Preschoolers’ Default Assumptions About Word Meaning: Proper Names Designate Unique Individuals

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Ninety 4-year-olds took part in this experiment. Children heard a novel word (e.g., “X”) uttered in an ambiguous sentence frame (e.g., “This Y is X,” where “Y” was a basic-level count noun, such as “dog”) and applied to either 1 or 2 drawings of familiar animals. This word could be construed either as a proper name (e.g., “This dog is Fred”) or as an adjective (e.g., “This dog is red”). Children were more likely to interpret the word as a proper name (and less likely to interpret it as an adjective) if it was applied to 1 than if it was applied to 2 objects. Children thus made a default assumption that, in order to be a proper name, a word should be applied to only 1 individual. However, children overrode this default assumption if sufficient contextual information (from additional syntactic cues) indicated that they should do so.

A proper name (e.g., “Jack”, “Jill”, “Spot”) is a word that refers to an individual and picks out that individual, independently of the situation of use, across all the times and places in which that individual appears (see Hall, 1994a; Littschwager & Markman, 1993; Macnamara, 1986). This article explores how children learn which words in the input they hear belong to the category, proper name. Children cannot be born with knowledge of how their particular language marks proper names (or any other word category), because the same lexical categories have different syntactic privileges in different languages. As a result, children need to have some other way of deciding whether a novel word should be interpreted as a proper name.

One way that children might come to discover which of the words they hear are proper names is by exploiting an implicit knowledge of their semantics (see Pinker, 1984, on “semantic bootstrapping”). For example, young children might possess the tacit knowledge that there exist words whose function is to refer (across all times and places, independently of the situation of use) to individuals. If children approached the word learning task with such knowledge, then they would be more likely to expect that a previously unclassified novel word was a proper name if it was paired uniquely with an individual than if it was not. By relying on this knowledge, children would thus be able to narrow down the possibilities about which words in the input were proper names and thereby simplify the learning task.

However, a mundane observation complicates this possibility: Many individuals share the same proper name. The fact that the world is full of men named “Jack,” women named “Jill,” and dogs named “Spot” poses an interesting problem for the proposal that children use semantics to learn proper names, because it reveals that a proper name—a supposed designator of one individual—is often used to pick out more than one individual. If young children regularly encountered such usages, then they could not easily exploit a potentially important cue to which words in the input were proper names—namely, those words that pick out unique individuals. In such cases, a proper name would be potentially confusable with a word from any other category whose members can also be extended across different individuals, such as a count noun (e.g., “dog,” which applies to all dogs) or an adjective (e.g., “furry,” which applies to all furry things). In fact, some scholars have even suggested that proper names used under such circumstances are, in some sense, no longer proper names: “If by chance there should be a room full of Millard Fillmores, then ‘Millard Fillmore’ can no longer function as a proper name should because it will fail to pick out a unique individual” (Miller & Johnson-Laird, 1976, p. 305).

Although any proper name can be used to pick out more than one individual, word learners may nonetheless initially assume that, in order to be a proper name, a novel word should be used to pick out only one individual. This would be a useful assumption to make, because the semantic role of a proper name is to designate a unique individual. Moreover, if children do make such an assumption, this does not imply that they must reject the possibility that a word could pick out more than one individual and still be a proper name. Clearly, young children do learn that the same proper name may pick out many different individuals. Almost certainly by the time they reach school age,
and probably much earlier (see below), they will have encountered two or more individuals bearing the same proper name. Of interest is whether children assume a one-proper-name-to-one-individual rule as a reassignable “default” assumption, that is, in the absence of information to the contrary (Markman, 1992; Merriman & Bowman, 1989; Woodward & Markman, 1991).

One type of evidence that would bear on the question of whether word learners assume—as a default—that a proper name designates a unique individual would come from the study of young children’s initial reactions to encountering multiple bearers of a single proper name (e.g., two boys named “Jack”). Any sign that children were reluctant to accept such usage might suggest that children did indeed expect that proper names should be linked uniquely to individuals. Relevant to this point, Macnamara (1982) made the following observation about his own son’s language development: “For a time, he seemed to assume that proper names were uniquely paired with individuals. The reason for believing so is that when he met his first ‘doppelgänger’ he refused to accept the name. He was at the time 16:13 and had met a cousin of his, Lisa. He was then introduced to a girl of about the same age as Lisa also called Lisa. They played for half an hour, yet, most unusual for him, he refused to say her name, no matter how often anyone said it or urged him. Shortly after that he met three girls all named Aimee and he accepted the name for all three” (p. 28).

Macnamara’s (1982) evidence is consistent with the hypothesis that children do make a default assumption that a proper name should designate a unique individual, and that children view the use of a proper name to pick out more than one individual in some sense as exceptional or marked (i.e., it violates children’s understanding of the semantics of proper names). The evidence is also consistent with the hypothesis that, given sufficient information that a proper name is being used to pick out more than one individual, a child can override this initial assumption and come to accept that it has multiple bearers. Yet although it is suggestive, Macnamara’s evidence is unconvincing for at least two reasons. First, the report is a parental recollection about a single child, and reliability would be greatly increased with more systematic evidence from children in a controlled experiment. An experiment would also provide firmer control over the linguistic input that children heard when learning a new proper name; from Macnamara’s evidence, we cannot be sure of precisely what syntactic cues were used to introduce the new word. Second, the dependent measure that Macnamara used as an index of the child’s initial rejection of the possibility that a proper name could pick out more than one individual—failure to utter the word—is open to alternative interpretations. We cannot be at all sure of what the boy inferred about the interpretation of a proper name with multiple bearers (i.e., “Lisa”) from his remaining silent. Data that also involved a clear positive assessment of children’s interpretation of a word applied to more than one individual—rather than silence—could provide much stronger support for the hypothesis.

A recent study of children’s learning of proper names used a paradigm that could be adapted to deal with the foregoing concerns. Hall (1994b) showed that 3- and 4-year-old children will interpret a word applied to an object drawing and modeled in the sentence frame “This Y is X” (“X” a novel word; “Y” a familiar basic-level count noun such as “dog” or “balloon”) as a proper name under some circumstances, but as an adjective under others. The design of the experiments relied on the fact that a word modeled in the just-mentioned frame is ambiguous between a proper name (“X” being a word like “Fred”) and an adjective or mass noun (“X” being a word like “red” or “lead”). Hall demonstrated that if the word was applied to a drawing of an object of certain kinds with a salient novel property (e.g., a dog with fluorescent stripes), then children tended to interpret it as a proper name for the named individual. However, if the same word in the same sentence frame was applied to a drawing of an object of certain other kinds with the same salient novel property (e.g., a balloon with fluorescent stripes), then children tended to interpret it as an adjective referring to the property. Hall drew these inferences about interpretation on the basis of the other drawings to which the children were willing to extend the novel word. These drawings were of the following: (a) the named object; (b) another object from the same subordinate-level kind lacking the salient property (e.g., a plain dog or balloon of the same type); (c) another object from the same basic-level kind but a different subordinate-level kind lacking the salient property (e.g., a plain dog or balloon of a different type); (d) an out-of-kind distractor with the salient property (e.g., a mushroom with fluorescent stripes); and (e) an out-of-kind distractor of a different kind lacking the salient property (e.g., a plain teapot). Children who extended the word only to (a) were credited with a proper name interpretation, while children who picked both (a) and (d) were credited with an adjective interpretation.

The present study adapted the design of the preceding experiments to test for the existence of a one-proper-name-to-one-individual assumption in preschoolers’ word learning. Instead of hearing a novel ambiguous word for a drawing of an object of one kind (e.g., a dog with fluorescent stripes) or another (e.g., a balloon with fluorescent stripes), preschool children heard a novel ambiguous word for a drawing of either one or two objects of the same kind (e.g., one or two dogs with fluorescent stripes). Furthermore, these objects were all from kinds that have members that children expect to be recipients of proper names (i.e., petlike animals), and children were of an age that clearly has demonstrated sensitivity to both proper name and adjectival construals of the novel word (i.e., 4-year-olds; Hall, 1994b; see also Hall, Waxman, & Hurwitz, 1993; Smith, Jones, & Landau, 1992; Taylor & Gelman, 1988; Waxman & Kosowski, 1990). Given the findings from Hall (1994b), the questions were whether children would (a) take a novel word applied to a drawing of one object (in one condition) as a proper name, but (b) avoid interpreting the same novel word applied to drawings of two objects (in another condition) as a proper name, and instead take it as a word of some other sort, such as an adjective. If children showed this pattern of behavior, then that would be positive evidence that they assume that in order to be a proper name, a novel word should be used to pick out one—not two—individuals.

Recall, however, the claim that the assumption in question should be thought of as a default, that is, as applying only in the absence of information to the contrary. Children do have to learn that proper names may have multiple bearers. So given clear information that a word should be a proper name, 4-year-old children should be willing to allow the word to pick out
either one or two individuals. Thus, this experiment also included two control conditions in which children heard a novel word ("X") presented more unambiguously as a proper name through the use of a wider range of syntactic frames that together clearly implied a proper name interpretation and ruled out an adjective interpretation (i.e., "This Y is X"; "The name of this Y is X"; "This Y is called X"; "This Y's name is X"). In one of these conditions, children heard the word modeled in all these frames and applied to one object drawing (chosen from among the same drawings as in the Ambiguous conditions just described); in the other, they heard it modeled in all the frames and applied to each of two. In light of the strong syntactic evidence calling for a proper name interpretation and blocking an adjective interpretation (and in light of the fact that the children were of an age that is highly sensitive to syntactic cues to lexical category, i.e., they were 4-year-olds), children should have been willing to take the word as a proper name in both cases—as picking out either one or two individuals.

In two further control conditions, children heard a novel word modeled more unambiguously as an adjective (again, as determined by the range of syntactic frames in which the word appeared, i.e., "This Y is X", "This Y is very X", "Look how X this Y is", "This is a very X Y"). These conditions were included in order to determine whether children could construe a novel word applied to the stimuli as an adjective referring to a salient property, irrespective of being taught for one or two referents. In one of these conditions, children heard the word modeled in all the frames and applied to one object, and in the other they heard it modeled in all the frames and applied to each of two. Given the strong syntactic evidence calling for an adjectival interpretation and blocking a proper name interpretation, children should have made an adjective interpretation regardless of the number of objects receiving the label.

To sum up, this experiment permits an assessment of the hypothesis that preschool children assume—as a default—that proper names are words that should be paired uniquely with individuals. In addition, it evaluates an evaluation of the hypothesis that, given additional information (here, unambiguous syntactic evidence that a word is a proper name), 4-year-olds are willing to revise this default assumption and accept that a proper name may be used to pick out more than one individual.

Method

Participants

Ninety 4-year-olds, ranging in age from 4 years 0 months to 5 years 1 month, were included in the study. There were 48 girls and 42 boys. Seventy-one were tested individually in a quiet corner of their nursery school classes during normal school hours; 19 were tested individually in the laboratory. Testing conditions were comparable in the two settings. The numbers of children tested in nurseries and in the laboratory were also comparable in all conditions. (Between 2 and 5 children per condition were tested in the laboratory.) Parents who brought their children to the laboratory received free round-trip taxi ride, but no other compensation. Children were predominantly White and from a range of socioeconomic backgrounds. They were assigned to one of six conditions, with roughly equal numbers of boys and girls in each condition, as follows:

1. Ambiguous conditions. Fifteen were assigned to the One Object Ambiguous condition ($M = 52.7$ months; $SD = 1.9$ months) and 15 to the Two Objects Ambiguous condition ($M = 53.2$ months; $SD = 3.0$ months).

2. Control conditions. (a) Proper Name conditions: Fifteen were assigned to the One Object Proper Name condition ($M = 54.5$ months; $SD = 3.7$ months) and 15 to the Two Objects Proper Name condition ($M = 53.4$ months; $SD = 3.3$ months). (b) Adjective conditions: Fifteen were assigned to the One Object Adjective condition ($M = 54.3$ months; $SD = 2.7$ months) and 15 to the Two Objects Adjective condition ($M = 53.5$ months; $SD = 2.6$ months).

Stimuli

Practice Sets

Two sets of five cards were used for the three One Object conditions (Ambiguous, Proper Name, and Adjective) and two sets of six for the three Two Objects conditions (Ambiguous, Proper Name, and Adjective). Each set consisted of line drawings done in black ink on 2 in. × 4 in. (approximately 5 cm × 10 cm) white cards. In the One Object conditions, Set 1 was made up of three elephants and two horses; Set 2 had four fish and one bear. In the Two Objects conditions, Set 1 had three elephants and three horses; Set 2 had four fish and two bears.

Test Sets

Four sets of five cards were used for the three One Object conditions and four sets of six for the three Two Objects conditions. Each set consisted of drawings done in black ink on 5 in. × 5 in. (approximately 13 cm × 13 cm) cards (some of which were colored in novel ways; see below).

One Object conditions. Each set consisted of the following cards: (a) the Target: a drawing of an object with a salient-colored novel property; (b) the Subordinate-Level Kind Match: a drawing of a different object from the same subordinate-level kind lacking the novel property; (c) the Basic-Level Kind Match: a drawing of a different object from a different subordinate-level kind within the same basic-level kind lacking the novel property; (d) the Property Match: a drawing of an out-of-kind distractor with the same novel property as the target; and (e) the Distractor: a drawing of an out-of-kind distractor lacking the novel property.

An example of a One Object set was the following: (a) Target: a short-haired cat with fluorescent multicolored hatches on it; (b) Subordinate-Level Kind Match: a different plain short-haired cat; (c) Basic-Level Kind match: a plain long-haired cat; (d) Property Match: a ball with fluorescent multicolored hatches on it; (e) Distractor: a plain comb.

Two Objects conditions. The sets were the same as in the One Object conditions, except that the Target now consisted of two cards, each showing a different object from within the same subordinate-level kind.

An example of a Two Objects set was the following: (a) Target: two different short-haired cats, each with fluorescent multicolored hatches on it; (b) Subordinate-Level Kind Match: a different plain short-haired cat; (c) Basic-Level Kind match: a plain long-haired cat; (d) Property Match: a ball with fluorescent multicolored hatches on it; (e) Distractor: a plain comb.

Figure 1 shows a sample test set. Multicolored hatches are indicated by shading. The kinds of objects were the same in the One Object and Two Objects conditions, and the target kinds were all typical pets—cats, dogs, birds, and rabbits. The distractor kinds were all kinds of artifacts—that is, from a different ontological category than the target kinds. See Table 1 for a complete list of the stimulus sets. In addition, a puppet with a pointy beak was used.

Procedure

Children were tested individually. The experimenter introduced the puppet to each child in the following way: "This is my friend. He’s not
very smart and he's going to ask if you can help him today to learn some words. Will you help him?"

**Practice Trials**

The aim of the two practice trials was to familiarize children with the procedure, which involved a yes–no task. Such familiarization was meant to eliminate response bias in the experimental trials. The experimenter said, "First we'll practice a bit." The experimenter laid out the cards from Practice Set 1 (elephants and horses) in a row, in a random order, facing the child. The experimenter said, "Now listen to my puppet. He's going to ask some questions. If you think the answer is 'yes,' tell my puppet 'yes.' But if you think the answer is 'no,' tell him 'no.'" The puppet then spoke. Pointing with his beak, he asked of each drawing, "Is this a horse?" Children usually answered these questions correctly, but they were corrected if wrong. After asking the question of all the drawings laid out in front of the child, the puppet said, "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 you again?" The puppet then asked the questions again, in reverse order, in exactly the same manner. The second practice was exactly the same as the first, except that it involved Practice Set 2 (fish and bear(s)), and the question was "Is this a bear?" After the second practice trial, the experimenter said that now they were going to begin to learn some new words and reminded children one more time to say "yes" if they thought the answer was yes and "no" if they thought it was no.

Several features of the practice trials should be noted. First, to succeed in the practice trials, children had to be willing to say both "yes" and "no" within a single set of drawings. This feature was meant to reduce response bias on the test trials. Second, the questions were formulated using familiar basic-level count nouns, rather than proper names (or adjectives or mass nouns), as in the test trials; this ensured that children received no reinforcement that was relevant to performance on the test trials (and if anything, it should have led children to make object kind interpretations on the test trials). Third, the number of appropriate "yes" answers differed in the two practice sets; this detail meant that children received no reinforcement for giving a fixed number of answers of a given type. Moreover, the number of "yes" answers on the two practice trials corresponded to the number of "yes" answers that children should have made if they made an adjective or mass noun interpretation (Set 1: two "yes" answers in the One Object conditions; three "yes" answers in the Two Objects conditions); and a proper name interpretation (Set 2: one "yes" answer in the One Object conditions; two "yes" answers in the Two Objects conditions). Fourth, Set 1 was used first half of the time, and Set 2 was used first the other half of the time. Finally, the puppet made it clear at the outset that it was forgetful: this was important because children were to be asked for answers twice on the test trials, and it seemed important to make this odd request pragmatically natural.

**Test Trials**

Children received a total of four test sets and thus learned four novel words. To begin, the experimenter laid out one of the four sets of test drawings (either one of the One Object sets or one of the Two Objects sets) so that the Target (either one or two cards) faced the child. The remaining four cards were placed in a random order in a row below the target, closer to and also facing the child. 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 procedural detail was meant to ensure that the objects were all familiar to children. Children always came up with an appropriate answer, although they hesitated, the experimenter sometimes provided clues (e.g., he said, “You make tea in it” for the teapot). Variants of the intended basic-level count noun were accepted (e.g., “kettle” for the teapot; “bunny” for the rabbit). The experimenter subsequently used whatever word the child had used. After the child had labeled the objects, the experimenter stressed that each of the three (or four) objects from the same basic-level kind was a numerically distinct object. He said, for example, pointing to each of the three (or four) cats, “See this cat, and this cat, and this cat (and this cat)? How many different cats do you see here?” The child was encouraged to count each cat as a distinct cat. The experimenter then repeated this information, “So we have three (four) different cats here.” Although the three (four) objects were perceptually distinct (see Figure 1), this important procedural detail was intended to provide added assurance that the child did not construe the drawings as different depictions of the same cat.

The experimenter then said, “Now we’re going to learn a new word. Do you think you could help my puppet?” Children were generally keen to do so. The experimenter continued: “Well, my puppet has to go away for a minute, but he’ll come back soon.” The experimenter put the puppet behind his back, telling the child that the puppet could not longer see or hear the conversation between experimenter and child. The experimenter then said, “Now listen closely” and proceeded as follows:

1. Ambiguous conditions. In the One Object Ambiguous condition, the experimenter pointed to the Target and said, for example, “Do you see this cat? This cat is DAXY.” The experimenter asked the child to repeat the novel word, and then repeated the sentence containing the novel word three more times, making a total of four repetitions of the novel word. In the Two Objects Ambiguous condition, the experimenter pointed first to either the left or the right Target drawing (determined randomly) and said, for example, “Do you see this cat? This cat is DAXY.” He asked the child to repeat the novel word and then repeated the sentence with the novel word three more times, making a total of four repetitions of the novel word. He then pointed to the other Target drawing and said, “And do you see this cat? This cat is DAXY.” He repeated the sentence with the novel word three more times for the second drawing, also making a total of four repetitions of the novel word. 2  

2. Control conditions. (a) Proper Name conditions. In the One Object Proper Name condition, the experimenter pointed to the Target and said, for example, “Do you see this cat? This cat is DAXY.” The experimenter asked the child to repeat the novel word. He then continued by modeling the word in three new sentence frames that implied a proper name interpretation: “This cat’s name is DAXY. The name of this cat is DAXY. This cat is called DAXY.” In the Two Objects Proper Name condition, the experimenter pointed first to either the left or the right Target drawing (determined randomly) and said, for example, “Do you see this cat? This cat is DAXY.” He asked the child to repeat the novel word and then continued: “This cat’s name is DAXY. The name of this cat is DAXY. This cat is called DAXY.” He then pointed to the other Target drawing and said, “And do you see this cat? This cat is DAXY. This cat’s name is DAXY. The name of this cat is DAXY. This cat is called DAXY.” Note that there were four repetitions of the

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1 Note that in both conditions, the novel word was applied a total of four times per drawing. Although this ensured that the conditions were equated for number of label repetitions per drawing, it also meant that children in the Two Objects Ambiguous condition heard the novel word twice as often as those in the One Object Ambiguous condition. This was true to the goal of the experiment and was preferable to equating children in the two Ambiguous conditions in terms of the total number of repetitions of the word, for the following reasons. First, if children were matched on total repetitions of the word, then those in the Two Objects condition would now hear the word applied to each target drawing half as often as children in the One Object condition heard it applied to the single target drawing. This might lead children to attend less to the individuality of the two drawings in the Two Objects condition—to treat them together as more of a single unit—than if they were each singled out and labeled as often as the single drawing in the One Object condition. This was not the intent of the experiment. Instead, the interest was to examine interpretation of a word if one as opposed to two distinct objects were labeled with it. As a result, it seemed important that the individuality of each of the two target drawings in the Two Objects condition be made as salient as the individuality of the single target drawing in the One Object condition. Second, the only way in which the conditions could be equated for total number of repetitions would be by doubling repetitions in the One Object condition (rather than halving repetitions in the Two Objects condition), for reasons that will become apparent from a description of the method used in the Control conditions. However, doubling repetitions in the One Object condition would mean that children would hear eight repetitions of the novel word in exactly the same sentence frame. This seemed excessive, pragmatically odd, and therefore undesirable. Nonetheless, to examine the effect of equating the conditions in terms of total number of repetitions of the novel word, eight 4-year-olds were tested in a supplementary One Object Ambiguous condition in which the novel label was repeated a total of eight times, rather than four. The performance of these children essentially mirrored that of children in the One Object Ambiguous condition used in this experiment, and so will not be discussed further.
novel word per drawing, exactly as in the Ambiguous conditions. (b) Adjective conditions: In the One Object Adjective condition, the experi-
menter pointed to the Target and said, for example, "Do you see this cat? This cat is DAXY." The experimenter asked the child to repeat the
novel word. He then continued by modeling the word in three more sentence frames that implied an adjective interpretation: "This cat is
very DAXY. Look how DAXY this cat is. This is a very DAXY cat." In
the Two Objects Adjective condition, the experimenter pointed first to
either the left or the right Target drawing (determined randomly) and
said, for example, "Do you see this cat? This cat is DAXY." He asked
the child to repeat the novel word and then said: "This cat is very DAXY.
Look how DAXY this cat is. This is a very DAXY cat." He then
pointed to the other Target drawing and said, "And do you see this cat?
This cat is DAXY. This cat is very DAXY. Look how DAXY this cat is.
This is a very DAXY cat." Again, the novel word was repeated four
times per drawing, as in the other conditions.

In all conditions, the experimenter then said, "Okay, can you remem-
ber what I told you? Try to remember what I told you. I hope you will
remember what I told you, because my puppy is coming 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 in
turn, beginning with the Target drawing(s), and then moving down to
the four drawings in the row below, and moving across from left to
right. Of each drawing, he asked, for example, "Is this [basic-level count
noun] DAXY?" Notice that the sentence frame of this question leaves
the category of word ambiguous between a proper name and an adject-
ive or mass noun (see also Hall, 1994b). After asking the questions
once of each drawing in the set, the puppet asked the questions a second
time, in reverse order (i.e., ending up with the Target drawing or
drawings), again under the pretext of having forgotten the child's
answers.

The order of the four sets was balanced across children in each con-
dition. The nonsense words were DAXY, PIFFY, FEPPY, and ZAYY,
and they were matched between pairs of test sets having the same
property.

Results

This section examines the proportions of "yes" answers chil-
dren gave to each drawing and the individual patterns of "yes"
answers children gave across the sets of drawings. Recall the
predictions: (a) In the Ambiguous conditions, children would
take a word applied to one individual as a proper name (i.e., as
picking out that named individual only), but would not take
the same word applied to two individuals as a proper name, and
instead would tend to interpret it as an adjective referring to a
salient property of the named individuals; (b) in the Proper
Name conditions, children would be willing to make a proper
name interpretation regardless of whether one or two objects
were labeled; and (c) in the Adjective conditions, children
would be willing to make an adjective interpretation regardless
of whether one or two objects were labeled.

Proportions of "Yes" Answers

Children received a score from 0 to 1 to reflect the proportion of
"yes" answers they gave to each drawing. For all drawings except
the Target, this scoring was straightforward; for the
Target, children were credited with a "yes" response if they said
"yes" to the one target drawing in the One Object conditions
and if they said "yes" to both target drawings in the Two Objects
conditions. (Note that there was never a case of a child's saying
"yes" to only one of the two target drawings in the Two Objects
conditions.) The mean proportions appear in Table 2.2

The mean proportions of "yes" answers to each of the four
drawings (excluding the Target, which children always selected)
in the six conditions were compared using two-way analysis of
variance (ANOVA), with Number of Targets (one or two) and
Syntax (Ambiguous, Proper Name, or Adjective) as between-
subjects factors. The critical prediction was an interaction be-
tween Number of Targets and Syntax for the Property Match
drawing. Specifically, the Property Match was expected to be
selected less often in the One Object Ambiguous condition than
in the Two Objects Ambiguous condition; this difference was
not anticipated in either the Proper Name or the Adjective
conditions. The rationale for this prediction was that (a) fewer ad-
jective interpretations were expected in the One Object Ambig-
uous condition than in the Two Objects Ambiguous condition,
but no difference was anticipated in either the Proper Name or
the Adjective conditions, and (b) saying "yes" to the Property
Match (in conjunction with answering "yes" to the Target, as
all children did) was crucial to an adjective interpretation (i.e.,
to interpreting the word as referring to the fluorescent property;
see below).

The results supported the prediction. There was a significant
Number of Targets × Syntax interaction for the Property Match,
F(2, 84) = 3.48, p < .05. Simple effects tests revealed that the effect of Number of Targets was significant in the Ambiguous
conditions (M = 0.10, SD = 0.26 in the One Object condition;
M = 0.56, SD = 0.45 in the Two Objects condition),
F(1, 84) = 16.98, p < .0001; the effect was not significant in
either Proper Name or Adjective conditions. The proportions
were low in both One Object Proper Name (M = 0.02, SD =
0.04) and Two Objects Proper Name (M = 0.13, SD = 0.27)
conditions. In contrast, the proportions were high in both One
Object Adjective (M = 0.82, SD = 0.38) and Two Objects Ad-
jective (M = 0.90, SD = 0.26) conditions. The interaction was
not significant for any other drawing.

The ANOVAs revealed four other significant findings. Three
of these were a significant main effect of Number of Targets for
the Subordinate-Level Kind Match, F(1, 84) = 4.30, p < .05,
the Property Match, F(1, 84) = 11.68, p < .005, and the Dist-
actor, F(1, 84) = 4.74, p < .05. In all cases, the result indicates
a weaker tendency to select the drawing in the One Object con-
dition than in the Two Objects condition. There was also a main
effect of Syntax for the Property Match, F(2, 84) = 51.63, p <
.0001, with children selecting the Property Match least in the
Proper Name conditions, most in the Adjective conditions, and
an intermediate proportion of the time in the Ambiguous
conditions.

Individual Patterns of "Yes" Answers

Children were then classified according to the pattern of their
"yes" answers across the four sets of drawings. All children were

2 Recall that children were asked each question twice. The reliabilities
between the proportions of "yes" answers given on the first and second
rounds of questioning were all high and as follows: r = .91 for the Sub-
ordinate-Level Kind Match, r = .96 for the Basic-Level Kind Match, r
= .98 for the Property Match, and r = .82 for the Distractor.
assigned to one of the following mutually exclusive interpretations (cf. Hall, 1994b):

1. **Proper Name interpretation.** The child gave six or more out of eight “yes” answers to the Target drawing (One Object Ambiguous condition) or drawings (Two Objects Ambiguous condition), and four or fewer out of eight “yes” answers to each other drawing;

2. **Adjective interpretation.** The child gave six or more out of eight “yes” answers to the Target drawing(s) and the Property Match, and four or fewer out of eight to each other drawing;

3. **Basic-Level noun interpretation.** The child gave six or more out of eight “yes” answers to the Target and both the Subordinate- and Basic-Level Kind Matches, and four or fewer out of eight to each other drawing;

4. **Subordinate-Level noun interpretation.** The child gave six or more out of eight “yes” answers to the Target and the Subordinate-Level Kind Match, and four or fewer out of eight to each other drawing.

Children who did not fall into any of these categories were credited with an *Other* interpretation. The numbers of children assigned to each of these interpretations appear in Table 3. In all conditions, most children were assigned to either a Proper Name or an Adjective interpretation. Asymmetric log-linear models (see Kennedy, 1992) were fitted to the 2 (number of targets: one or two) × 3 (syntax: Ambiguous, Proper Name, or Adjective) × 2 (interpretation: Proper Name or Adjective) contingency table, with the last variable as the response variable. As with the analyses based on the proportions of “yes” answers, the crucial prediction was an interaction between Number of Targets and Syntax. Specifically, more Proper Name than Adjective interpretations were expected in the One Object Ambiguous condition than in the Two Objects Ambiguous condition. This difference was not anticipated in either the Proper Name or the Adjective conditions.

The prediction of a significant Number of Targets × Syntax interaction was confirmed, \( \chi^2(2, N = 80) = 6.04, p = .05 \). This result did reflect the fact that there were more Proper Name than Adjective interpretations in the One Object Ambiguous condition (Proper Name, \( n = 13 \); Adjective, \( n = 1 \)) than in the Two Objects Ambiguous condition (Proper Name, \( n = 3 \); Adjective, \( n = 8 \)). This was not the case in the two types of Control condition. Children favored a Proper Name interpretation irrespective of being in the One Object Proper Name condition (Proper Name, \( n = 14 \); Adjective, \( n = 0 \)) or the Two Objects Proper Name condition (Proper Name, \( n = 11 \); Adjective, \( n = 1 \)). In contrast, children tended to make an Adjective interpretation, regardless of being in the One Object Adjective condition (Proper Name, \( n = 2 \); Adjective, \( n = 12 \)) or the Two Objects Adjective condition (Proper Name, \( n = 2 \); Adjective, \( n = 13 \)).

In addition, the effect of Number of Targets, \( \chi^2(2, N = 80) = 38.82, p < .0001 \), was significant; there were relatively more Proper Name than Adjective interpretations in the One Object than in the Two Objects conditions. The effect of Syntax was also significant, \( \chi^2(1, N = 80) = 7.10, p < .01 \); specifically, it appeared that the tendency for there to be more Proper Name than Adjective interpretations was greatest in the Proper Name conditions, least in the Adjective conditions, and intermediate in the Ambiguous conditions.4

In summary, the findings from the Ambiguous conditions suggest that children construed a novel ambiguous word (“X”) modeled in the frame, “This [basic-level noun] is X” and applied to a single object as a proper name, but did not construe the same novel word modeled in exactly the same way and applied to two objects as a proper name (and instead often construed it as an adjective). The findings are consistent with the hypothesis that children assume, as a default, that a proper name should be paired with a unique individual. The findings do not imply, however, that children are unwilling to allow that a proper name could pick out more than one individual. If chil-

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3 The criteria used to classify children were the same as those used in Hall (1994b) in order to facilitate comparisons between that study and the present one. It is worth noting, however, that the classifications remained largely unchanged, and there were no statistically significant repercussions, if a tighter criterion of “3 or fewer” replaced the “4 or fewer” criterion.

4 Each of the effects in the log-linear analysis was obtained from a model that was fit to the data after the relevant term was removed on its own from the saturated model. The saturated model was used for this purpose because removing any of the relevant terms (Number of Targets × Interpretation, Syntax × Interpretation, or Number of Targets × Syntax × Interpretation) from it resulted in a significant or near-significant increase in \( G^2 \).
Table 3
Numbers of Children Showing Different Patterns of Interpretation

<table>
<thead>
<tr>
<th>Condition</th>
<th>Proper Name</th>
<th>Adjective</th>
<th>Basic-Level noun</th>
<th>Subordinate-Level noun</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambiguous</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Object Ambiguous</td>
<td>13</td>
<td>1</td>
<td>1</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>2 Objects Ambiguous</td>
<td>3</td>
<td>8</td>
<td>3</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Control</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proper Name</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Object Proper Name</td>
<td>14</td>
<td>0</td>
<td>1</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>2 Objects Proper Name</td>
<td>11</td>
<td>1</td>
<td>2</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Adjective</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Object Adjective</td>
<td>2</td>
<td>12</td>
<td>0</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>2 Objects Adjective</td>
<td>2</td>
<td>13</td>
<td>0</td>
<td></td>
<td>0</td>
</tr>
</tbody>
</table>

Note. N = 15 per condition.

dren received additional, unambiguous syntactic information that blocked one of the two interpretations (as they did in the Control conditions), they overrode their default interpretation and appeared to allow that the same novel word could be either (a) a proper name for either one or two individuals or (b) an adjective for either one or two individuals.

Discussion

Much recent research in the field of lexical development has centered on the question of constraints on interpretation (e.g., Au & Glusman, 1990; Baldwin, 1989; Bloom, 1994; Golinkoff, Mervis, & Hirsh-Pasek, 1994; Hall, 1993; Hall & Waxman, 1993; Landau, Smith, & Jones, 1988; Markman, 1989; Soja, Carey, & Spelke, 1991). One important strand of discussion concerns whether these constraints should be better thought of as inviolable restrictions on interpretation (e.g., Nelson, 1988) or as revisable default assumptions (e.g., Merriman & Bowman, 1989; Woodward & Markman, 1991). As an example of a constraint that should be thought of as a default assumption, Woodward and Markman (1991; Merriman & Bowman, 1989) discussed mutual exclusivity—the constraint that an object should have only one object kind label. On the other hand, it must eventually be revised and overridden, because, for example, the adult lexicon contains many hierarchically related words (e.g., “animal,” “dog,” “poodle”), in violation of mutual exclusivity. On the other hand, mutual exclusivity appears to be an assumption that children do readily make, given no other information about how a novel word should be interpreted—that is, as a default. Moreover, the assumption is highly useful, because much of the child’s early “basic-level” vocabulary is mutually exclusive.

The new constraint on interpretation proposed in this article is clearly of the probabilistic or default sort. Given ambiguous input, children showed clear-cut evidence of respecting the constraint, that is, a tendency to make a proper name interpretation of a novel word if one object was labeled, but to avoid a proper name interpretation (and instead make an adjective interpretation) of the same novel word if two objects were labeled. However, with clear syntactic information, children were willing to override the assumption and to revise their interpretation. The additional syntactic cues led children to make an appropriate interpretation—either a proper name or an adjective irrespectively of hearing one or two objects labeled. Children were not, then, simply unable to allow that a proper name could be used to pick out more than one individual. They appeared to realize that there could be, for example, two dogs both named “Spot.” Instead, they simply found this a marked or exceptional phenomenon, and given the chance to “opt out” of a proper name interpretation (as they were in the Ambiguous conditions), they readily did so.

With this default assumption documented here for the first time with 4-year-olds, it will be important for future research to determine if it guides word learning from the outset, and so might help children initially to determine which novel words they hear belong to the category, proper name. There is some reason to speculate that the assumption does govern the learning of proper names early in development. First, there is evidence that children as young as a year and a half in age will spontaneously restrict the use of a new proper name to only a named individual, ignoring another individual of the same kind also present (Katz, Baker, & Macnamara, 1974; see also Gelman & Taylor, 1984, and Hall, 1991, for a replication with 2-year-olds). This is not direct support for the proposed default assumption, because it does not show that children actively reject a second individual as the referent of a single proper name. However, the evidence is at least consistent with the possibility that the proposed assumption is governing children’s interpretation below 2 years. Second, the evidence reviewed earlier from Macnamara (1982) indicates an active rejection of a second referent for the same proper name at 16 months. However, Macnamara’s anecdotal evidence left it unclear what interpretation a child of that age actually makes when faced with the same proper name for more than one individual. There is room for interesting further investigation of this issue with young children, with possible relevant evidence coming from the study of

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4 It is possible that children’s performance in the Ambiguous conditions was driven not only by the assumption that proper names should be used to pick out unique individuals but also by an expectation that adjectives should be used to pick out more than one individual. It is worth noting, however, that nothing about the semantics of an adjective specifies the number of individuals to which it should apply, whereas the semantics of a proper name actually indicates that it should pick out one individual.
the naturalistic speech of very young children (does it contain proper names that pick out more than one individual?) or subtle experimental tasks. Among the challenges facing researchers who tackle the problem experimentally is to devise a sensitive and unambiguous means of assessing a willingness or unwillingness to make a proper name interpretation when children are too young to appreciate the ambiguity of the sentence frame, "This is X." After all, very young children—unlike 4-year-olds, or even 2-year-olds (Gelman & Taylor, 1984; Katz et al., 1974)—must at some point in development lack any sensitivity to how lexical categories (including both proper names and adjectives) are marked syntactically in their own language.

It is important to be clear, then, about the precise role of the proposed default assumption: It is to direct children toward the words in their language that are proper names by having them conjecture that, wherever they may be, they will be paired uniquely with individuals. This assumption is useful because the semantic function of a proper name is to refer to a single individual, and violations of this function are semantically marked. Thus, the default assumption would not merely be of help to the English-speaking child in disambiguating proper names and adjectives. The fact that the categories of proper name and adjectival overlap (but do not coincide completely) in their syntactic distributions in English is fortuitous. It enables the design of an experiment like the one reported in this article, showing that English-speaking children (who were sufficiently advanced linguistically to appreciate the partial overlap) can be driven away from a proper name interpretation and toward an adjectival interpretation of a novel word simply on the basis of the number of referents to which the novel word was applied. However, the category of proper name need not overlap in its syntactic distribution with another lexical category in order for the proposed assumption to be of great value to the young child.

In a language where proper names do not plausibly overlap at all in their syntactic privileges with any other grammatical category (or even in very young children learning English who, as yet, have no appreciation of the overlap that does exist), children still should initially show reluctance to assign a proper name interpretation to a novel word if it is applied to more than one individual (cf. the evidence from Macnamara's 16-month-old son). The fact that children may not have at their disposal a plausible alternative interpretation to a proper name (such as an adjective in English) does suggest that other indexes would have to be relied on as evidence of the operation of the proposed default assumption (instead of the tendency to make an adjectival interpretation); however, this fact does not rule against the testable possibility that the assumption is universal, guiding children's learning from the outset.

It is worth addressing three questions that could be raised about the interpretation of children's performance in this experiment. First, if children answered "yes" only to the Target drawing(s) in this study, they were credited with a Proper Name interpretation. It is possible that this pattern of answers instead reflected a Subordinate-Level Kind interpretation, albeit a highly restricted Subordinate-Level Kind drawing (e.g., cats of a certain kind with fluorescent multicolored hatchies on them). However, if children did make a restricted Subordinate-Level Kind interpretation when they selected only the Target drawing(s) there would be no obvious explanation for cross-condition differences in the tendency to make this construal. The fact that there were strong differences across conditions in the numbers of children showing this pattern of performance (differences that could be explained on the assumption that it reflected a Proper Name interpretation) makes it seem unlikely that children's selections of only the Target(s) reflected a restricted Subordinate-Level Kind interpretation (see also Hall, 1994b).

Second, children were credited with an Adjectival interpretation in this experiment only if they interpreted the novel word as picking out the fluorescent-colored property. However, children might have taken the word to name some other unintended property of the Target (e.g., nice), and so extended the word to other objects of the same Basic-Level Kind on the assumption that such a property would be shared by all members of a kind (e.g., all cats are nice). Such children would have been credited with a Basic-Level Kind interpretation when they really should have been assigned to an Adjectival interpretation. However, there are two reasons for doubting that this possibility explains the observed differences among conditions. First, it is a good bet that the fluorescent property was the most salient property and thus the best candidate for the meaning of a property term (if children did take the word as a property word); the property clearly drew children's attention and interest. Moreover, the fluorescent property was novel (unlike many other common properties that might have occurred to children, such as nice), and there is considerable evidence to suggest that children will avoid mapping a new word onto a previously labeled meaning (e.g., Clark, 1987). Second, the tendency to make a Basic-Level Kind or a Subordinate-Level Kind interpretation was not very common in any condition. Thus, even if some children did take the word as naming some other property (but were credited with a Proper Name interpretation), this probably would not have exerted a significant impact on the results.

A final concern is that children may have felt uncertain about generalizing the novel word, but this uncertainty would not be captured in the results, because children were required to answer "yes" or "no" to all questions. No data on children's tendency to express uncertainty were gathered in this experiment, and so it is difficult to know what role it may have played in the results. However, it is worth noting that there is no clear rationale for predicting that uncertainty would be expressed exclusively as "yes" or as "no" answers, especially given children's pretest in which they were required to answer both "yes" and "no" within a single set of questions. Nonetheless, it would be of interest to add a category of "Not sure" to future investigations using this paradigm.

The results of this study provide new evidence that children can use semantics (an understanding of what a particular type of word means) to learn words, specifically proper names. Previous work has indicated that children are more likely to construe a word as a proper name if it is applied to a familiar object (i.e., an object for which the basic-level count noun is known) than an unfamiliar object (Hall, 1991). Furthermore, as noted earlier, there is evidence that children are more likely to take a word as a proper name if it is applied to certain kinds of individual (e.g., petlike animals) than if it is applied to others (e.g., artifacts; Gelman & Taylor, 1984; Hall, 1994b; Katz et al., 1974). The present findings add an important new factor to this set: The results suggest that even when a word is applied to a
familiar peltlike animal, children are still more likely to take the word as a proper name if it is applied to one than if it is applied to two individuals.

References


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