Semantic Constraints on Word Learning: Proper Names and Adjectives

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Recent experimental evidence suggests that children as young as 2 years of age are able to identify proper names (e.g., "Tom," "Dick," "Harry") in the input, and that they understand that these words refer to individuals. For example, children can infer that a novel word modeled in the syntactic frame associated with a proper name (e.g., "This is Zav") should pick out only the named individual in an array of toys, but that a novel word modeled as a count noun (e.g., "This is a zav") could pick out either of two members of the same object kind in the array (e.g., Gelman & Taylor, 1984; Katz, Baker, & Macnamara, 1974).

Only some of the individuals that children normally encounter get referred to by proper names, and previous research provides evidence that young children are aware of this fact. For example, Gelman and Taylor (1984) and Katz et al. (1974) have shown that 2-year-olds are more likely to interpret a word modeled as a proper name as referring to an individual if the word is used to pick out a toy doll or a toy doll-like animal than if it is applied to a plastic block or a plastic block-like toy. Furthermore, Hall (1991) has shown that 2-year-olds will interpret a novel word modeled as a proper name as referring to an individual if it is applied to a cat or a dog.

A first goal of the present experiments was to resolve an unanswered question about children's novel word interpretation. If children fail to interpret a novel word ("X") modeled in the frame "This is X" as a proper name, what alternative interpretation can they make? The results of Katz et al.

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Both Gelman and Taylor’s (1984) and Katz et al.’s (1974) findings do show that children who learned a word modeled as a proper name for a block or a block-like toy failed to take the word as referring only to the named individual; that is, they avoided attributing a proper name to the named individual. However, the results are less clear about what this failure reflects. This is not a criticism of these studies, of course, because they were not addressing this question. However, the findings are consistent with (at least) two possibilities. One possibility is that the children believed that the sentence frame “This is X” applied to an object could only appropriately imply X’s reference to an individual (that “X” is a proper name). Thus, if children heard the frame used to apply a novel word to (what they took to be) a non-proper-nameable object, then they could make no sense of the word, and so either misconstrued it as an object kind term, or (strikingly) assumed that it must be a proper name for some other more proper-nameable individual.

However, another possibility is that children knew that the sentence frame “This is X” is also consistent with an adjective/mass noun interpretation, and so “X” could have referred either to the named individual (e.g., “This is Fred”) or to a salient property/material kind of the named individual (e.g., “This is red”/“This is lead”). Neither Gelman and Taylor nor Katz et al. noted that children’s apparent object kind interpretations (i.e., their extension of the word from the named object to another object of the same object kind) could have reflected a property/material kind interpretation, because the two objects, in addition to sharing object kind, also shared certain properties (e.g., shape, texture) as well as material kind (e.g., PLASTIC). Moreover, recent findings suggest that children as young as 3 years of age appreciate that the sentence frame “This is X” applied to a familiar inanimate solid object can refer to a property/material kind (Markman & Wachtel, 1988). It is not known if 2-year-olds appreciate the link between the sentence frame “This is X” and X’s reference to a salient property/material kind. However, there is evidence that children between 2 and 4 years of age are aware that some novel words used under some circumstances do refer to properties/material kinds. For example, there is evidence that they appreciate a link between the sentence frame, “This is an X one” and X’s reference to a property/material kind (e.g., Hall, Waxman, & Hurwitz, 1993; Prasada, 1993; Smith, Jones, & Landau, 1992; Taylor & Gelman, 1988).

Design limitations of the previous studies of proper name acquisition make it difficult to know if preschool children do appreciate that the frame “This is X” can imply either a proper name or an adjective/mass noun interpretation. First, the test objects did not really permit children to demonstrate both a proper name interpretation and an adjective/mass noun interpretation of the novel word. The test objects simply shared, or did not share, object kind membership with the named object. This design feature enabled the researchers to detect a proper name interpretation, because the researchers could distinguish selection of the named individual from selection of another individual of the same object kind. However, no test object shared only a salient property/material kind with the named object (and

1 In fact, even a so-called proper name interpretation (i.e., the restriction of the word to the named object) might have reflected a property/material kind interpretation, because the two objects of the named kind always contrasted on certain properties (e.g., hair color), any of which may have been the interpretation children assigned to the novel word (e.g., blonde). But see the General Discussion for arguments against this possibility.
not object kind), and so there was no easy way for children to demonstrate clearly a salient property/material kind interpretation of the novel word. Second, use of the novel word in the tasks of Gelman and Taylor and Katz et al. was really not felicitous for an adjective/mass noun interpretation. After hearing the word introduced initially (e.g., "This is Zav"), children subsequently heard the word used in other sentence frames not suitable for an adjective/mass noun (e.g., "Can you wash Zav?"). Thus, if children had initially shown any tendency to make an adjective/mass noun interpretation, this subsequent use of the word may have confused them.

The first goal of the current experiments was thus to test whether preschool children do appreciate both senses of the inherently ambiguous sentence frame, "This is X." Unlike previous experiments, these experiments implemented several design features that enhanced the likelihood of detecting this appreciation, if children did indeed have it. First, the experiments employed larger sets of test objects, including (among others) objects that matched the object in kind but not in a salient property, objects that matched in a salient property but not in object kind, and objects that matched in neither. The properties were all highly salient—fluorescent multicolored geometric designs. Second, the test questioning left the interpretation of the word as plausibly either a proper name or an adjective/mass noun, because the only sentence frames in which the word appeared were felicitous for either interpretation. Third, because the familiarity of the named object (i.e., knowledge of the basic-level count noun) has been shown to enhance children's tendency to interpret a novel word as either a proper name (Hall, 1991) or an adjective/mass noun (Hall et al., 1993; Markman & Wachtel, 1988), these experiments employed only familiar objects. Fourth, because children are more likely to avoid an object kind interpretation if the basic-level count noun is mentioned by the experimenter than if it is not mentioned (Waxman, Shipley, & Shepperson, 1991), the novel word in this study was mentioned along with the familiar basic-level count noun. Thus, the sentence frame used to label the named objects was actually "This Y is X," where X was the ambiguous novel word, and Y was the familiar basic-level count noun. Fifth, the novel words carried a suffix ("-y") that is felicitous for both a proper name and an adjective interpretation. Finally, although no previous experiment has shown an appreciation of both possible construals of the novel word, these experiments focused on children in an age range where separate pieces of previous evidence clearly suggest an appreciation of each of the two possible interpretations (i.e., 3- and 4-year-olds).

Consider now the experiments' second goal. Even if children are able to assign the novel word to either a proper name interpretation or an adjective/mass noun interpretation, it is not clear for (at least) two reasons what influences the interpretation in any instance. One reason is that previous findings do not reveal whether a relevant factor is simply that the named individual is a member of a kind of animal (including PERSON) rather than a kind of artifact. The previously studied animals have been dolls, humanoid creatures, or cats and dogs. These individuals do not span the range of animals; for example, no animals from the lower end of the phylogenetic scale have been studied (e.g., insects). Moreover, the previously studied artifacts have been very simple (blocks, block-like toys); no highly complex artifacts have been tested (e.g., artifacts with many parts and complicated internal workings, like vehicles). In order to understand more clearly the precise relevance of the animal-artifact distinction to children's willingness to ascribe a proper name to an individual, it would seem important to sample objects across a broader range of animal kinds and artifact kinds.

Another reason why it is not clear what factors affect interpretation is because it is not obvious what role the social significance of the named individual (e.g., whether the individual is known to be possessed by someone) plays in children's willingness to ascribe a proper name to it. Children might have attributed a proper name to individuals in previous studies not only because they were animals, but also because they were socially significant, that is, human (human-like) or presumed to be possessed by humans. To address the relevance of this property to children's willingness to ascribe a proper name to an individual, it would seem important to compare objects of certain kinds that are marked as socially important (e.g., as possessed by someone) to objects of the same kinds that are not marked as socially important (e.g., not possessed by someone).

Thus, the second goal of the following
experiments was to offer a more systematic investigation of the role of two factors in children’s willingness to attribute a proper name to an individual: (1) whether the individual belongs to a kind of animal rather than a kind of artifact, and (2) whether the individual is marked as socially important rather than not so marked. In Experiments 1 and 2, children learned novel words for either a range of typical pets (a dog, a cat, a rabbit, a bird) or a range of simple artifacts (a balloon, a hat, a cup, a shoe). Experiments 3 and 4 contrasted a range of non-pet animals (a spider, a caterpillar, a snail, and a bumblebee) with a range of more complex artifacts (a train, a boat, a car, a plane). Furthermore, Experiments 3 and 4 compared children’s interpretation of a proper name when the referent individual was either possessed or not possessed by someone.

**Experiment 1**

**METHOD**

**Subjects**

Thirty-two 3½–4½-year-old children participated. Sixteen were assigned randomly to the Typical Pet condition ($M = 48.1$ months, $SD = 4.1$ months, range = 42–54 months) and the remainder to the Simple Artifact condition ($M = 48.1$ months, $SD = 3.8$ months, range = 41–53 months), with the constraint that the children in the conditions be approximately matched in terms of mean age and number of each sex. Children were tested under one of two sets of circumstances. Twenty were tested in their nursery classroom during normal school hours, in a quiet corner, or in an adjoining room; 12 were tested in the laboratory. The same numbers were tested under each set of circumstances in the two conditions. For those children tested in the laboratory, parents’ names were obtained primarily through birth records, hospital prenatal clinics, and newspaper advertisements. We paid the cost of their journeys to and from the laboratory. Children were predominantly white, and from a range of socioeconomic backgrounds.

**Stimuli**

**Practice sets.**—There were two sets of five practice drawings. Each drawing was done in black ink on white 5 x 5-inch cardboard cards. Set 1 comprised four drawings of elephants and one drawing of a fish. Set 2 had three drawings of horses and two drawings of bears.

**Test sets.**—There were four sets of five drawings for the Typical Pet condition, and four other sets of five drawings for the Simple Artifact condition. All drawings were done in black ink on white 5 x 5-inch cardboard cards. All eight sets consisted of the following: (1) a target drawing with a salient novel property, henceforth the Target; (2) a drawing of a different object from the same subordinate-level kind lacking the novel property, henceforth the Subordinate-level Kind Match; (3) a drawing of a different object from a different subordinate-level kind within the same basic-level kind lacking the novel property, henceforth the Basic-level Kind Match; (4) an out-of-kind distractor with the same novel property as the target, henceforth the Property Match; and (5) an out-of-kind distractor of a different kind lacking the novel property, henceforth the Distractor.

An example of a Typical Pet set was the following: (1) a bluetit-like bird with fluorescent multicolored circles on it, (2) a different plain bluetit-like bird, (3) a plain cardinal-like bird, (4) a bottle with fluorescent multicolored circles on it, and (5) a plain apple. An example of a Simple Artifact set was: (1) a man’s dress shoe with fluorescent multicolored circles on it, (2) a different plain man’s dress shoe, (3) a plain woman’s pump shoe, (4) a bottle with fluorescent multicolored circles on it, and (5) a plain apple. This sample pair of sets is shown in Figure 1 (with the fluorescent multicolored circles indicated by shading). All sets are described in Table 1. Notice that the Typical Pet sets and the Simple Artifact sets were matched in terms of the novel salient properties and also in terms of the distractor kinds. Notice also that the distractors came from a wide range of object kinds; the only constraints were that the kinds fell outside the subordinate-level kind of the Target in both Typical Pet and Simple Artifact conditions, and that half the time they were natural kinds and half the time artifact kinds. Finally, note that the Subordinate-level Kind Match was perceptually distinct from the Target (i.e., a numerically distinct object), not another drawing of the Target itself.

In addition to the sets of drawings, a col-

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2 The terms “simple” and “complex” are meant to capture the difference in properties (e.g., small vs. large number of parts, simple vs. complicated internal workings) between the two sets of artifact kinds used in the studies.
orful bird puppet with a pointy beak was used.

**Procedure**

Children were tested individually. The experimenter introduced the children to the puppet in the following way: “This is my friend. He’s not very smart and he’s going to ask if you can help him to learn some words. Will you help him to learn some words?” Children generally were very eager to help the puppet.

**Practice trials.**—The purpose of these trials was to familiarize children with the procedure, and thereby to avoid response biases in the experimental trials (i.e., children saying only “yes” or only “no” to all questions). There were two practice trials, each using one of the practice sets described above. The order of using Sets 1 and 2 was balanced across children.

On the first practice trial, the experimenter said, “First we’ll have a practice to learn how to play the game.” The experimenter laid out the five cards from one of the sets (e.g., Set 1, the four elephants and the one fish) in a random order in a straight row in front of the child. Then he said, “Now listen to my puppet. He’s going to ask you some questions. If you think the answer is ‘yes,’ tell my puppet ‘yes.’ But if you think the answer is ‘no,’ tell my puppet ‘no.’” Then the puppet spoke. Using a basic-level count noun, he asked of each drawing in turn, “Is this a fish?” (for Set 1). Children almost always got these questions right, but if they answered incorrectly, they were corrected. After asking the question of all five drawings in the set, the puppet said, “I’m a very forgetful puppet, and I have a very bad memory. I forget things all the time. I’ve already forgotten what you told me. Would you tell me again, if I asked again?” Children again were generally more than happy to help the forgetful puppet. The puppet then asked the questions again, in exactly the same manner, but in reverse order. The experimenter then said, “You’re really helping my puppet, and you’re learning to play the game. Could you help him again?”

The second practice was exactly like the first, but involved the other practice stimuli set (e.g., Set 2, the three horses and the two bears). The questions were again formulated using a basic-level count noun (“bear” for Set 2). After the second practice, the experimenter told the children that they would now start the real game, and that the children should remember to say “yes” if they thought the answer was “yes,” and to say “no” if they thought the answer was “no.”

There are several points to note about the practice. First, to answer correctly, children had to be willing to say both “yes” and “no” within a given set of drawings. This feature was meant to try to stop children from showing a response bias on the test trials. Second, the questions were formulated using familiar basic-level count nouns,
<table>
<thead>
<tr>
<th>Target</th>
<th>Subordinate-Level Match</th>
<th>Basic-Level Match</th>
<th>Property Match</th>
<th>Distractor</th>
<th>Property</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical Pet:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>dog (labrador)</td>
<td>dog (labrador)</td>
<td>dog (beagle)</td>
<td>mushroom</td>
<td>teapot</td>
<td>pink-yellow wavy stripes</td>
</tr>
<tr>
<td>cat (short-hair)</td>
<td>cat (short-hair)</td>
<td>cat (long-hair)</td>
<td>ball</td>
<td>flower</td>
<td>orange-blue cross-hatches</td>
</tr>
<tr>
<td>rabbit (hare)</td>
<td>rabbit (hare)</td>
<td>rabbit (jackrabbit)</td>
<td>tree</td>
<td>table</td>
<td>green-red triangles</td>
</tr>
<tr>
<td>bird (bluetit)</td>
<td>bird (bluetit)</td>
<td>bird (cardinal)</td>
<td>bottle</td>
<td>apple</td>
<td>yellow-blue circles</td>
</tr>
<tr>
<td>Simple Artifact:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>balloon (round)</td>
<td>balloon (round)</td>
<td>balloon (elongated)</td>
<td>mushroom</td>
<td>teapot</td>
<td>pink-yellow wavy stripes</td>
</tr>
<tr>
<td>hat (fedora)</td>
<td>hat (fedora)</td>
<td>hat (cowboy hat)</td>
<td>ball</td>
<td>flower</td>
<td>orange-blue cross-hatches</td>
</tr>
<tr>
<td>cup (teacup)</td>
<td>cup (teacup)</td>
<td>cup (drinking cup)</td>
<td>tree</td>
<td>table</td>
<td>green-red triangles</td>
</tr>
<tr>
<td>shoe (men's shoe)</td>
<td>shoe (men's shoe)</td>
<td>shoe (pump)</td>
<td>bottle</td>
<td>apple</td>
<td>yellow-blue circles</td>
</tr>
</tbody>
</table>
rather than proper names or adjectives/mass nouns, as in the test trials; this feature kept children from being reinforced in any way relevant to the test trials (and, if anything, this should have biased children toward making object kind interpretations on the test trials). Third, the number of appropriate "yes" answers differed in the two practice sets; this feature ensured that children were not being trained to give a fixed number of answers of either type. Moreover, the 4:1 and 3:2 ratios of "no" to "yes" answers correspond to the ratios that children would have to provide if they were to make a proper name and a property interpretation, respectively, of the novel word. (See the Results section for more detail.) Fourth, the puppet told the children from the very beginning that it was forgetful. This was an important point to establish, because in the test trials, children were always asked for answers twice to increase reliability (and also to allow children to express some degree of uncertainty about the answer), and it seemed vital that this request be as pragmatically natural as possible.

Test trials.—The experimenter laid out one of the four sets of test drawings (either one of the Typical Pet sets, or one of the Simple Artifact sets) in a row in front of the children. He asked the children, "Before we learn a new word, could you tell me what you see in these drawings?" Children were thus invited to give the basic-level count noun for the objects in the drawings. This part of the procedure was intended to ensure that the objects were all familiar to children. Children never had problems in identifying the objects, although in several instances they had to be given clues (e.g., "You make tea in it" for a teapot). Furthermore, sometimes children labeled an object using a related basic-level count noun (e.g., "kettle" instead of "teapot"). The experimenter/puppet subsequently used whatever word the child had used. After the child had labeled the objects, the experimenter stressed that each of the three objects from the target object kind was a numerically distinct object. He said, for example, motioning to the three birds (or shoes), "See this bird [shoe], and this bird [shoe], and this bird [shoe]? How many different birds [shoes] do you see?" The child was encouraged to count each bird (shoe) as a different bird (shoe). The experimenter then repeated this information, "So we have three different birds [shoes] here." Although, as noted earlier, the three objects were perceptually distinct, this procedural detail was meant to provide added assurance that the child did not construe the drawings as different depictions of the same bird (shoe).

The experimenter said, "Now we're going to learn a new word. Do you think you could help my puppet to learn a new word?" Children were generally eager to do so. The experimenter continued, "Well, my puppet has to go away for a minute, but he'll come back soon." The experimenter hid the puppet behind his back, telling the child that the puppet could no longer see or hear the conversation between experimenter and child. The experimenter then singled out and pointed to the target object in the row, and said, "Now listen carefully. Do you see this bird [or shoe]?" The experimenter always used the basic-level count noun for the familiar target object. "This bird [shoe] is PIFFY." The experimenter used one of these words: ZAVY, DAXY, FEPPY, PIFFY. Note that these novel words could (in the adult language) readily be construed either as proper names (e.g., "This is Billy") or as adjectives (e.g., "This is shiny"). The experimenter then asked, "Can you say PIFFY?" Children were asked to repeat the word. All children did so. The experimenter repeated the word up to three times, and then continued by saying, "Okay, now my puppet is going to come back. Will you help him?" The puppet reappeared and said, "Hello. Can you help me?" Using his beak, the puppet then pointed to each of the drawings (including the target), beginning with the drawing on the child's left and moving across the row, and asked, for example, "Is this bird [shoe] PIFFY?" Notice that this sentence frame leaves the category of word ambiguous between proper name and adjective/mass noun. Recall that in previous studies, the sentence frame used in questioning always made any interpretation besides a proper name interpretation infelicitous (e.g., "Can you wash X?" as used in previous work, is felicitous for a proper name but not for an adjective). After asking the questions once of each object in the array, the puppet asked the questions a second time, in the reverse order, again under the pretext of having forgotten the child's answers.

The order of the four sets was balanced across subjects in each condition. Placement of cards in a row was random for each subject in each trial. The nonsense words were matched between pairs of test sets having the same property.
TABLE 2
MEAN PROPORTION OF "YES" ANSWERS (AND STANDARD DEVIATION) FOR EACH DRAWING

<table>
<thead>
<tr>
<th>Experiment 1:</th>
<th>Target</th>
<th>Subordinate-Level Match</th>
<th>Basic-Level Match</th>
<th>Property Match</th>
<th>Distractor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical Pet</td>
<td>.98 (.06)</td>
<td>.21 (.34)</td>
<td>.15 (.32)</td>
<td>.05 (.09)</td>
<td>.05 (.13)</td>
</tr>
<tr>
<td>Simple Artifact</td>
<td>1.00 (.00)</td>
<td>.10 (.21)</td>
<td>.10 (.23)</td>
<td>.76 (.38)</td>
<td>.05 (.13)</td>
</tr>
<tr>
<td>Experiment 2:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Typical Pet</td>
<td>1.00 (.00)</td>
<td>.25 (.38)</td>
<td>.25 (.38)</td>
<td>.13 (.19)</td>
<td>.08 (.13)</td>
</tr>
<tr>
<td>Simple Artifact</td>
<td>1.00 (.00)</td>
<td>.25 (.38)</td>
<td>.17 (.35)</td>
<td>.87 (.47)</td>
<td>.08 (.13)</td>
</tr>
<tr>
<td>Experiment 3:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-pet Animal</td>
<td>1.00 (.00)</td>
<td>.16 (.35)</td>
<td>.15 (.35)</td>
<td>.44 (.47)</td>
<td>.05 (.15)</td>
</tr>
<tr>
<td>Complex Artifact</td>
<td>1.00 (.00)</td>
<td>.09 (.25)</td>
<td>.09 (.25)</td>
<td>.68 (.41)</td>
<td>.04 (.09)</td>
</tr>
<tr>
<td>Experiment 4:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-pet Animal (&quot;my&quot;)</td>
<td>1.00 (.00)</td>
<td>.13 (.34)</td>
<td>.13 (.34)</td>
<td>.29 (.43)</td>
<td>.00 (.00)</td>
</tr>
<tr>
<td>Complex Artifact (&quot;my&quot;)</td>
<td>1.00 (.00)</td>
<td>.11 (.25)</td>
<td>.10 (.26)</td>
<td>.66 (.45)</td>
<td>.02 (.07)</td>
</tr>
</tbody>
</table>

NOTE.—N = 16 per condition in Experiments 1, 3, and 4. N = 8 per condition in Experiment 2.

Results and Discussion
Children first received a score from 0 to 1 to reflect the proportion of "yes" answers they gave to each drawing. These proportions are shown in Table 2. A preliminary analysis using the overall proportion of "yes" answers as a dependent measure established that there was no effect of drawing set, and no interaction between condition and drawing set. The proportions of "yes" answers given to each drawing were then compared between conditions. The only drawing on which the two conditions differed was the Property Match, with a higher proportion of children saying "yes" in the Simple Artifact condition (M = .76, SD = .38) than in the Typical Pet condition (M = .05, SD = .09); t(30) = 7.28, p < .0001. This finding is revealing because saying "yes" to the Property Match was necessary in order for children to be credited with a property interpretation of the novel word (see below); that is, the Property Match was the only drawing, besides the Target, that carried the novel salient property.

A second analysis involved classifying children according to the number of "yes" answers they gave to the Property Match. Children were categorized according to whether they gave 0–1, 2–3, 4, 5–6, or 7–8 "yes" answers. The numbers of children assigned to each category appear in Table 3. The relation between giving either 0–1 or 7–8 "yes" answers and being in either the Typical Pet or Simple Artifact condition was significant by Fisher's exact test, p < .0001.

The next analysis involved classifying children according to the pattern of their "yes" answers across the sets of drawings. All children were classified as falling into one of the following mutually exclusive categories: (1) Proper Name interpretation: The child gave six or more out of eight "yes" answers to the Target and four or fewer out of eight "yes" answers to each other drawing; (2) Property interpretation: The child gave six or more out of eight "yes" answers to both the Target and the Property Match, and four or fewer out of eight to each other drawing; (3) Basic-level Kind interpretation: The child gave six or more out of eight "yes" answers to the Target, and to both the Subordinate- and Basic-level Kind Matches, and four...
TABLE 3
NUMBERS OF CHILDREN PROVIDING 0 TO 8 “YES” ANSWERS TO PROPERTY MATCH

<table>
<thead>
<tr>
<th>Number of Answers</th>
<th>0–1</th>
<th>2–3</th>
<th>4</th>
<th>5–6</th>
<th>7–8</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Experiment 1:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Typical Pet</td>
<td>14</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Simple Artifact</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td><strong>Experiment 3:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-pet Animal</td>
<td>8</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Complex Artifact</td>
<td>4</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td><strong>Experiment 4:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-pet Animal (“my”)</td>
<td>10</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Complex Artifact (“my”)</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>9</td>
</tr>
</tbody>
</table>

*NOTE.—N = 16 per condition.*

The numbers of children assigned to each of these categories in each condition appear in Table 4. Most children were assigned to either the Proper Name or the Property category. This finding itself is interesting because a central aim of the study had been to determine if children could construe a novel word either as a proper name or as an adjective/mass noun according to the kind of object that was labeled. The numbers of children assigned to either the Proper Name or the Property category in the two conditions were compared. In the Typical Pet condition, 14 children were assigned to the Proper Name category, and none to the Subordinate-level Kind Match, and four or fewer out of eight to each other drawing.4

The results of Experiment 1 thus show clearly that children were more likely to make a proper name interpretation of a novel word applied to a typical pet than to a simple artifact. Moreover, when faced with an artifact, children readily made a property interpretation of the novel word. Previous studies

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4 It is worth noting the probabilities of a child’s being classified as falling into any of these patterns by chance. Consider first the probabilities calculated on the assumption that each of the child’s eight answers to a given drawing can be taken as independent of the others. The total number of possible patterns is 2^8. Of this total, only a subset corresponds to each of the four patterns described in this experiment. Take the Proper Name pattern as an example. There are 37 possible ways to achieve a Proper Name pattern with respect to the Target drawing (i.e., 28 ways to give 6/8 “yes” answers, plus eight ways to give 7/8, plus one way to give 8/8); for each of the other four drawings, there are 163 ways of achieving the pattern (i.e., one way to give 0/8 “yes” answers, plus eight ways to give 1/8, plus 28 ways to give 2/8, plus 56 ways to give 3/8, plus 70 ways to give 4/8). The probability of achieving a Proper Name pattern simply by chance is thus 37 x 163 x 163 x 163 x 163 / (2^8)^4, which is .024. The probabilities of achieving each of the other patterns can be worked out in a similar fashion, and they are similarly low: Property: p = .0054; Basic-level Kind: p = .0012; Subordinate-level Kind, p = .0054. There may, however, be reason to question the assumption that each of a child’s eight answers to a given drawing should be thought of as completely independent of all the others, because the answers were given in pairs. Conservative calculations of chance probabilities were carried out on the assumption that the two answers to a given pair of questions were completely dependent upon each other. These calculations were based on the number of answer pairs (4), not the number of answers (8). The probabilities were calculated in a manner similar to the one just described, with the numbers of individual “yes” answers mentioned in the criteria being translated into pairs of “yes” answers as follows: 7 or 8 “yes” answers became 4 pairs; 5 or 6 became 3; 3 or 4 became 2; 1 or 2 became 1; and 0 became 0. The resulting conservative probabilities remained relatively low, but they were not as low as those computed on the assumption of complete independence of answers: Proper Name: p = .070; Property: p = .032; Basic-level Kind: p = .014; Subordinate-level Kind, p = .032.
have not been able to show this because they used test arrays that did not enable children to reveal clearly that they had mapped the word onto a salient property, and they did not employ a question sentence frame that was felicitous for both a proper name and an adjective interpretation. When such an ambiguous sentence frame was provided in this experiment, children were clearly able to interpret the word as referring to a salient property. The results thus provide a striking demonstration of preschool children's ability to use semantic information pertaining to certain object kind properties (here, related to whether the object is a typical pet or a simple artifact) to construe a novel word sensibly in either of two ways. The results also confirm that 3½–4½-year-old children are sensitive to the referential correlates of both proper names (referring to individuals) and adjectives (referring to salient properties).

Could the results be extended to younger children? Pilot testing revealed that children below 3 years of age had some difficulty with the procedure; for example, despite the practice trials, they often showed a "yes" or "no" response bias in the test trials. It was possible, however, to test children as young as 36 months of age, with two small procedural changes noted below.

**Experiment 2**

**Method**

**Subjects**

Sixteen 3–3½-year-olds took part. None of them had been tested in Experiment 1. Half were assigned randomly to a Typical Pet condition (M = 38.1 months; SD = 1.9 months; range = 36 to 41 months), and half to a Simple Artifact condition (M = 38.9 months; SD = 1.5 months; range = 36 to 41 months), with the constraint that the children in the conditions be approximately matched in terms of mean age and number of each sex. Children were tested under the same two sets of circumstances as in Experiment 1 (14 in nursery schools; two in the laboratory; the same numbers under each set of circumstances in the two conditions), and the children came from the same general populations.

**Stimuli**

These were the same as in Experiment 1.

**Procedure**

This was the same as in Experiment 1, with the following changes: (1) Children saw only three of the four sets of stimuli, chosen in a balanced way from among the four. (2) On the first round of questioning on each test trial, the experimenter began with the Target; pilot work had indicated that younger children sometimes appeared confused if the Target was not asked about first, and they showed a tendency to have a "no" response bias.

**Results and Discussion**

As in Experiment 1, children received a score from 0 to 1 to reflect the proportion of "yes" answers they gave to each drawing. These proportions are shown in Table 2. Preliminary analyses again revealed no effect of drawing set on the overall

### TABLE 4

**NUMBERS OF CHILDREN SHOWING DIFFERENT PATTERNS OF INTERPRETATION**

<table>
<thead>
<tr>
<th>Experiment</th>
<th>Proper Name</th>
<th>Property</th>
<th>Basic-Level Kind</th>
<th>Subordinate-Level Kind</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:</td>
<td>Typical Pet</td>
<td>14</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Simple Artifact</td>
<td>2</td>
<td>13</td>
<td>1</td>
</tr>
<tr>
<td>2:</td>
<td>Typical Pet</td>
<td>6</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Simple Artifact</td>
<td>2</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>3:</td>
<td>Non-pet Animal</td>
<td>7</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Complex Artifact</td>
<td>4</td>
<td>11</td>
<td>1</td>
</tr>
<tr>
<td>4:</td>
<td>Non-pet Animal (&quot;my&quot;)</td>
<td>10</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Complex Artifact (&quot;my&quot;)</td>
<td>4</td>
<td>11</td>
<td>1</td>
</tr>
</tbody>
</table>

Note. — N = 16 per condition in Experiments 1, 3, and 4. N = 8 per condition in Experiment 2.
A second analysis focused on "yes" answers to the Property Match. Children were classified according to the number of "yes" answers they gave to the Property Match. The coding categories were 0–1, 2–4, and 5–6 "yes" answers. The relation between giving either 0–1 or 5–6 "yes" answers and being in either the Typical Pet or the Simple Artifact condition was significant by Fisher's exact test, \( p < .05 \). Six children gave 5–6 "yes" answers in the Simple Artifact condition, while none did so in the Typical Pet condition; in contrast, two children gave 0–1 "yes" answers in the Simple Artifact condition, while five did so in the Typical Pet condition.

The next analyses were based on the classification of children according to the pattern of their "yes" answers across the sets of drawings. All children were classified as falling into one of the following mutually exclusive categories: (1) Proper Name interpretation: The child gave five or six out of six "yes" answers to the Target, and three or fewer out of six to each other drawing; (2) Property interpretation: The child gave five or six out of six "yes" answers to both the Target and the Property Match, and three or fewer out of six to each other drawing; (3) Basic-level Kind interpretation: The child gave five or six out of six "yes" answers to the Target and to both the Subordinate- and Basic-level Kind Matches, and three or fewer out of six to each other drawing; (4) Subordinate-level Kind interpretation: The child gave five or six out of six "yes" answers to the Target and to the Subordinate-level Kind Match, and three or fewer out of six to each other drawing.

The numbers of children assigned to each of these categories in each condition appear in Table 4. (Note that one child in the Simple Artifact condition fell into none of the four patterns described above.) As in Experiment 1, the relation between making a Proper Name or a Property interpretation and being in either the Typical Pet or the Simple Artifact condition was tested. Six children were assigned to the Proper Name category in the Typical Pet condition; only two were so assigned in the Simple Artifact

\[5\] A square root transformation on the dependent measure brought the variances in the two conditions closer together. The recomputed \( t \) test remained significant, \( t(14) = 2.52, p < .05 \). In addition, children were again highly consistent in their selections, giving the same answer to both questions in a pair between 83% and 100% of the time, depending on the drawing. As in Experiment 1, the results of supplementary analyses based on the proportions of "yes" answers given only to consistent pairs mirrored those from analyses in which all pairs were included.

\[6\] It is again worth noting the probabilities of a child's being classified as falling into any of these patterns by chance. Consider first the probabilities calculated on the assumption that each of the child's six answers to a given drawing can be taken as independent of the others. The total number of possible patterns is \( 2^6 \). Of this total, only a subset corresponds to each of the four patterns described in this experiment. Take the Proper Name pattern as an example. There are seven possible ways to achieve a Proper Name pattern with respect to the Target drawing (i.e., 6 ways to give 5/6 "yes" answers, plus one way to give 6/6); for each of the other four drawings, there are 42 ways of achieving the pattern (i.e., one way to give 0/6 "yes" answers, plus six ways to give 1/6, plus 15 ways to give 2/6, plus 20 ways to give 3/6); the probability of achieving a Proper Name pattern simply by chance is \( \frac{6 \times 42}{2^6} = \frac{252}{64} \), which is .020. The probabilities associated with the other patterns can be worked out in a similar fashion and are similarly low: Property: \( p = .0034 \); Basic-level Kind: \( p = .0056 \); Subordinate-level Kind, \( p = .0034 \). Again, however, there may be reason to question the assumption that each of a child's six answers to a given drawing should be thought of as completely independent of all the others, because the answers were given in pairs. Conservative calculations of chance probabilities were carried out on the assumption that the two answers to a given pair of questions were completely dependent upon each other. These calculations were based on the number of answer pairs (3), not the number of answers (6). The probabilities were calculated in a manner similar to the one just described, with the numbers of individual "yes" answers mentioned in the criteria being translated into pairs of answers as follows: 5 or 6 "yes" answers became 3 pairs; 3 or 4 became 1; 2 or 1 became 0. The resulting conservative probabilities remained relatively low, but they were not as low as those computed on the assumption of complete independence of answers: Proper Name: \( p = .073 \); Property: \( p = .010 \); Basic-level Kind: \( p = .0015 \); Subordinate-level Kind, \( p = .010 \).
condition. No child was assigned to the Property category in the Typical Pet condition, but four were so assigned in the Simple Artifact condition; by Fisher's exact test, the relation was significant, \( p < .05 \).

The results of Experiment 2 thus extend the findings from Experiment 1 to a younger age group. Children as young as 3 years of age can construe a novel word appropriately in either of two ways (as a proper name or as an adjective) dependent only upon the kind of object being labeled. Moreover, the study provides evidence that young 3-year-olds are sensitive to the referential correlates of both proper names (referring to unique individuals) and adjectives (referring to salient properties).

The animals studied in Experiments 1 and 2 were all typical pets, animals that children may have had heard proper names for. The artifacts were all simple things that children almost certainly would not have heard proper names for. Moreover, the range of animal and artifact kinds was rather restricted. Experiments 3 and 4 extended the range of object kinds under investigation. Again, there was an animal condition and an artifact condition, but the objects were selected from different basic-level kinds. Instead of typical pets, Experiments 3 and 4 involved animals which may be viewed as much less pet-like, such as insects. It is possible that some preschool children may have seen or heard stories in which insects (or spiders or snails) received proper names, but it is less likely that they have actually experienced proper names for real animals of these kinds. The drawings used in the experiments depicted real insects (and spiders and snails), not cartoon characters. Also, instead of simple artifacts, these Experiments involved a group of highly complex artifacts. These were vehicles, kinds of object that also share certain features with kinds of animal (i.e., the individuals are capable of moving on their own). Adults sometimes even give proper names to vehicles (e.g., boats often receive women's names). The stimuli used in these studies thus enabled a better understanding of the role that the animal kind versus artifact kind distinction plays in 3- and 4-year-olds' willingness to attribute a proper name to an individual.

**Experiment 3**

**Method**

**Subjects**

Thirty-two 3 1/2–4 1/2-year-old children participated. None had taken part in either previous experiment. Sixteen were assigned randomly to the Non-pet Animal condition \( (M = 48.6 \text{ months}, SD = 5.0 \text{ months}, \text{range} = 42 \text{ to } 56 \text{ months}) \), and the remainder to the Complex Artifact condition \( (M = 48.6 \text{ months}, SD = 4.8 \text{ months}, \text{range} = 44 \text{ to } 55 \text{ months}) \), with the constraint that children in the conditions be approximately matched in terms of mean age and number of each sex. Children were tested under one of two sets of circumstances described in Experiment 1 (15 in nursery school; 17 in the laboratory; approximately equal numbers under each set of circumstances in the two conditions), and they came from the same general populations.

**Stimuli**

**Practice sets.**—These were the same as in Experiment 1.

**Test sets.**—There were four sets of five drawings for the Non-pet Animal condition, and four other sets of five drawings for the Complex Artifact condition, all done in black ink on white 5 × 5-inch cardboard cards. The sets were designed exactly as in Experiment 1.

An example of a Non-pet Animal set was the following: (1) a hairless caterpillar with fluorescent multicolored circles on it, (2) a different plain hairless caterpillar, (3) a plain fuzzy caterpillar, (4) a bottle with fluorescent multicolored circles on it, and (5) a plain apple. An example of a Complex Artifact set was: (1) a yacht-like boat with fluorescent multicolored circles on it, (2) a different plain yacht-like boat, (3) a plain sailboat, (4) a bottle with fluorescent multicolored circles on it, and (5) a plain apple. These sample sets are shown in Figure 2 (with shading replacing the fluorescent multicolored circles). All sets are described in Table 5. Note that the salient properties and distractor object kinds were matched between sets, and that these were the same as were used in Experiments 1 and 2.

The bird puppet used in previous experiments served again in this experiment.

**Procedure**

This was exactly as in Experiment 1.

**Results and Discussion**

Children received a score from 0 to 1 to reflect the proportion of "yes" answers they provided to each drawing. Initial analyses on the overall proportions of "yes" answers revealed no effect of drawing set, and no interaction between set and condition. Thus,
the next analyses compared the proportion of “yes” answers given to each drawing in the two conditions. Unlike Experiment 1 (or Experiment 2), there were no significant differences, by t test, for any of the drawings. Table 2 shows these results.7

The second analysis again focused on “yes” answers to the Property Match. Children were classified according to the number of “yes” answers they gave to the Property Match across all sets, as in Experiment 1. The numbers of children falling into each of several categories in the two conditions appear in Table 3. The relation between giving either 0–1 or 7–8 “yes” answers and being in either the Non-pet Animal or the Complex Artifact condition was not significant, by Fisher’s exact test.

Children then were assigned to an interpretation based on the pattern of their selections across all questions. Exactly as in Experiment 1, children were coded as having made a Proper Name interpretation, a Property interpretation, a Basic-level Kind interpretation, or a Subordinate-level Kind interpretation.

The results appear in Table 4. Of major interest again were the numbers of Proper Name and Property interpretations. In the Non-pet Animal condition, there were seven proper name interpretations and seven property interpretations, whereas in the Complex Artifact condition, there were four proper name interpretations and 11 property interpretations; the relation was not significant, \( \chi^2(1, N = 29) = 1.68, p > .15 \).

A comparison of the results of Experiments 1 and 3 revealed that the principal difference lay in the animate conditions (Typical Pet vs. Non-pet Animal), rather than in the inanimate conditions (Simple Artifact vs. Complex Artifact). In other words, children in Experiments 1 and 3 seem to have been approximately equally unwilling to treat the word as a proper name if it was applied to either a simple artifact \((N = 2)\) or a complex artifact \((N = 4)\); however, children in the experiments seemed less willing to treat the word as a proper name for a non-pet animal \((N = 7)\) than for a typical pet \((N = 14)\). Perhaps the lack of difference between conditions in Experiment 3 reflected the fact not that some children were unwilling to treat a non-pet animal as worthy of a proper name, but rather that they were unsure of the status of the particular animals in the experiment. The children may have believed that because the stimuli were animals, they could be given proper names;

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7 Children gave consistent answers to pairs of questions between 89% and 100% of the time. Supplementary analyses based on the proportions of “yes” answers given only to consistent pairs yielded the same results as those in which all pairs were included.
<table>
<thead>
<tr>
<th>Target</th>
<th>Subordinate-Level Match</th>
<th>Basic-Level Match</th>
<th>Property Match</th>
<th>Distractor</th>
<th>Property</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-pet Animal:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>bee (round body) ..............</td>
<td>bee (round body)</td>
<td>bee (elongated body)</td>
<td>mushroom</td>
<td>teapot</td>
<td>pink-yellow wavy stripes</td>
</tr>
<tr>
<td>spider (thin-legged) .........</td>
<td>spider (thin-legged)</td>
<td>spider (hairy-legged)</td>
<td>ball</td>
<td>flower</td>
<td>orange-blue cross-hatches</td>
</tr>
<tr>
<td>snail (striped) ..............</td>
<td>snail (striped)</td>
<td>snail (coiled)</td>
<td>tree</td>
<td>table</td>
<td>green-red triangles</td>
</tr>
<tr>
<td>caterpillar (hairless) .......</td>
<td>caterpillar (hairless)</td>
<td>caterpillar (fuzzy)</td>
<td>bottle</td>
<td>apple</td>
<td>yellow-blue circles</td>
</tr>
<tr>
<td>Complex Artifact:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>airplane (jet) ...............</td>
<td>airplane (jet)</td>
<td>airplane (propeller)</td>
<td>mushroom</td>
<td>teapot</td>
<td>pink-yellow wavy stripes</td>
</tr>
<tr>
<td>train (steam train) ..........</td>
<td>train (steam train)</td>
<td>train (electric train)</td>
<td>ball</td>
<td>flower</td>
<td>orange-blue cross-hatches</td>
</tr>
<tr>
<td>car (car) ....................</td>
<td>car (car)</td>
<td>car (race car)</td>
<td>tree</td>
<td>table</td>
<td>green-red triangles</td>
</tr>
<tr>
<td>boat (yacht) ..................</td>
<td>boat (yacht)</td>
<td>boat (sailboat)</td>
<td>bottle</td>
<td>apple</td>
<td>yellow-blue circles</td>
</tr>
</tbody>
</table>
however, they may have failed to assign them a proper name because the importance of their individuality was not highlighted in any way.

Experiment 4 tested this possible interpretation of some children's tendency not to construe the word as a proper name for a non-pet animal in Experiment 3. It involved the same stimuli and procedure as Experiment 3, with the following simple change: At the point where the Experimenter introduced the Target, he indicated that it belonged to the Experimenter, thereby suggesting that it was important as an individual. The prediction was that adding this detail about possession would tend to increase children's willingness to interpret the word as a proper name for the non-pet animal. However, on the hypothesis that the animacy of the named object is also relevant to the willingness to attribute a proper name, knowledge of possession was predicted not to affect the interpretation of the word applied to the vehicle; children still should have thought the word was not a proper name. The overall prediction, then, was that more children would make a proper name interpretation in the Non-pet Animal condition than in the Complex Artifact condition when the named objects were described as being possessed by someone.

**Experiment 4**

**METHOD**

**Subjects**

Thirty-two 3½–4½-year-old children participated. None had taken part in any previous experiment. Sixteen were assigned randomly to the Non-pet Animal condition (M = 48.6 months, SD = 3.9 months, range = 43 to 54 months) and the remainder to the Complex Artifact condition (M = 48.1 months, SD = 3.1 months, range = 42 to 55 months), with the constraint that children in the conditions be approximately matched in terms of mean age and number of each sex. Children were tested under one of the two sets of circumstances described in Experiment 1 (eight in nursery schools; 24 in the laboratory; approximately equal numbers under each set of circumstances in the two conditions), and they came from the same general populations.

**Stimuli**

These were the same as in Experiment 3.

**Procedure**

This was the same as in Experiment 3, with the following exception. When singling out the Target, and before teaching the novel word, the experimenter mentioned the basic-level count noun ("Y") in the frame "This is my Y," to mark the object as possessed by the experimenter.

**Results and Discussion**

Children again first received a score from 0 to 1 to reflect the proportion of "yes" answers they gave to each drawing. Preliminary analyses of the overall proportion of "yes" answers revealed no effect of drawing set, and no interaction between set and condition. Again, the proportions of "yes" answers to each of the drawings were compared between conditions. Unlike Experiment 3, but like Experiment 1, there was now a significant difference between conditions for the Property Match, t(30) = 2.38, p < .05, revealing a greater proportion of "yes" answers for the complex artifacts (M = .66, SD = .45) than for the non-pet animals (M = .29, SD = .43). Table 2 shows these findings.*

Again, the focus then turned to the numbers of "yes" answers to the Property Match. Children were classified according to the number of "yes" answers they gave to the Property Match, as in Experiments 1 and 3. The numbers of children falling into each of several categories in each condition appear in Table 3. The relation between giving either 0–1 or 7–8 "yes" answers to the Property Match and being in either the Non-pet Animal or the Complex Artifact condition was tested. This relation did not quite reach significance, p = .064, by Fisher's exact test.

Children then were classified based on the pattern of their "yes" answers across all drawings in all sets. Children were attributed a Proper Name, a Property, a Basic-level Kind, or a Subordinate-level Kind interpretation, exactly as in Experiments 1 and 3. The results are in Table 4. Now, unlike Experiment 3, there was a significant relation between condition and number of children assigned to either the Proper Name or the Property category. In the Non-pet Ani-

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* Consistent answers to pairs of questions were given between 94% and 100% of the time. The results from supplementary analyses based on the proportions of "yes" answers given only to consistent pairs mirrored those from analyses in which all pairs were included.
mal condition, 10 children were assigned to the Proper Name category, and four to the Property category. In the Complex Artifact condition, four were assigned to the Proper Name category and 11 to the Property category. The relation was significant, \( \chi^2(1, N = 29) = 5.81, p < .05 \).

The findings of Experiment 4 thus suggest that, indeed, if an object was introduced as being possessed by an individual, children were more likely to conceive of it as meriting a proper name if it was a non-pet animal than if it was a complex artifact. The primary difference between Experiments 3 and 4 appeared to be in the Non-pet Animal conditions, with children showing a somewhat greater tendency to make a proper name interpretation in Experiment 4 (when possession was indicated) than in Experiment 3 (when it was not).

Cross-Experiment Comparisons

Experiments 1, 3, and 4 shared the same general design, subject characteristics, and experimenter. Because of these similarities, cross-experiment comparisons were carried out; however, in interpreting these comparisons, recall that assignment of children to conditions occurred within each experiment, not across all conditions in the three experiments.

A one-way ANOVA was conducted on the proportions of "yes" answers to each drawing in the six conditions combined from Experiments 1, 3, and 4. The only significant result was for the Property Match, \( F(5, 90) = 7.75, p < .0001 \). Pairwise post-hoc contrasts (Scheffe's F test) then were computed. They revealed the following: (1) There were no differences among the artifact (Simple Artifact, "This" Complex Artifact, and "My" Complex Artifact) conditions in the three experiments; and (2) Among the animal (Typical Pet, "This" Non-pet Animal, and "My" Non-pet Animal) conditions, there was a significant difference between Experiments 1 (Typical Pet) and 3 ("This" Non-pet Animal), with a lower proportion of "yes" answers to the Property Match in Experiment 1 (Typical Pet) than in Experiment 3 ("This" Non-pet Animal), but no difference between Experiments 1 (Typical Pet) and 4 ("My" Non-pet Animal). These findings suggest that children did distinguish reliably between the typical pets and the non-pet animals as likely recipients of proper names, but that this distinction was not evident if the non-pet animals were introduced as being possessed by the experimenter (i.e., as if they were pets). It should also be noted, however, that there was no reliable difference in the direct comparison between the animal conditions of Experiments 3 ("This" Non-pet Animal) and 4 ("My" Non-pet Animal). Thus, on its own, simply highlighting one of the non-pet animals as being possessed by someone did not lead to a significant increase in the tendency to take the word as a proper name for that individual. Recall, however, that even in the nonpossessed Non-pet Animal condition (in Experiment 3), children made a proper name interpretation about half the time.

General Discussion

This article had two goals. The first was to see if children could interpret a novel word ("X") modeled in the frame, "This Y is X" (where "Y" is the basic-level count noun), as either a proper name (referring to an individual) or an adjective/mass noun (referring to a salient property/kind of material). Previous research had left it unclear whether preschool children have this ability. The results of these studies provide a striking demonstration of 3- and 4-year-olds' ability to make either such interpretation dependent solely on the properties of the named individual (described below). The results thus extend previous findings of an understanding that proper names refer to individuals (Gelman & Taylor, 1984; Katz et al., 1974) to 3- and 4-year-olds; more interestingly, they offer evidence of an understanding among children as young as 3 years of age that words ("X") modeled in the frame "This Y is X" can refer to properties (see Markman & Wachtel, 1988, where "X" was intended as a mass noun; see Hall et al., 1993; Smith et al., 1992; Taylor & Gelman, 1988, for evidence when the sentence frame is "This is an X one").

The manner of limiting hypotheses about word meaning documented in this article—by considering properties of the referent to which the novel word is applied—is complementary to another frequently documented way in which children limit hypotheses about word meaning, that is, by considering properties of the sentence frame in which the novel word appears (e.g., Brown, 1957; Fisher, Hall, Rakowitz, & Gleitman, 1994; Hall et al., 1993; Waxman & Kosowski, 1990). Knowledge of the meaning of the syntactic frame in which the novel word appeared was wholly unhelpful in the current experiments, because the frame was kept
ambiguous and was kept constant across conditions. The present studies thus show how, in a situation where syntactic information is unhelpful in limiting word meaning, semantic information can help in this important task.

How clear is it that children who selected only the target object were indeed making a proper name interpretation of the word? This question could be raised in conjunction with the previous studies of proper name acquisition (e.g., Gelman & Taylor, 1984; Katz et al., 1974), and it also arises here. The difference between previous studies and the present ones is that the target in these studies carried a highly salient property, and this property was also carried by another unrelated object; as a result, children who selected only the target drawing in these studies were most likely not taking that salient property per se to be the meaning of the novel word. However, it is still possible that some children who selected only the target drawing nonetheless had interpreted the word as a property term, albeit a restricted property term (e.g., a term referring to fluorescent multicolored circles on shoes only). There are such restricted property terms in English; for example, an adjective like “freckled” picks out individuals having a certain salient property (i.e., spots), but it better suits some individuals than others (e.g., people rather than hats). If children in these studies were making a restricted property interpretation when they selected the named object only, then they would have been falsely assigned to a proper name interpretation. However, young children’s ability to learn such restricted property terms has not been clearly documented before, so it is unclear how readily children might have made such interpretations. More importantly, even if children had the ability to make such restricted interpretations, it is not clear that they should be more prevalent in any one rather than any other of the conditions in these experiments.

Another possibility is that children who selected only the target object made a subordinate-level kind interpretation, albeit a highly restricted subordinate-level kind interpretation, so that only the target would be judged a member of the kind. This criticism also could be leveled at past studies of the acquisition of proper names, and it has recently been addressed by Liittschwager and Markman (1993). They designed a procedure that enabled them to rule out the possibility that children as young as 3 years of age were making a subordinate-level kind interpretation rather than a proper name interpretation of a proper name applied to an individual. After hearing a novel proper name for an individual with a distinguishing marker, children watched as the individual was moved to a new location and the marker removed. Then a second object, identical to the first, but without the distinguishing marker, was placed in the original location. Although the two items looked identical (thus giving children no “subordinate-level kind” information to guide their inferences), 3-year-olds tended to pick the labeled object as the referent of the proper name. In addition, Hall (1991) found evidence from spontaneous speech against the possibility that 2-year-old children who selected only a target object had made a subordinate-level kind interpretation of a novel proper name. Children asked questions of other objects in the array of test stimuli that suggested a true proper name interpretation; for example, they asked of the other individual that shared object kind with the target, “And who is this name?” or “And who is that?” These facts militate against the likelihood that children in the present studies were making either a restrictive subordinate-level kind interpretation, or some restricted property interpretation, if they selected only the target drawing.

Another issue arises in conjunction with the attribution of a property interpretation to children. It is highly likely that children who answered “yes” to only the Target and the Property Match in these experiments took the salient property marked on these drawings (i.e., the fluorescent pattern) to be the interpretation of the novel word. Yet it is possible that some children took another property (e.g., the shape of the Target) to be the interpretation of the novel word, even though each stimulus set was constructed with the intention that the most salient property be the fluorescent pattern. Any child who did so would not have been credited with a property interpretation in these studies; instead, they may have been credited with another interpretation, in particular, a basic-level kind interpretation. Individuals in a given basic-level kind share a common general shape, and so it is difficult to tease these two interpretations (shape-property and basic-level kind) apart. However, basic-level kind interpretations were not common in any of the experiments, and they were distributed evenly across all conditions in all experiments.
The article's second goal was to investigate the properties that, for preschoolers, make individuals of certain kinds rather than others more likely to merit reference by a proper name. Because of the limited range of object kinds tested in previous research, it was unclear what properties were important. The results of these experiments showed that 3- and 4-year-olds were often more likely to make a proper name interpretation of the very same novel word if the referent was an animal of some kind than if it was an artifact of some kind. Whether the artifact was simple (e.g., a shoe) or complex (e.g., a car), and whether the complex artifact was possessed (e.g., "my car") or not possessed (e.g., "this car") by someone, preschoolers tended to expect that a novel word applied to it would not be a proper name. This finding suggests that although adults may assign proper names to artifacts of some kinds (e.g., boats, cars), young children do not expect such objects to receive proper names. On the other hand, preschoolers did appear to differentiate among animal kinds as potential recipients of a proper name. Most children interpreted a novel word applied to a typical pet (e.g., a dog) as a proper name, and so did the majority who learned the word for a non-pet animal that was possessed by someone (e.g., a bee introduced as "my bee"). However, only about half the children made a proper name interpretation if the word was applied to a non-pet animal not possessed by someone (e.g., a bee introduced as "this bee").

Although these experiments did test a broader range of object kinds than past experiments, the sampling of object kinds was far from comprehensive. This makes it difficult to pinpoint exactly what properties of the named animals affected the tendency to interpret the novel word as a proper name. One possibility is that the strong tendency to make a proper name interpretation was associated with the pethood or social importance of the named animal, because these interpretations were associated with animals that were typical pets, and with certain non-pet animals that were described as possessed by someone (although the difference between the possessed and nonpossessed Non-pet Animal conditions was not significant in its own right). However, it is possible that other differences between the typical pets and the non-pet animals also contributed to the observed differences. For example, although the animals in the two conditions did not differ in terms of familiarity, where familiarity is defined as knowledge of the basic-level count noun, they did differ in terms of typicality as members of the superordinate-level kind, ANIMAL. The animals in the Typical Pet condition were more typical animals than were those in the Non-pet Animal conditions. How could one tease apart the relative contributions of typicality and social importance to the tendency to make a proper name interpretation? One way to begin to do this would be to broaden further the range of animal kinds under investigation so as to include highly typical animals that are, nonetheless, not typical pets (e.g., elephants, bears). Such a study might help to determine if the strong tendency to make a proper name interpretation in the Typical Pet conditions in these studies is owing to the animals' being typical pets, to their being highly typical animals, or perhaps to their being both.

One last important issue that these experiments do not address concerns the origin of the expectation that some individuals but not others merit reference as individuals (through a proper name). Presumably children learn much information about specific kinds of individual and their distinguishing properties during the preschool years, and presumably children acquire the expectation that individuals appearing in certain social contexts will be given proper names. It is thus an interesting question whether there are any core properties that make certain individuals, from the outset of word learning, better potential candidates for receiving proper names than others.

The results of these experiments add to the set of factors that appear to affect children's tendency to interpret a novel word applied to an object as a proper name, factors that may help children to identify proper names in the linguistic input. Previous research has shown that children are more likely to interpret a novel word as a proper name if it is applied to an object for which the basic-level count noun is known (e.g., a dog) than unknown (e.g., an unfamiliar creature) (Hall, 1991). Furthermore, children appear to be more likely to interpret a novel word as a proper name if it is applied to one rather than two individuals, even though they realize that a given proper name can be used to refer to more than one individual (Hall, 1994; Macnamara, 1982). The current experiments show that, in addition to these factors, the perceived importance of the named individual as an individual (reflected here in its being an animal, and also, per-
haps, its being possessed by someone) also affects the tendency to interpret a novel word applied to it as a proper name.

References


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