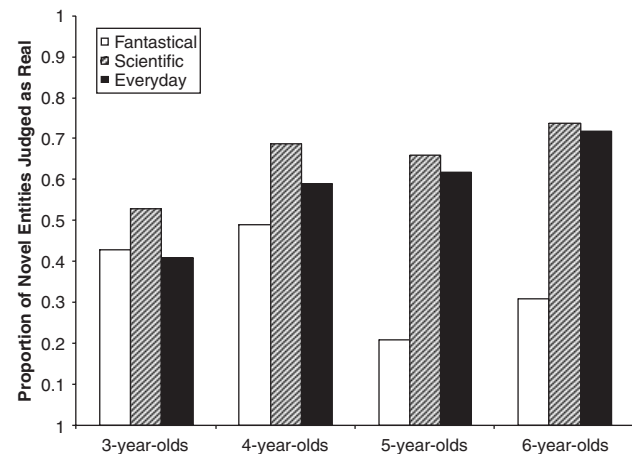


Figure 3. Experiment 3: Proportion novel entities judged as real.

real significantly more often than children in the fantastical context condition ($M = .31$, $SD = .34$).

We also analyzed children's responses on the familiar real and fantastical entities. A 4 (age) \times 3 (condition) ANOVA on children's reality status judgments averaged across the 3 real entities revealed a main effect for age, with 3-year-olds significantly less likely to claim that the real entities were real than children in each of the other age groups, $F(3,183) = 20.63$, $p < .01$. Item analyses revealed no significant differences in children's judgments about these entities. There were also no significant effects of condition on responses to questions about the real entities. Regarding the fantastical entities, a 4 (age) \times 3 (condition) ANOVA also revealed a significant main effect of age, $F(3,183) = 20.37$, $p < .01$. Three-year-olds ($M = .51$, $SD = .39$) and 4-year-olds ($M = .39$, $SD = .35$) were significantly more likely to claim that the fantastical entities were real than were 5- ($M = .17$, $SD = .30$) and 6-year-olds ($M = .06$, $SD = .12$), all p 's $< .01$. Item analyses indicated that children were more likely to judge a dragon ($M = .34$, $SD = .47$) as real than a ghost ($M = .21$, $SD = .41$). There were no effects of condition on children's judgments regarding the fantastical entities.

Because the youngest children were less likely to judge correctly the reality status of the familiar entities, the weaker effects of context in these age groups may be due to our not having manipulated context adequately, rather than indicating a lack of use of context by these children. In other words, if children thought that certain of the fantastical entities were real, then hearing about novel entities in that context could lead them to believe that the novel entities were real as well. Although the majority of children (88%) were correct on questions about familiar entities, we divided children into two groups: (1) children who met the criterion of correctly identifying the reality status of at least 4 of the 6 familiar entities of each type ("passers," $n = 164$) and (2) those who did not meet this criterion ("failers," $n = 22$). A 3 (condition) \times 2 (passers, failers) ANOVA on the number of novel entities judged as real revealed significant main effects of both condition, $F(2,1,105) = 4.38$, $p < .05$, and passing criterion, $F(1,1,105) = 5.02$, $p < .05$, along with a significant interaction between condition and passing criterion, $F(2,1,105) = 9.94$, $p < .01$. As shown in Figure 4, in the fantastical context condition, whereas passers ($M = .27$, $SD = .45$) were significantly less likely to judge novel entities as real compared with children in the other two conditions, failers ($M = .67$, $SD = .47$) were not. In other words, for the failers,

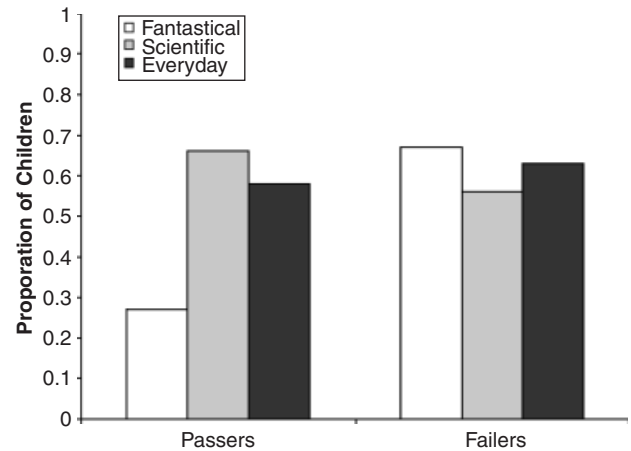


Figure 4. Experiment 3: Proportion novel entities judged as real by passing criterion.

because they misidentified the fantastical entities as real, their responses in the three conditions were statistically identical.

To probe this further, we then conducted a 4 (age) \times 3 (condition) ANOVA on only the passers' responses. This reduced the sample to thirty-two 3-year-olds, thirty-six 4-year-olds, forty-six 5-year-olds, and forty-seven 6-year-olds. This analysis revealed main effects of both age group, $F(3,967) = 9.37$, $p < .01$, and condition, $F(2,967) = 48.86$, $p < .01$. Unlike the original analyses that included both passers and failers, however, there was no significant interaction between age group and condition; the effects of context were present in each age group. These analyses suggest that the lack of a context effect in the youngest participants may have been due to the lack of effective context cues rather than an inability to utilize context to make reality status judgments. This will be discussed further in the General Discussion.

Effects of different types of statements. To explore whether different types of statements differentially facilitate the use of context, we compared children's averaged responses across the 3 association trials to their responses on the 3 inference trials using a paired t test. This analysis indicated that, on inference trials, children were slightly but significantly more likely to claim that the novel entities were real ($M = .56$, $SD = .39$) than on association trials ($M = .51$, $SD = .38$), $t(193) = 2.01$, $p < .05$.

Explanation data. To attempt to gain further insight into how children were using these different types of statements, we analyzed children's explanations for their answers. Children's explanations were coded as one of four major categories: Reality

status inference, Reference to focal relation, Reference to irrelevant property, and Experience. Details of the coding categories are given below.

Reality Status: Child makes an inference based on the reality status of the familiar entity in the definition (e.g., “because grandmothers are real”).

Focal relation: Child refers to the relation between the novel entity and the familiar entity in the definition (e.g., “because they make shots” or “people see them in their gardens”).

Irrelevant property: Child explains his/her answer with reference to either the uninformative property in the definition (e.g., “because they’re round”), with reference to their own previous judgment about a property in one of the questions (e.g., “because they’re big”), a property not mentioned in the experiment (e.g., “because they move”) or refers to the way the word sounds (e.g., “it sounds like a real thing”).

Experience: Child refers to his/her own experience or lack thereof (e.g., “I never saw them” or “I saw one at the zoo”).

Because 3-year-olds as a group offered very few codable explanations, we focused our analyses on the explanation data from the 4- to 6-year-old participants. An independent coder coded explanations from one third of the participants. Interrater reliability (calculated as the number of agreements/agreements+disagreements) was 97%. The main focus of the analysis was whether children differentially explained their judgments on inference trials versus association trials. Figure 5 shows the mean number of explanations (out of 3) that children produced for each of the coding categories on inference and association trials. Inspection of the figure indicates that children used different types of explanations for the

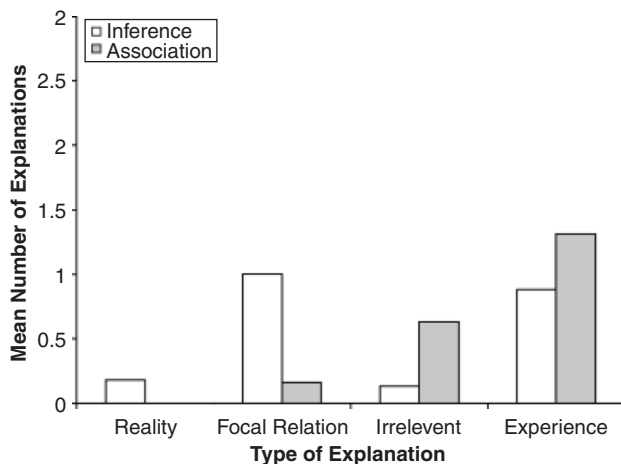


Figure 5. Experiment 3: Patterns of explanation on inference versus association trials.

two types of trials. Although children rarely referred explicitly to the reality status of the familiar entities (e.g., “because grandmas are real”), they did so only on inference trials. It also appears that children referred more to the relation between the familiar and the novel entity (e.g., “because people use them to make salt”) on inference than on association trials. In contrast, children appear to refer to irrelevant properties (e.g., “because they’re soft” or “because it sounds like a real thing”) more on the association trials than on the inference trials. Finally, children appear to refer equally to experience to justify their decisions on both types of trials (e.g., “because I never saw one”).

To analyze these patterns statistically, we conducted separate 3 (age) \times 2 (trial type: inference vs. association) ANOVAs on each type of explanation. The first analysis, on the reality status explanations, revealed main effects of both trial type, $F(1, 288) = 13.16, p < .01$, and age, $F(2, 288) = 12.45, p < .01$, as well as an interaction between trial type and age, $F(2, 288) = 4.13, p < .05$. Separate ANOVAs for each age group revealed that although 4-year-olds did not differentially use reality status explanations on the two types of trials, 5-year-olds, $F(1, 102) = 4.43, p < .05$, and 6-year-olds, $F(1, 94) = 8.25, p < .01$, did. Both 5- and 6-year-olds used reality status explanations more on inference trials ($M = .19$ out of 3, $SD = .66$ for 5-year-olds and $M = .60, SD = 1.03$ for 6-year-olds) than on association trials ($M = .00, SD = .00$ for 5-year-olds and $M = .15, SD = .41$ for 6-year-olds).

Analysis of children’s use of explanations that focused on the relation between the familiar and the novel entity (Focal relation explanations) revealed main effects for both trial type, $F(1, 288) = 47.20, p < .01$ and age, $F(2, 288) = 3.9, p < .05$. The age effect appears to be due to increasing use of Focal relation explanations with age on the inference trials, although the interaction effect was only a trend at $p < .09$. Overall, children of all ages used significantly more Focal relation explanations on inference trials ($M = .69, SD = 1.02$) than on association trials ($M = .10, SD = .30$).

Regarding children’s reference to irrelevant properties, which included uninformative properties in the definition or the question, or reference to how the word sounded, ANOVA indicated main effects of both trial type, $F(1, 288) = 24.26, p < .01$ and age, $F(2, 288) = 5.93, p < .01$. The interaction between trial type and age was also significant, $F(2, 288) = 5.92, p < .01$. Separate ANOVAs for each age group indicated that although 4-year-olds did not differentially refer to irrelevant properties across the two trial types, both 5-year-olds, $F(1, 102) = 6.34, p < .05$, and

6-year-olds, $F(1, 94) = 18.91, p < .01$, did. Both 5- and 6-year-olds more often referenced irrelevant properties in explaining their judgments on association trials ($M = .58, SD = .90$) than on inference trials ($M = .10, SD = .39$). Finally, an ANOVA on children's use of their own experience to justify their decisions (e.g., "I never saw one") indicated that children used this sort of explanation equally across both trial types.

General Discussion

The results of these studies are consistent with other studies showing that children have the capacity to evaluate new information critically, and also identify an important cue that children use to make reality status decisions. Specifically, our results show that, like adults, young children consider contextual information in making a decision about a novel entity's reality status. Although children are often credulous, and maintain beliefs in fantastical entities introduced to them by adults (see, e.g., Woolley et al., 2004), when contextual cues are available to guide their decisions, they are able to use these cues to reject or affirm an entity's reality status. Without this ability, it is likely that children would make numerous incorrect reality status assignments for many of the novel entities they encounter, in books, on television, in movies, and from other sources. The ability to use context may be partially responsible for the fact that children do not make numerous errors of this sort. With this ability, children can critically consume such information, increasing the potential for learning and discovery.

In Experiment 1, we manipulated context in two ways simultaneously. We used a local context manipulation in which novel entities were described with reference to familiar entities, and a global context manipulation, in which children were read a story before encountering the novel entities. The results of this study indicated that the context in which a novel entity is encountered affects children's judgments of its reality status, with children judging novel entities as real more often when they were encountered in realistic versus fantastical contexts. The results of this study also indicated that the ability to use context cues to make reality status decisions develops significantly between the ages of 3 and 5.

In Experiment 2 we addressed whether the local or the global context manipulation was driving the effects we obtained in Experiment 1. The results of this study were that the local context manipulation, describing the entities with reference to familiar entities, significantly affected judgments about the reality status of the novel entities. The global context

manipulation did not affect participants' judgments. Although the basis of the failure of this manipulation awaits further research, a few potential explanations will be offered. One is that perhaps our storybooks represented extreme instances of fantasy and reality. The literature on priming indicates that ambiguous stimuli are judged as members of the primed category only when "moderate categories" are primed (Herr, 1986, p. 67). It is also possible that our manipulation simply did not make the categories available enough (Johnson & Harris, 1994). If this were the case, then a more powerful global context manipulation might be more effective. For example, children could be tested by someone dressed as a doctor or a magician (e.g., as in Chandler and Lalonde, 1994), and/or the testing room could be "decorated" to reflect these different contexts.

It is also possible that the manipulation was too distanced from the test questions. Thus, a manipulation that occurred closer to the test question might have more of an effect on children's judgments. For example, children could be introduced to the novel entities in the course of reading a storybook; a surint could be encountered at the end of a scientific book versus a fantastical one. This is not to imply that the lack of such an effect is necessarily viewed as a shortcoming in children. In fact, the ability to transition from one learning situation to another, without carrying over affect or response sets from the previous situation, may actually facilitate children's learning in school, where story reading and science lessons are often offered in close proximity. It would also be important, in future studies, to include a control condition, in which children encounter the novel entities in the absence of any context. Although our studies clearly demonstrate the effects of context on children's responses, including a control condition would allow us to provide more precise information on the magnitude and direction of these effects.

Finally, the results of Experiment 3 replicated those of the first two studies, and extended those findings in a number of ways. First, analysis of the responses of children who correctly identified the reality status of the majority of the familiar entities indicated that even some 3-year-olds have the ability to use context to make reality status judgments. Owing to limitations in their ability to categorize correctly various entities as to their reality status, 3-year-olds may not have the same opportunities to benefit from contextual cues as do older children and adults. However, if the context involves an entity whose reality status is known to the child, even a very young child may be capable of taking advantage of it. Experiment 3 also indicated that, to some

extent, when the novel entity is presented in a meaningful relation with a familiar entity, children are more likely to use the contextual cues to make reality status decisions. However, although this pattern was significant, it was not as strong as we had expected. Many children still used contextual cues even when the novel entity was simply associated in a nonmeaningful way with a familiar entity. Yet their explanations for their judgments revealed that, when they did this, they justified their judgments in different ways from when they made inferences, often referring to irrelevant properties. The pattern of explanations suggests that they may have just been guessing on these trials. One way to explore this possibility would be to give children a "can't tell" option. It may be that many children felt forced to make a decision and used the information in the association trials because it was better than nothing. Another option would be to reintroduce the certainty judgments. It may be the case that when children used the information in the associative statements, they were less certain of their decisions.

This brings up the more general question of how best to capture children's knowledge and beliefs about reality status. In asking children to state whether each entity was "real" or "pretend," we obtained important information about the effects of context on children's beliefs. However, there may be times, including those in our research, in which children are uncertain for a period of time about the reality status of a novel entity or process. Perhaps they might feel that they need more information before coming to a conclusion or before they can be certain. Providing the option to respond with "can't tell" or "don't know" could provide valuable information about the status of children's beliefs in these situations. Future research could use methods similar to those used by Fay and Klahr (1995), in which one of children's response options is that they are in a situation in which they simply do not have enough information to make a decision. Then children could be given opportunities to acquire different sorts of information, and the paths they choose could be monitored.

In conclusion, these studies provide new insight into the development of children's ability to make the fantasy-reality distinction. Because children have traditionally been presumed to be universally credulous about what they hear, few researchers have attempted to discern what factors might affect how they make decisions about the reality status of novel entities encountered via testimony. It is clear from the present studies that young children use the context surrounding the presentation of novel information to make inferences about the real versus

fantastical nature of the entities they encounter, and that this ability develops during the preschool years.

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Appendix A. Wording Used in Tasks in Experiment 1

Judgment Task

Experimenter: "Here's the game. I have a bag of cards. On each card is the name of a certain thing. Some of the things are real and some of them are pretend. Some of them are things you already know about but some are things you've probably never heard of before. Your job is to figure out if the things are real or if they are pretend and then tell me. Okay?"

Certainty Task

Experimenter: "See these pictures? We can use these to say how sure we are about something. If I really know something then I say I'm really sure (researcher pointed to

the picture of the child who looked certain). But sometimes I think I know something but I'm just a little sure about that (researcher pointed to the picture of the child who looked like he was thinking). And sometimes I really just don't know. Then I say I'm not so sure (researcher pointed to the picture of the child who looked quizzical)."

Appendix B. Entities Judged in Experiment 1 and Associated Descriptions

Real Entities

Scientist. Scientists are people who like to find out how the world works.

Child. A child is a boy or girl just like you.

Cat. Cats are animals that say "meow" and purr when you pet them.

Fantastical Entities

Dragon. Dragons breathe fire and have wings.

Ghost. Ghosts fly around and say "BOOO!"

Barney. Barney is a purple dinosaur that likes to play with children.

Novel Entities

Surnit, Trag, Kimp (sample descriptions for surnit below.)

Scientific context condition. Scientists like to try to catch them. Surnits are usually medium sized. Scientists collect surnits.

Fantastical context condition. Dragons like to try to catch them. Surnits are usually medium sized. Dragons collect surnits.

Everyday context condition. Children like to try to catch them. Surnits are usually medium sized. Children collect surnits.

Appendix C.

Table C1
Entities and Descriptions Used in Experiment 3

Novel entity	Familiar entity			Description
	Scientific	Everyday	Fantastical	
Wug	Doctor	Child	Ghost	"This game is about (familiar entity) and wugs and all kinds of things."
Polef	Dentist	Teacher	Monster	"Oh look, a (familiar entity) card got stuck to the polef card."
Surnit	Helicopter	Car	Magic carpet	"Surnit starts with 's' and (familiar entity) starts with (first letter of word)."
Trag	Pilot	Cat	Witch	"(Familiar entities) try to catch trags."
Ranif	Snake	Grandma	Dragon	"(Familiar entities) find ranifs in their (nests, gardens, caves)."
Herc	Medicine	Salt	Fairy dust	"HerCs are used to make (familiar entity)."