

Preschoolers Are Sensitive to the Speaker's Knowledge When Learning Proper Names

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Unobservable properties that are specific to individuals, such as their proper names, can only be known by people who are familiar with those individuals. Do young children utilize this "familiarity principle" when learning language? Experiment 1 tested whether forty-eight 2- to 4-year-old children were able to determine the referent of a proper name such as "Jessie" based on the knowledge that the speaker was familiar with one individual but unfamiliar with the other. Even 2-year-olds successfully identified *Jessie* as the individual with whom the speaker was familiar. Experiment 2 examined whether children appreciate this principle at a general level, as do adults, or whether this knowledge may be specific to certain word-learning situations. To test this, forty-eight 3- to 5-year-old children were given the converse of the task in Experiment 1—they were asked to determine the individual with whom the speaker was familiar based on the speaker's knowledge of an individual's proper name. Only 5-year-olds reliably succeeded at this task, suggesting that a general understanding of the familiarity principle is a relatively late developmental accomplishment.

INTRODUCTION

A 3-year-old is at a birthday party and hears someone say, "There's Jessie!" Imagine that he or she has never met Jessie before. How does the 3-year-old determine to whom *Jessie* refers? Even if the word *Jessie* is an unfamiliar one, the 3-year-old can infer from the linguistic context that it is likely to be a proper name. If it were a common noun such as *dog*, one would say, "There's a Jessie!"; if the word were an adjective such as *spotted*, one would say, "There's the Jessie one!" Even 2-year-olds are sensitive to such syntactic cues to word form when learning new words (e.g., Gelman & Taylor, 1984; Gordon, 1988; Katz, Baker, & Macnamara, 1974; for a review, see Bloom, 2000).

Once the child has established that *Jessie* is a proper name, he or she knows that *Jessie* applies to a specific individual (e.g., Hall, 1996; Sorrentino, 1999). But which individual? There are several cues that children can use to determine the referent of *Jessie*. Information provided by the behavior of the speaker, including direction of gaze, is one potential indicator. On hearing someone utter a new word, 18-month-old children will check to see where the speaker is looking to determine what the word refers to (Baldwin, 1991). If the speaker is looking into the kitchen, then the child might reasonably infer that this is the location of the individual named *Jessie*.

A further cue to a word's referent is provided by lexical contrast, which is a bias to believe that two different words should not have the same meaning (Clark, 1993). With regard to proper names, lexical contrast is informative because it biases the child to believe that a person should have one, and only one, proper name (Hall & Graham, 1999). In the above

birthday party scenario, this bias assists the child in determining the referent of *Jessie* by eliminating any person whose proper name is already known by the child.

There are also cues that are specific to proper name learning; these do not apply to the learning of other parts of speech. One such cue is the kinds of entities that proper names tend to refer to. Common nouns such as *dog* or *chair* are used to refer to all kinds of things, both animate and inanimate. The entities that proper names refer to are considerably more limited. It is unusual (although not impossible) for a brick or a shoe to get a proper name. Proper names are much more likely to refer to animate objects such as people and pets, or animate surrogates such as dolls. Even 2-year-olds appreciate this rule, and are more likely to interpret a novel word as a proper name if it is applied to a doll than if it is applied to a block (Gelman & Taylor, 1984; Hall, 1994; Katz et al., 1974).

The likely reference of proper names can be made narrower still, because not all animate objects are equally worthy of receiving a proper name in the eyes of children. Young children are more likely to attribute a proper name to a dog than to a bee (Hall, 1994). Interestingly, their reluctance to accept a proper name for a bee decreases if it is presented as being owned by someone (e.g., "This is my bee"), whereas their reluctance to accept a proper name for an inanimate object (e.g., "This is my shoe") is unaffected by ownership (Hall, 1994). Returning to the birthday party scenario, such constraints will guide the child to assume that the word *Jessie* is more likely to refer to a person or a dog than to a chair or a fly.

The research reported in this article focused on another principle that might facilitate word learning—one that has been neglected by researchers, but perhaps not by children. We have dubbed this “the familiarity principle,” which states that unobservable properties that are specific to an individual can only be known by people who are familiar with that individual. For instance, knowledge that a given person was born on a Tuesday, likes dogs, or is a widow, is obtained only through some prior acquaintance with that person. In contrast, it is not necessary to have previous experience with that person to know that he or she is short (because this is an observable property) or has red blood (because this is a property that is not specific to that person).

In the domain of language, this principle applies to proper names, which are specific to individuals, but not to common nouns, which refer to kinds or categories. For example, on seeing an animal that has four legs, a tail, and barks, one could determine that it is a dog, even if one has never seen that animal before. It would be impossible, however, to determine the dog’s proper name unless one was familiar with that particular dog. To paraphrase Ziff (1960), if there are two animals in a cage and one is a tiger, and the other animal is virtually indistinguishable from it, then the second animal is also a tiger. If, however, there are two animals in a cage and one is *Witchgren* and the other is virtually indistinguishable from it, it does not follow that the second animal is also *Witchgren*. That is the difference between “a rose” and “Rose.”

The familiarity principle involves certain assumptions about children’s ‘theory of mind’—their understanding of the thoughts of others. To apply this principle, children must have some appreciation of the knowledge or ignorance of a speaker. There is some evidence, independent of language learning, that young children do possess this appreciation. In a study by O’Neill (1996), 2-year-olds watched a toy being placed on a high shelf. The children’s parents were either present or absent during the placement of the toy. Later, when the children needed help in retrieving the toy, the children whose parents were absent during the placement of the toy were more likely to name it and gesture to its location, indicating an understanding that their parents did not know where the toy was.

The notion that theory of mind plays a role in word learning is consistent with several lines of research (for a review, see Bloom, 2000). As previously mentioned, 18-month-old children will use direction of gaze as a cue to the reference of a new object name (Baldwin, 1991). This is the case even if the children are attending to a different object when the word is

spoken. They do not assume that the word applies to the object to which they are attending. Instead, they use the speaker’s direction of gaze as a cue to what that person intended to refer to.

Tomasello and Barton (1994) explored a different role of theory of mind in word learning. In this study, 24-month-olds were presented with an array of five buckets each containing a novel object. The children heard the experimenter say, “Let’s find the *toma*. Where’s the *toma*?” Then the experimenter withdrew an object, scowled, and placed it back in the bucket. This was repeated for a second object. On retrieval of a third object, the experimenter held it up and exclaimed excitedly, “Ah!” and then handed it to a child. Then the experimenter removed the remaining objects from the buckets, saying each time, “Let’s see what’s in here?” When children were then asked to find the *toma* among the five objects, they selected the object that the experimenter seemed pleased with, despite the fact that it was not the last object that they saw, and not the first. To succeed at such a task the children could not simply rely on the speaker’s direction of gaze. Instead, it required sensitivity to the speaker’s goal and when it was achieved.

The current research explored another potential role of theory of mind in word learning by examining children’s understanding of the familiarity principle, specifically with regard to proper names. Experiment 1 explored whether children appreciate that one must be familiar with an individual to know the individual’s proper name. Experiment 2 explored the nature of children’s appreciation for this principle. Does their appreciation exist as a broad principle of knowledge, or does it stem from a more tacit or restricted understanding, perhaps one that is specific to word learning? In both experiments, children were also tested with common nouns; the prediction was that the familiarity principle would not apply to these words.

EXPERIMENT 1

Method

Participants. Twenty-four undergraduates (9 male, 15 female) from the University of Arizona in Tucson participated in the experiment. Adult participants were predominantly White and from middle- to upper middle-class backgrounds. They were recruited through sign-up sheets that were posted at the university, and were tested in a quiet university laboratory. For their participation, adults received experimental credits toward their undergraduate psychology courses. All adults provided written consent prior to participation.

Forty-eight preschool children (sixteen 2-year-olds,

sixteen 3-year-olds, and sixteen 4-year-olds) participated. Child participants were predominantly White, and from middle- to upper middle-class backgrounds. The mean age of the 2-year-olds was 31 months ($range = 26\text{--}36$ months; 9 males, 7 females), the mean age of the 3-year-olds was 44 months ($range = 37\text{--}48$ months; 4 males, 12 females), and the mean age of the 4-year-olds was 55 months ($range = 49\text{--}64$ months; 4 males, 12 females).

Child participants were recruited by providing procedural information and consent forms to parents at local day-cares. All of the 3- and 4-year-old children, and ten of the 2-year-old children, were recruited from day-cares in Tucson, AZ. The remaining 2-year-olds were recruited from day-cares in New Haven, CT. All children participated in a quiet area of their day-care. The parents of all children who participated provided written consent and the children themselves agreed to participate. The children received stickers for their participation.

Materials. Twelve stuffed animals (six pairs) served as stimuli. The pairs were divided into two plastic bags (one white and one blue) with one member of the animal pair in each bag. The animal pairs were similar on all physical dimensions except color. Animal Set #1 was contained in the blue bag and consisted of a yellow dog, a purple cat, a black-and-white whale, a red-and-yellow frog, a white horse, and a brown bear. Animal Set #2 contained a purple dog, a yellow cat, a gray whale, a blue-and-black frog, a brown horse, and a black-and-white bear. Half of the participants in each condition received Animal Set #1 as the familiar animals and half received Animal Set #2 as the familiar animals. Two shoeboxes and a blue-and-white cloth were used to cover the animals during the hide-and-go-seek procedure described below.

Procedure. Participants were randomly assigned to either the proper name condition or the common noun condition and tested individually. Prior to the children's entrance into the testing area, a bag of animals (the unfamiliar bag) was placed among other items in the room. The children were then brought into the room and shown the other bag of toys (the familiar bag). The experimenter said to the children, "See this bag of toys? This is a bag of stuffed animals that I brought from home. I brought a cat, and a dog, and a whole bunch of animals. I've played with all of these animals before. I thought you might like to play a game with these animals. Does that sound like fun? Maybe we can play with some other animals too. Do you see any other animals?" Their attention was then drawn to the previously hidden bag and together, the experimenter and children "discovered" its contents.

During the entire episode, the experimenter acted ignorant with regard to the contents of the previously hidden bag. When an animal was withdrawn from the bag, the experimenter questioned the children by saying "What's that?" upon which the children typically announced the common noun for the animal. Whether or not the children provided the common noun, the experimenter would then say, "Wow, it's a dog! I've never, ever seen that dog before. I have a dog that I brought from home." The experimenter then retrieved the second member of the animal pair from the familiar bag and exclaimed, "See? This is the dog I brought from home. I've played with this dog before."

After a brief period during which children were allowed to play with both animals, the experimenter said, "Let's play a hide-and-go-seek game with both the dogs." Both animals were placed in front of the child and the experimenter reiterated her familiarity with one animal and ignorance of the other: "This is the one I've played with before [pointing to the familiar animal]. I've never, ever seen or played with this one before" [pointing to the unfamiliar animal]. The animals were then covered with a cloth. Following this, the experimenter said to the children in the proper name condition, "Oh, where's Jessie? Where did Jessie go? Can you find Jessie?" The cloth was moved up and down so that the children could see the animals and were able to choose one. Once the children had selected an animal, regardless of their selection, they were told "very good." To avoid giving the children any cues from gaze direction, the experimenter was careful to look at the children, rather than the animals, while asking the question and waiting for the response.

The only difference between the proper name condition and the common noun condition was that the latter group heard, "Oh, Where's the dog? Where did the dog go? Can you find the dog?" instead of hearing a proper name. The common noun condition served to control for the possibility that the familiar animal might be selected more often, simply because it was perceived as more salient or as a better candidate for discussion because it was owned by the experimenter.

The procedure was repeated six times (once for each animal kind). The order of the trials was random because it depended on the order in which the children retrieved the animals from the unfamiliar bag. In the proper name condition, six different proper names were used in a constant order: Jessie, Kip, Bailey, Cody, Nikki, and Jamie.

Adults were tested using a similar procedure. The experimenter told the adults that a friend had given her the "unfamiliar bag" and that she had not yet seen the animals it contained. One member of an animal

pair was retrieved from each bag. The order of the retrieval of the animals (familiar first versus unfamiliar first) was counterbalanced. When the two animals were placed in front of the adults, the experimenter reiterated, "I brought this one from home. This one I've seen and played with before. My friend gave this one to me [referring to the other animal]. I've never, ever seen this one before." The experimenter then closed her eyes and told the adults to hide *Jessie* or the dog under one of two boxes and she would guess which box. On occasion the adult participants questioned, "Which one?" in response to the experimenter's request to hide the dog. (None of the children ever responded in this way.) On these occasions the experimenter simply said, "Do whatever you think."

The procedure for the preschoolers differed slightly from that used with adults to allow the preschoolers to simply point to one of the animals rather than hide it under a box. The presentation of the unfamiliar animals was also different for the preschoolers because it was believed that having the contents of the unfamiliar bag "discovered" would be more salient.

Results

The number of times the participants selected the familiar animal served as the dependent measure. These numbers were then converted to percentages (number of times out of six trials). A 2 (condition) \times 2 (gender) ANOVA analyzing the adult's responses yielded a significant main effect of condition, $F(1, 20) = 7.82, p < .05$. As predicted, adults selected the familiar individual in the proper name condition ($M = 81\%$, $SD = 25\%$) significantly more often than in the common noun condition ($M = 51\%$, $SD = 19\%$). Because the children's procedure was a slight modification of that used with adults, a separate ANOVA was used to analyze the children's responses. A 3 (age) \times 2 (condition) \times 2 (gender) ANOVA revealed a significant main effect of condition, $F(1, 36) = 25.41, p < .05$. As predicted, child participants selected the familiar animal in the proper name condition ($M = 84\%$, $SD = 9\%$) significantly more often than in the common noun condition ($M = 30\%$, $SD = 6\%$). No other main effects or interactions were significant. One-way ANOVAs were computed for each age group comparing familiar responses in the two conditions. See Figure 1 for participants' responses by age and condition.

A one-sample t test comparing adults' familiar responses in the proper name condition with chance ($M = 50\%$) was significant, $t(11) = 4.33, p < .05$, but their familiar responses in the common noun condition did not differ from chance, $t(11) = .25, p = .809, ns$.

Four-year-olds gave significantly more familiar responses in the proper name condition than in the common noun condition ($M = 94\%$, $SD = 12\%$ versus $M = 42\%$, $SD = 45\%$), $F(1, 14) = 9.79, p < .05$. A one-sample t test comparing 4-year-olds' familiar responses in the proper name condition with chance was also significant, $t(7) = 9.98, p < .05$.

An unexpected finding was that some of the children selected both individuals in the common noun condition. Consequently, participants that selected both individuals on any given trial were excluded from the one-sample t tests comparing familiar responses in the common noun condition with chance. A one-sample t test comparing the remaining 4-year-olds' likelihood of selecting the familiar individual in the common noun condition ($M = 48\%$, $SD = 46\%$), with chance was not significant, $t(6) = -.14, p = .895$.

Three-year-olds gave significantly more familiar responses in the proper name condition than in the common noun condition, ($M = 75\%$, $SD = 30\%$ versus $M = 27\%$, $SD = 34\%$), $F(1, 14) = 8.92, p < .05$. A one-sample t test comparing 3-year-olds' familiar responses in the proper name condition with chance was significant, $t(7) = 2.39, p < .05$. Three-year-olds' familiar responses in the common noun condition were at chance ($M = 50\%$, $SD = 44\%$), $t(2) = .00, p = 1.00, ns$.

Finally, 2-year-olds gave significantly more familiar responses in the proper name condition than in the common noun condition ($M = 69\%$, $SD = 23\%$ versus $M = 21\%$, $SD = 21\%$), $F(1, 14) = 18.99, p < .05$. A one-sample t test comparing 2-year-olds' familiar responses in the proper name condition with chance was significant, $t(7) = 2.35, p = .05$. In contrast, 2-year-olds' familiar responses in the common noun condition were at chance ($M = 50\%$, $SD = 0\%$). A one-sample t test could not be computed because the SD was 0.

To determine whether there were any differences in the 2-year-olds' responses due to the geographic location from which they were sampled, 2 one-way ANOVAs were performed with location (Tucson, AZ versus New Haven, CT) as a between-subjects factor. No significant differences were found for either familiar responses, $F(1, 14) = 1.05, p = .323$, or both responses, $F(1, 14) = .10, p = .757$.

Discussion

These findings reveal that preschool children, like adults, appreciate that a proper name is more likely to refer to an individual with whom a speaker (in this case, the experimenter) is familiar than an individual

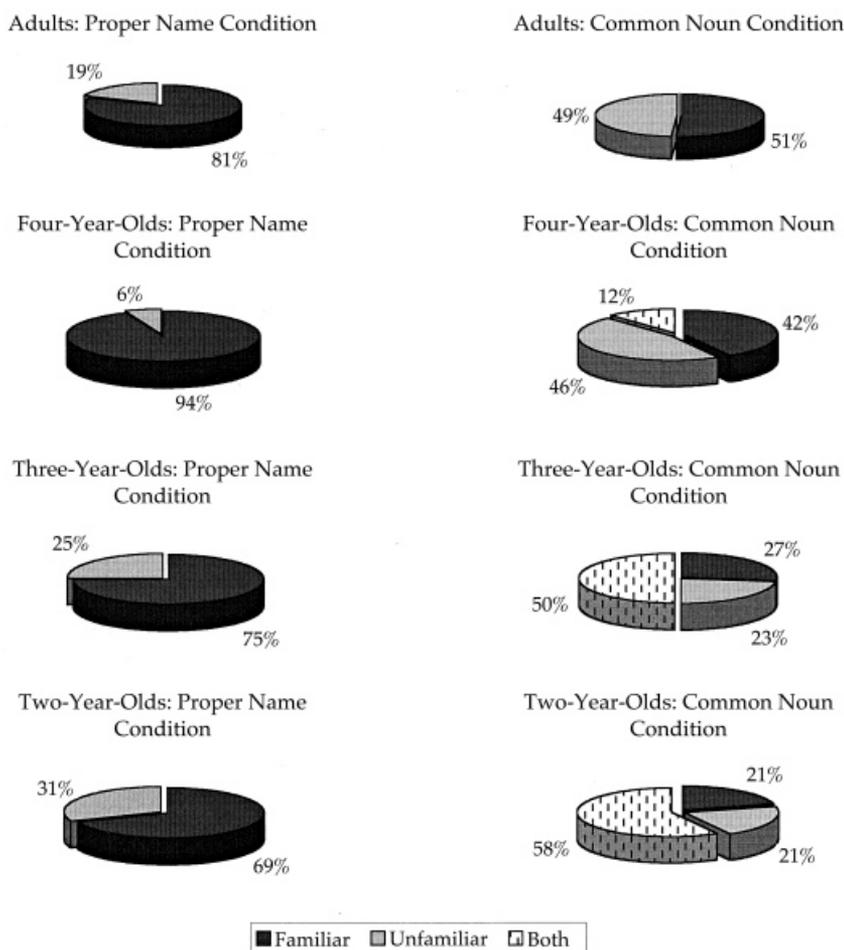


Figure 1 Experiment 1: Mean Percentage Responses \times Age and Condition.

that a speaker has never seen before. Even 2-year-olds were more likely to select an animal that the experimenter was familiar with when the experimenter used a proper name (e.g., "Where did *Jessie* go?") as opposed to a common noun (e.g., "Where did the *dog* go?"). These findings suggest that young children appreciate that knowing an individual's proper name requires a person being familiar with that individual, but do not assume the same to be true of a person's knowledge of common nouns. From this, one can conclude that when young children are learning new words they are sensitive to the familiarity principle, at least as it applies to proper names.

One unexpected finding was that the younger children sometimes opted to choose both animals. This behavior was only exhibited in the common noun condition. There is logic to responding in this way. Because there was no recognizable correct response, choosing both animals ensured that the response at least included the correct answer. On the other hand,

this response was discordant with the precise wording of the question, which asked for only a single animal (e.g., "Can you find the dog?"). This finding is consistent with findings of an earlier study by Brown (1973), who reported that long after children were correctly using the plural morpheme in their spontaneous speech, they were insensitive to its presence when given instructions, and did not behave any differently when asked, "Give me the pencil" versus "Give me the pencils." Note also that children frequently selected both animals in the common noun condition, but never did so in the proper name condition. This supports extant research demonstrating that young children appreciate that proper names denote particular individuals whereas common nouns can apply to several individuals (e.g., Katz et al., 1974).

Experiment 1 was designed to examine a novel role of theory of mind in word learning—whether preschool children can take into consideration the fa-

miliarity status of the speaker to assist them in learning proper names. It is apparent from Experiment 1 that children as young as 2 can appreciate that the speaker is more likely to know the proper name of an individual with whom he or she is familiar than an individual with whom he or she is not familiar. That is, very young children are sensitive to the familiarity principle as it applies to proper names and can utilize this principle to assist them in their word learning. What, however, is the nature of their understanding of this principle? Experiment 2 was designed to explore the scope of children's understanding of this principle. Do young children have a general understanding of this principle, or is it more limited—possibly restricted to an implicit understanding that is elicited to facilitate word learning?

Adults explicitly understand the familiarity principle. If someone were to state that a person has to be familiar with another individual to know his or her name, adults would likely agree. In this regard, the familiarity principle is different from abstract principles of grammar and phonology, which are usually not explicitly understood. This explicit understanding allows the application of the familiarity principle to be less limited than learning new words. It applies more generally: for instance, this principle can be used not only to infer which individual is *Jessie* (i.e., the one with whom the speaker is familiar), but also to infer the individual with whom the speaker is familiar (i.e., the one that he or she called *Jessie*).

To investigate whether preschooler's knowledge of the familiarity principle also applies more generally, Experiment 2 implemented the converse of the task utilized in Experiment 1. In Experiment 1, the referent of the proper name was made ambiguous and children were asked to infer the appropriate referent. In contrast, in Experiment 2 the referent of the proper name was made unambiguous. The task in this experiment was not to determine the referent of a word, but rather to assess the familiarity status of the speaker based on the speaker's knowledge of an individual's proper name.

In Experiment 1, the speaker pretended to be familiar with one set of animals (i.e., by bringing them with her) and unfamiliar with the other set (i.e., by discovering them), and children were tested on how they extended a proper name and common noun. In Experiment 2, the design was flipped: children heard the speaker use a proper name or common noun to refer to a specific individual and were tested on their judgments of which individual the speaker was familiar with. To ensure that both sets of animals were equally plausible candidates with regard to being familiar to the speaker, they needed to be introduced in

the same manner. Furthermore, to make it plausible that some of the animals were familiar to the speaker whereas others were not, the experimenter could not both introduce the animals to the child and serve as the speaker. Consequently, a puppet was introduced to the experimental design to serve as the speaker.

EXPERIMENT 2

Method

Participants. Twenty-four undergraduates (12 male, 12 female) from Yale University in New Haven, CT participated in the experiment. None of these participants had participated in Experiment 1. Adult participants were predominantly White, and from middle- to upper middle-class backgrounds. They were recruited through sign-up sheets that were posted at the University, and were tested in a university laboratory. For their participation, adults received experimental credits toward their undergraduate psychology courses. All adults provided written consent prior to their participation.

Forty-eight preschool children (sixteen 3-year-olds, sixteen 4-year-olds, and sixteen 5-year-olds) participated. None of these participants had participated in Experiment 1. Child participants were predominantly White, and from middle- to upper middle-class backgrounds. Forty-six of the children were tested in a quiet area of their day-care center. The remaining 2 children were tested in a university laboratory. The children who were tested at the university were the younger siblings of children who were participating in other psychology experiments taking place at the university.

The mean age of the 3-year-olds was 44 months (*range* = 39–51 months; 11 males, 5 females), the mean age of the 4-year-olds was 53 months (*range* = 49–59 months; 10 males, 6 females), and the mean age of the 5-year-olds was 64 months (*range* = 59–73 months; 11 males, 5 females). Child participants were recruited by providing procedural information and consent forms to parents at local day-cares. The parents of all children who participated provided written consent and the children themselves agreed to participate. The children received stickers for their participation.

Materials. The same 12 stuffed animals as in Experiment 1 were used in this experiment. The animals consisted of the two animal sets used in Experiment 1, but were placed in a single blue plastic bag. A gray cloth puppet of "Percy," the bulldog from the animated Walt Disney movie *Pocahontas*, served as the speaker.

Procedure. Participants were randomly assigned to either the proper name condition or the common noun condition and tested individually. Participants

were seated across from the experimenter and told, "I brought a bag of stuffed animals with me. I have cats and dogs and a whole bunch of animals." The experimenter then said to the participants, "Do you know what else I brought with me? I brought my puppet friend Percy. Let me introduce you to Percy." The experimenter then retrieved Percy from her bag and placed her hand inside the puppet.

While animating the puppet, the experimenter donned a deeper voice and said, "Hi! My name is Percy! What's your name?" When the participants answered, Percy would say, "Hi [participant's name]! I'm Percy. Nice to meet you!" The experimenter then removed her hand from the puppet and, returning to her normal voice, said, "So this is Percy [pointing to the puppet]. Let me tell you something about Percy. Percy's played with some of these animals before [pointing to the bag of animals] but some of them he has never, ever seen before. Let's bring out some of the animals." At this point, an animal pair was removed from the bag (e.g., two dogs) and placed side by side in front of the participants.

To ensure consistency, the animal of each pair that was from Animal Set #1 was always placed on the experimenter's right. Every time an animal pair was placed in front of the participants, the experimenter reiterated, "Percy's played with one of these *dogs* before, but he's never ever seen or played with the other one. Let's bring out Percy and show him the *dogs*." Percy was then brought out by saying, "Here comes Percy!"

Participants in the proper name condition heard Percy exclaim, "Hey, there's *Jessie*!" and pick up the animal on the experimenter's right. Then, Percy said, "Hey, there's one!" and picked up the animal on the experimenter's left. Participants in the common noun condition heard Percy exclaim, "Hey, there's a *dog*!" and pick up the animal on the experimenter's right. Then Percy said, "Hey, there's *one*!" and picked up the animal on the experimenter's left. Percy always referred to the animal on the experimenter's right first. The order was counterbalanced, however, such that half the time the animal to the experimenter's right was referred to with a proper name or common noun, whereas the remainder of the time it was referred to as *one*.

Participants in both conditions were then asked by the experimenter, "Which one has Percy played with before? Can you point to the one you think Percy's played with before?" If participants were reluctant to point to one, they were told to guess which one Percy had played with before. When participants had selected an animal, regardless of their selection, they were told "very good." To avoid giving participants any cues from gaze direction, the experimenter was careful to look at Percy while picking up the animals

and at the participant while asking the question and waiting for a response.

The procedure was repeated six times (once for each animal kind). The order of the animal kind was random, because it depended on the order in which the experimenter retrieved the animals from the bag. In the proper name condition six different proper names were used in a constant order: Jessie, Kip, Bailey, Cody, Nikki, and Jamie. At the end of the sixth trial, participants in the proper name condition who correctly selected the named animal as the one with whom Percy was familiar were asked, "How do you know that's the one Percy has played with before?"

Results

The dependent measure for participants was the number of times they selected the animal described using either a proper name or common noun (i.e., *Jessie* or *dog*) as the one with whom Percy had played before. These numbers were then converted to percentages (number of times out of six trials). A 4 (age) \times 2 (condition) \times 2 (gender) \times 2 (order) ANOVA was performed and revealed a significant main effect of condition ($M = 80\%$, $SD = 6\%$ versus $M = 55\%$, $SD = 6\%$), $F(1, 42) = 8.76$, $p < .05$. As predicted, participants in the proper name condition were significantly more likely to select *Jessie* as the one with whom Percy had played than participants in the common noun condition were to select a *dog* as the one with whom Percy had played. A main effect of age was also found, $F(3, 42) = 3.46$, $p < .05$. No other main effects or interactions were significant in this analysis. One-way ANOVAs were computed for each age group comparing proper name responses and common noun responses in the two conditions. See Figure 2 for participants' responses by age and condition.

A one-way ANOVA comparing adults' responses in the proper name condition with their responses in the common noun condition was significant ($M = 99\%$, $SD = 5\%$ versus $M = 64\%$, $SD = 41\%$), $F(1, 22) = 8.35$, $p < .05$. That is, adults were significantly more likely to select the individual named by a proper name as the one with whom Percy had played before than they were to select the individual named by a common noun as the one with whom Percy had played before. Adults' responses in the proper name condition were significantly different from chance, $t(11) = 35.00$, $p < .05$. Their responses in the common noun condition were not significantly different from chance, $t(11) = 1.16$, $p = .269$.

A one-way ANOVA on the 5-year-olds also revealed a significant effect of condition ($M = 98\%$, $SD = 6\%$ versus $M = 67\%$, $SD = 33\%$), $F(1, 14) = 6.82$, $p <$

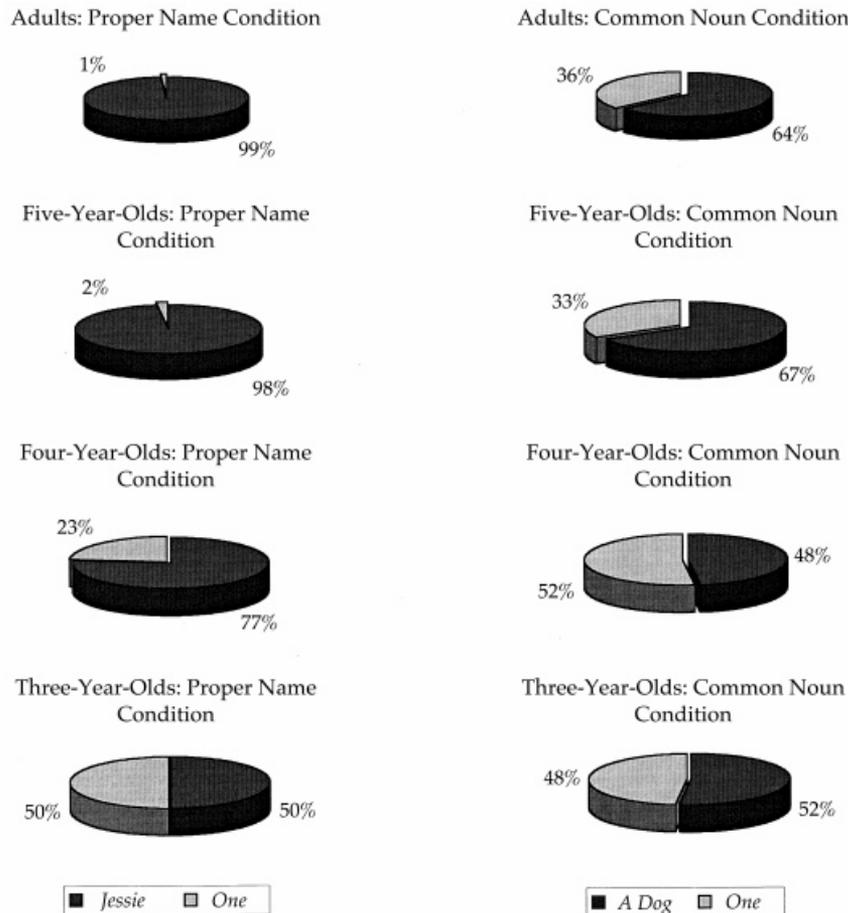


Figure 2 Experiment 2: Mean Percentage Responses \times Age and Condition.

.05. Five-year-olds' preference for the named individual in the proper name condition ($M = 98\%$, $SD = 6\%$) was significantly greater than chance, $t(7) = 23.00$, $p < .05$. Five-year-olds' responses in the common noun condition ($M = 67\%$, $SD = 33\%$) were not significantly different from chance, $t(7) = 1.41$, $p = .200$.

When asked which one Percy had played with before, four-year-olds in the proper name condition did not select the animal labeled with a proper name significantly more often than 4-year-olds in the common noun condition selected the animal labeled with a common noun ($M = 77\%$, $SD = 36\%$ versus $M = 48\%$, $SD = 42\%$), $F(1, 14) = 2.24$, $p = .157$, *ns*. Four-year-olds' responses were marginally different from chance in the proper name condition ($M = 77\%$, $SD = 36\%$), $t(7) = 2.15$, $p = .068$, but were virtually at chance in the common noun condition ($M = 48\%$, $SD = 42\%$), $t(7) = -.14$, $p = .893$, *ns*.

Finally, when 3-year-olds were asked which one Percy had played with before, those in the proper

name condition were no more likely to select the animal labeled with a proper name than those in the common noun condition were to select the animal labeled with a common noun ($M = 50\%$, $SD = 39\%$ versus $M = 52\%$, $SD = 38\%$), $F(1, 14) = .01$, $p = .915$, *ns*. Three-year-olds performed at chance in both the proper name condition and common noun condition.

After noting that many of the children's responses were random, even in the proper name condition, there was concern that participants might be failing the task due to memory demands. Therefore, a memory test was added at the end of the sixth trial in the proper name condition, to rule out this possibility. Half of the 3- and 4-year-old children and three quarters of the 5-year-old children were given the memory test. These children were asked, "Do you remember which one is *Jamie*?" Children were coded as passing the memory test if they selected the animal that Percy had picked up and labeled as *Jamie* on the sixth trial. All of these children passed the memory test.

Discussion

Data from Experiment 2 suggest that 5-year-olds recognize that the speaker's knowledge of an individual's proper name was indicative of familiarity with that individual. Half of these children were even able to articulate this understanding explicitly: When asked at the end of the final trial how they knew which one Percy had played with before, they said it was because Percy knew its name. In contrast, 3-year-olds were unable to recognize that the speaker's knowledge of an individual's proper name was indicative of familiarity with that individual. Four-year-olds fell in between, with marginally significant better-than-chance performance in the proper name condition. This suggests that the ability to use the familiarity principle to infer the familiarity status of the speaker is not fully developed until the age of 5.

An alternative explanation is that young children failed this task because they did not pay attention when the speaker named the individuals or they simply forgot which animal was which when asked to select the one with whom Percy had played before. The fact that all of the younger children who were given the memory test passed this test, however, indicates that memory and attentional demands could not account for the younger children's failure.

One difference between Experiments 1 and 2 was the introduction of the puppet in Experiment 2. The task in Experiment 2 questioned whether children could assess the speaker's familiarity with the individuals based on the speaker's knowledge of their proper names. Unlike Experiment 1, it was necessary for the animals to be presented in the same manner to ensure that the method of introduction did not make one set of animals the more likely candidates for being familiar to the speaker. Because the experimenter had to introduce the individuals in the same manner, it seemed implausible that she might be familiar with some of the individuals and unfamiliar with others. Therefore, a puppet was introduced to serve as the speaker. The introduction of the puppet should not have increased the processing demands of the task in Experiment 2 over the task in Experiment 1. Both tasks required the assessment of the familiarity or knowledge status of the speaker. In Experiment 1, the speaker was the experimenter. In Experiment 2, the speaker was the puppet, Percy. There was no additional mind to consider in Experiment 2, because appreciating the knowledge or familiarity of the experimenter was irrelevant to the task. Another difference between Experiments 1 and 2 was the question that the children were asked (i.e., "Where's Jessie?" versus "Which one has Percy played with before?" re-

spectively). There is no reason to doubt, however, that even the youngest children understood the meaning of both questions.

In sum, children as young as 2 were able to use the speaker's familiarity status to determine the referent of a proper name, but it was not until around age 5 that they were able to use the speaker's knowledge of a proper name to determine the speaker's familiarity.

GENERAL DISCUSSION

Experiment 1 demonstrated that on hearing someone use a proper name, children as young as 2 assumed that the name referred to an individual with whom the speaker was familiar, rather than one whom the speaker had never seen before. There was no such assumption, however, when a common noun was used. These findings suggest that young children are sensitive to the familiarity status of the speaker when learning words. More generally, these findings support the position that theory of mind capacities are an important part of the word-learning process. It remains an open question, of course, whether the particular aspects of theory of mind that underlie the familiarity principle are present at the onset of word learning, or whether they emerge later, perhaps as the result of prior linguistic experience.

There are subtleties to the familiarity principle that warrant further discussion. Familiarity has many degrees. It is possible to know someone's name without ever having met that individual in person. One could have had contact with that person on the phone, via e-mail, or merely know the person through hearing others talk about him or her. As the term is used in this study, all of these examples would count as being "familiar" with that person. It is also worth emphasizing that familiarity is a necessary condition for knowledge, not a sufficient condition. To know someone's name, for instance, it is necessary to be familiar with that individual in some manner. The converse is not true, however: it is possible to be familiar with someone without knowing his or her name.

Experiments 1 and 2 manipulated familiarity in its most blatant form; children were told that the experimenter (Experiment 1) or "Percy" (Experiment 2) had seen and played with one of the animals before, and had never seen or played with the other. An interesting question is how abstract children's understanding of familiarity is. Do they appreciate, as do adults, that a speaker might know the name of someone whom he or she has never met, so long as the speaker has some acquaintance with that individual, however indirect?

In a related vein, there is the puzzling case of indi-

viduals such as Mickey Mouse, Winnie the Pooh, Santa Claus, and Batman. A person might see a doll for the first time, for instance, and know that it is *Batman*, without ever having encountered that particular doll before; or a person might see an unfamiliar individual in a shopping mall and identify him as *Santa Claus*. On the face of it, such examples violate the familiarity principle, because there is use of a proper name without any prior experience with the individual that is being named.

It is possible that these words are actually not proper names, but rather common nouns that refer to kinds or categories; however, this is unlikely. From a grammatical standpoint, *Batman* is as much a proper name as *Jessie*; one says "There's *Batman*," not "There's a *Batman*." Conceptually, *Batman* is seen as a character with a specific identity and history. His parents were killed when he was young, he resides in Gotham City, he sleeps only 1 hour a night, and so on. *Batman* is an individual person (albeit a fictional one); he is not a category.

We believe that a more plausible explanation is that proper names refer to individuals—to singular entities. Proper names, however, like many other words, can also refer to representations. *Jessie* refers to a specific person, but the word can also refer to drawings of *Jessie*, images of *Jessie* on a television screen, a *Jessie* doll, and so on. At least for adults, then, naming a *Batman* doll as *Batman* does not actually violate the familiarity principle, because, although one might not be familiar with the doll, one is familiar with the individual that the doll represents. The question of how children cope with such cases, however, is an open one (for some preliminary evidence, see Gutheil, Kelaita, Michos, & Gelman, 1999).

The question of interest in Experiment 2 was whether children understand the familiarity principle at a general level, as do adults, or whether their success in Experiment 1 stems from a more implicit, or limited, appreciation. Experiment 2 revealed that although adults and 5-year-olds were able to infer the speaker's familiarity with an individual based on the speaker's use of a proper name, this ability was not present in younger children. Three-year-olds, and to some extent 4-year-olds, have a more limited appreciation of the relation between familiarity and knowledge of unobservable properties than do 5-year-olds and adults—they can infer reference of a proper name based on the speaker's familiarity, but they cannot infer the speaker's familiarity based on the speaker's use of a proper name.

What is the nature of the younger children's knowledge of the familiarity principle? Perhaps it is specific to certain word-learning tasks. Because Ex-

periment 1 required inference of the referent of a word, whereas Experiment 2 did not, it is possible that knowledge of the familiarity principle was only accessible to children of this age when they inferred the referent of a word. On the other hand, the familiarity principle might be accessible during other tasks that do not involve word inference. For example, it is possible to imagine a case in which a child is able to infer that the speaker is familiar with another individual because the speaker knows that the individual likes dogs but despises cats. Experiment 2 simply demonstrates that the familiarity principle is more restricted in its application for young children than for older children and adults. Exactly how restricted remains an empirical question.

Finally, consider the question of the origin of the familiarity principle with regard to proper names. It is obviously not the product of explicit instruction. It might be a specifically innate principle of word learning, as has been proposed for other constraints on word learning. On the other hand, children might learn it by noticing that speakers only use proper names to refer to individuals with whom they are familiar. This learning account presupposes that young children can identify when a speaker is using a proper name, which is plainly within their powers; but it also makes the more contentious assumption that young children, in the normal course of affairs, make a judgment as to whether or not the speaker is familiar with the individual being named.

We favor a third view, which is that children's appreciation for the familiarity principle as it applies to proper names emerges as part of their understanding of the mental states of others. We propose that young children have a rudimentary appreciation of the origin of knowledge in other people—they appreciate that knowledge of a word presupposes some prior experience with what the word refers to. That is, children appreciate that if a speaker uses the word "dog," it implies that the speaker has had some experience, however indirect, with dogs; if a speaker uses the word "running," he or she has had some experience with running. And if the speaker uses the word "Jessie," this word should refer to an individual with whom he or she has had prior experience, and not one with whom he or she is unfamiliar. Our research suggests that early knowledge of the familiarity principle may be encapsulated—available for certain tasks, such as determining the referent of a word, but not for other tasks, such as determining the familiarity status of the speaker.

In sum, we found that children as young as 2 are sensitive to the speaker's familiarity status when learning proper names. They know that when a proper

name is used, it is more likely to refer to an individual with whom the speaker is familiar than one with whom the speaker is not familiar. Initially, this appreciation stems from a rudimentary appreciation of the familiarity principle that is available to assist children in their language acquisition. It is not until later in development, around 5 years of age, that children have a more general appreciation for the role of familiarity in knowledge of proper names.

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