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Author(s): Carolyn B. Mervis, Roberta Michnick Golinkoff and Jacquelyn Bertrand  
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# Two-Year-Olds Readily Learn Multiple Labels for the Same Basic-Level Category

**Carolyn B. Mervis**

*Emory University*

**Roberta Michnick Golinkoff**

*University of Delaware*

**Jacquelyn Bertrand**

*Emory University*

MERVIS, CAROLYN B.; GOLINKOFF, ROBERTA MICHNICK; and BERTRAND, JACQUELYN. *Two-Year-Olds Readily Learn Multiple Labels for the Same Basic-Level Category*. CHILD DEVELOPMENT, 1994, 65, 1163–1177. 2 basic frameworks for lexical principles have been proposed (Golinkoff, Mervis, & Hirsh-Pasek; Markman). In many types of situations, these frameworks make the same predictions regarding 2-year-olds' interpretation of novel terms. However, the predictions diverge in some cases. 3 experiments were conducted to address 1 such situation: the case in which the child hears a novel term but already knows a label for each of the objects present. Results of all 3 studies converged on the same outcome: The new term was most likely to be treated as a second basic-level name for the category to which the object belonged. Analyses of individual patterns of responding revealed that, of the 58 subjects, 50 made more basic-level responses than part responses, 1 made equal numbers of basic-level and part responses, and 7 made more part responses than basic-level responses. Implications of these findings for models of early lexical development are discussed.

To account for the rapid word learning which begins late in the second year of life (see Bloom, 1973; Nelson, 1973), a new line of research on the "principles," "constraints," or "biases" that guide lexical acquisition has emerged (e.g., Clark, 1983; Golinkoff, Mervis, & Hirsh-Pasek, 1994; Landau, Smith, & Jones, 1988; Markman, 1989; Merriman & Bowman, 1989; Mervis & Bertrand, 1993; Waxman & Kosowski, 1990). This research is based on the rationale that an important reason why lexical acquisition proceeds relatively rapidly is that the use of lexical principles (or constraints or biases) dramatically reduces the number of hypotheses the child must consider for what a new term might mean. In the present paper, we use the term "principle." Principles operate like the heuristics in problem solving and

are intelligent strategies that have the effect of heightening the likelihood that the child will entertain certain hypotheses over others. That is, principles enable something to occur rather than preventing something that might happen without them (Golinkoff et al., 1994; Slobin, 1973, 1985). Principles may develop as a function of the child's repeated interaction with the world of words and concepts and with the people who are part of the child's world (Golinkoff et al., 1994; Mervis & Bertrand, 1993).

There is considerable agreement on the necessity for positing constraints, principles, or biases (although not unanimity; see, e.g., Nelson, 1988, 1990). A substantial amount of research supporting these principles has begun to accumulate (see reviews in Golinkoff

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koff et al., 1994; Markman, 1989; Mervis & Bertrand, 1993). The use of principles to explain three particular aspects of early lexical acquisition has been stressed. First, the Whole Object principle (Markman, 1989; Mervis, 1987) and the Object Scope principle (Golinkoff et al., 1994; Mervis & Bertrand, 1993) have been proposed to account for children's propensity to interpret a novel word as a label for a whole object rather than for a part or attribute of the object. Second, the Taxonomic principle (Markman & Hutchinson, 1984) and the Categorical Scope principle (Golinkoff et al., 1994; Mervis & Bertrand, 1993) have been offered to account for children's extension of novel words on the basis of taxonomic category membership rather than on the basis of thematic categories. Third, the Novel Name-Nameless Category principle (Golinkoff et al., 1994; Mervis & Bertrand, 1993, in press) and the Mutual Exclusivity principle (Markman & Wachtel, 1988) have been proposed to account for children's ability to map a novel word to an object for which they do not yet have a label.

Two basic frameworks for lexical principles have been offered. Markman (e.g., 1989; Markman & Wachtel, 1988) has proposed that the Whole Object, Taxonomic, and Mutual Exclusivity principles provide the basis for lexical development. In most cases, these principles work cooperatively. However, under certain circumstances, the principles, particularly Whole Object and Mutual Exclusivity, make conflicting predictions. In such cases, the principle of Mutual Exclusivity takes precedence (Markman, 1989). Thus, this principle is the most powerful.<sup>1</sup>

Golinkoff et al. (1994) have proposed the developmental lexical principles framework. This framework emphasizes two aspects of lexical acquisition that have not been stressed in previous work. First, lexical principles are acquired in a developmental sequence. Second, the principles are designed to work in combination with linguistic and nonlinguistic input. None of the prin-

ciples included in the framework is expected to have the type of power that has been attributed to Mutual Exclusivity.

In many cases, these two frameworks yield parallel predictions regarding the extension of a novel word. Nevertheless, there are also important differences. In the remainder of the introduction, we discuss first a common situation in which the two frameworks make the same prediction for how a child will interpret a new word. We then present an important situation in which the two frameworks diverge in their predictions. In this situation, the child hears a novel word in the presence of an object for which he or she already knows a name. The three experiments reported in this paper are concerned with 2-year-olds' interpretations of novel words in this situation.

#### *Situation 1: Novel Word, Nameless Object Available*

A common word-learning situation involves hearing a new term in the presence of a group of objects which includes one object for which the child does not yet know a name. In this situation, the two frameworks yield the same prediction, although for different reasons. Both frameworks predict that the new word will be taken as the name for the basic-level category to which the previously nameless object belongs. This prediction has been confirmed in a number of studies, using children as young as 18 months of age as subjects (Golinkoff, Hirsh-Pasek, Bailey, & Wenger, 1992; Markman & Wachtel, 1988; Mervis & Bertrand, in press; see Woodward & Markman, 1991, for a review).

To arrive at this prediction from Markman's (1989) framework, the following steps are involved. Using the Whole Object principle, the child assumes that the novel word refers to a whole object rather than to a part or attribute of an object. Based on Mutual Exclusivity, the child would map the novel word to the novel object rather than to one of the objects for which he or she already has a name. This is done to avoid attaching a second label to an object for which the child

<sup>1</sup> Merriman and Bowman (1989) also have provided an extensive discussion of ME. As part of this discussion, they note three effects that may provide evidence for ME: disambiguation, correction, and rejection. If ME is upheld, at least one of these effects should be demonstrated. In addition, ME *requires* that the child show the restriction effect (i.e., the child must "not generalize more than one name to the same thing," Merriman & Bowman, 1989, p. 3). Woodward and Markman (1991) agree with this analysis of ME. In contrast to Markman and her colleagues (Markman, 1989; Markman & Wachtel, 1988; Woodward & Markman, 1991), however, Merriman and Bowman (1989) argue that ME is not present in children younger than 2½ years of age (see also Merriman & Schuster, 1991).

already has a name (Markman, 1989). Then, using the Taxonomic principle, the child assumes that the word refers to the (basic-level) category to which the previously nameless object belongs.

To reach this prediction from Golinkoff et al.'s (1994) developmental lexical principles perspective, the following steps are required. Using the principle of Object Scope, the child assumes that the new word refers to a whole object rather than to an action, attribute, or part of an object. Using the Novel Name–Nameless Category (N3C) principle, the child assumes that the new word refers to the object for which the child does not yet have a name. This is done so that the previously nameless object will have a name. Then, using the Categorical Scope principle, the child assumes that the novel word refers to the basic-level category to which the previously nameless object belongs.

*Situation 2: Novel Word, No Nameless Object Available*

What happens when a child hears a novel label but already knows a name for each of the objects present? In this situation, the two frameworks offer divergent predictions. From Markman's perspective, this situation leads to a conflict between the Mutual Exclusivity (ME) and Whole Object principles. According to Whole Object, the child should treat the word as a name for the whole object, even though the child already has another name for the object. According to ME, the child should treat the word as the name for a part or attribute of the object rather than as a second label for the whole object. In such cases, ME takes precedence over Whole Object (Markman, 1989; Markman & Wachtel, 1988; Woodward & Markman, 1991). Thus, the new word most likely would be treated as the name for a salient part for which the child does not yet have a name.

From the perspective of the developmental lexical principles framework (Golinkoff et al., 1994), the child could not apply the N3C principle in this situation, since there is no object available for which he or she does not yet have a basic-level name. In this case, there are a number of alternative possibilities for how to interpret the new

term. The child will rely heavily on linguistic and nonlinguistic input in determining the referent of the new label. For example, if someone was manipulating a salient part of the object as the label was being said, the child might assume that the new term was a name for that part of the object (e.g., "propeller" on a plane). If the utterance in which the label was contained also included the phrase, "a kind of [basic-level name]," the child might assume that the new word labeled the subordinate-level category to which the known object belonged. Or, if no part was being manipulated and no qualifying phrases were included, the child is most likely to assume, based on Object Scope, that the term was simply another name for the object (e.g., "couch" and "sofa"). Then on Categorical Scope, the child would extend the new name to the same basic-level exemplars to which he or she extends the original name.

There has been very little empirical investigation of this type of situation, particularly with children younger than 3 years. Markman and Wachtel (1988), in a study involving preschoolers, found that these children sometimes, but not always, favored ME over the Whole Object principle when the two were in conflict. In some experiments, almost half of the responses conformed to the Whole Object principle (novel word = name for object for which child already had a name) rather than to the ME principle (novel word = name for salient part of the object for which the child already had a name). This finding is in conflict with the claim that ME routinely takes priority over the Whole Object principle. In addition, no pretest was conducted to determine if children already comprehended the "unfamiliar" part names. In fact, the part names (e.g., claw, receiver) used with the familiar categories in some of the experiments were almost certainly familiar to many of the subjects. In such cases, children would be expected to choose the part as the referent of the word because they already knew the meaning of the word, rather than because of ME. Other evidence which may be inconsistent with the priority of the ME principle includes both observational (Macnamara, 1986; Mervis, 1984, 1987) and experimental (Banigan & Mervis, 1988;<sup>2</sup> Waxman &

<sup>2</sup> Banigan and Mervis (1988) found that 24-month-olds who were simply given a new name for an object for which they already had a name were less likely to learn the new name than were children who were given the new name accompanied by a description and demonstration of a salient property of the object that was relevant to the new name. Woodward and Markman

Hatch, 1992; Waxman & Senghas, 1992) data indicating that young children are comfortable having two labels for the same object.

### *The Present Research*

Additional data concerning very young children's willingness to interpret a new term as a label for a category for which they already know a name clearly are needed. In the present paper, we report three experiments using 2-year-olds as subjects that were designed to address this gap. Children's interpretations of a second term were determined by their selections of referents for the new term. Possible referents included members of two clearly different subordinate categories included in the basic-level category labeled by the known label, a member of a different basic-level category from the same superordinate category, a salient part for which the child did not have a name, and an unrelated object. Thus, the set of referents permitted us to differentiate among a variety of possibilities for interpretation of the new term: second basic-level name, part name, subordinate category name, superordinate category name, proper name.

### **Experiment 1**

In this study, children between the ages of 2 years 8 months and 3 years 0 months heard a novel word in the presence of an object for which they already had a name. We were interested in the children's interpretation of the novel word. Given the design of the experiment and the nature of the linguistic input, two alternative responses were most likely, although others were possible. First, children could interpret the second term as a label for a salient part for which they do not yet have a name. This is the response that would be expected if the ME principle has priority (as predicted by Markman, 1989). Second, children could interpret the second term as a second name for the basic-level category. This is the response predicted by the developmental lexical principles framework (Golinkoff et al., 1994). Less likely interpretations were subordinate category label, superordinate category label, proper name, rejection (in which case the

child should choose no referents for the new label), and correction (in which case the child should choose no referents for the old label).

### **METHOD**

#### *Subjects*

Participants were 16 children (eight boys, eight girls) between the ages of 2-8 and 3-0 (mean age: 2-10.10). All children were recruited from middle-class families in the metropolitan Atlanta area and were monolingual speakers of American English. A variety of ethnic groups was represented, although Caucasian children were in the majority. Four additional boys were excluded because of lack of cooperation.

#### *Materials*

The materials were chosen so that we could study four basic-level categories: truck, flower, shoe, and shovel. For each of these target categories, two sets of objects were assembled. The exposure set included two exemplars of the target category. Each exemplar was from a different subordinate category. (The two subordinate categories were chosen to be clearly differentiable by 2-year-olds.) The comprehension set included two sets of five objects: one novel exemplar of each of the two subordinate categories used for exposure, two exemplars of a salient detached part of members of the basic-level category, and one exemplar of a different category from the same superordinate as the target category. Pilot testing confirmed that 3-year-olds did not already have a label for the salient parts. This basis for selecting the salient part is important because according to ME, children will not assign a novel noun to a part if they already know a name for the part. The exposure and comprehension sets for each category are listed in Table 1.

Each basic-level category was referred to by two different names: a known label and an unknown label. For two of the categories, both of the names were English words: truck-lorry, flower-blossom. For the other two categories, one name was an English word, whereas the other was a nonsense

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(1991) have claimed that this difference provides support for ME. However, demonstration of support for ME requires that the restriction effect be upheld (Merriman & Bowman, 1989; Woodward & Markman, 1991). In the Banigan and Mervis study, results of immediate comprehension tests of the new and old labels indicated that, in 96% of the cases in which children learned a new label (regardless of condition), the restriction effect was violated. This finding provides strong evidence contradictory to ME.

TABLE 1  
OBJECTS INCLUDED IN EXPOSURE AND COMPREHENSION SETS

Category	Exemplar 1	Exemplar 2	
<b>Exposure:</b>			
Truck/lorry .....	Pickup truck	Cement truck	
Flower/blossom .....	Tulip	Daisy	
Shoe/morba .....	Maryjane	Sneaker	
Shovel/nupa .....	Sand shovel	Trowel	
	Targets	Parts	Distractor
<b>Comprehension:</b>			
Truck/lorry .....	Pickup truck	Cab	Boat
	Cement truck	Cab	...
Flower/blossom .....	Tulip	Petal	Apple
	Daisy	Petal	...
Shoe/morba .....	Maryjane	Upper	Shirt
	Sneaker	Upper	...
Shovel/nupa .....	Sand shovel	Handle	Wrench
	Trowel	Handle	...

word: shoe-morba, shovel-nupa. Pilot testing with 10 3-year-olds indicated that none of these children identified a truck as the referent for "lorry" and only one child (whose mother spontaneously indicated that she was an avid gardener) identified a flower as the referent for "blossom."

A warm-up set of toys was used to assure children that part responses were acceptable. This set included two plastic rotary dial telephones, two detached dials, two detached receivers, two detached bases, and one 12 × 5 × 6-inch brown plastic basket.

#### *Procedure*

Children were tested individually by two female experimenters (A and B). The experimenters sat across from each other at a child-sized table; the child sat at the end of the table. Sessions were videotaped to provide a means of verifying children's responses.

#### *Warm-Up Task*

The experiment began with a warm-up task. For this task, the telephones and parts of telephones were laid out on the table. The experimenter directed the child's attention to the objects verbally and nonverbally by pointing and saying "Look at these." The experimenter then asked the child to put all the parts into the basket by saying, "Can I have all the parts? Put the parts in this basket." If the child did not respond, the experimenter assisted the child by picking up a part or a whole telephone and asking, "Is this a part? Should I put it in the basket?"

The experimenter then put the object in the basket or back on the table in accordance with the child's answer. In the few cases in which a child tried to put a whole telephone into the basket, the experimenter responded, "Is that a part? I only want parts in this basket." If the child did not spontaneously put the whole telephone back on the table, the experimenter explicitly asked the child to do so. After all the parts were placed in the basket, the experimenter said, "Thanks. You gave me all the parts. That's just what I wanted." All children completed the warm-up task successfully, either by themselves or with minimal assistance from the experimenter.

#### *Experimental Task*

The experimental task consisted of four phases per category. Each child saw exposure and comprehension sets for all four categories. Children completed all phases for one category before beginning the next category. Presentation order of the known and unknown words was counterbalanced such that each child was exposed to the known word first for two categories and to the unknown word first for the other two categories. Order of presentation of categories was randomized across children.

For each of the two trials in a comprehension test (see below), a child had the opportunity to make two choices. The two choices for a given trial constituted the child's response to that trial. Children made a total of four responses per category: one

response for each of the two trials for the known word, and one response for each of the two trials for the unknown word. A child was considered to have chosen an item if he or she placed the item in the experimenter's hands or held the item out to the experimenter or parent. In the few cases in which the child picked up an item and examined it, walked away with an item, or started playing with an item without first showing it or giving it to the experimenter, the experimenter asked the child, "Is that an X?" If the child answered affirmatively, the child was considered to have chosen the item. If the child answered negatively, the item was returned to the table, and the experimenter repeated the comprehension procedure. If the child refused to indicate an item after several requests, the choice was recorded as "none."

*Exposure: Target word 1.*—After the warm-up task, Experimenter A placed the first exposure set on top of the table in front of the child. If the child did not spontaneously attend to the toys, Experimenter A drew the child's attention to the objects by saying, "Oh, look at these." Once joint attention to the objects had been established, Experimenter A provided the three input sentences, as follows: "These are Xs. This is an X. And this is an X." Experimenter A indicated a referent for each input sentence by pointing in the general direction of the exposure set items. Children were permitted to play briefly with the items.

*Comprehension: Target word 1.*—After exposure to target word 1, the exposure set was removed from the table, and the comprehension set for the first comprehension trial was placed in front of the child. The objects were randomly arranged in a horizontal line in front of the child. Experimenter B then asked the child, "Can you give me the X?" After the child indicated his or her choice, the experimenter asked, "Is there another X? Are there any more Xs?" After the child's response, Experimenter B removed the first comprehension set from the table and placed the comprehension set for the second comprehension trial on the table. The same procedure was followed for this comprehension set.

*Exposure: Target word 2.*—After the second comprehension trial, Experimenter B removed the comprehension set and returned the exposure set to the table. Input about the second target word was provided in the same manner as for target word 1, but by Experimenter B. If target word 1 was a

known word, then target word 2 was the unknown word for the same referents. If target word 1 was an unknown word, then target word 2 was the known word for the same referents.

*Comprehension: Target word 2.*—Finally, the exposure set was removed and the first comprehension set was returned. Experimenter A then tested the child for comprehension of the second target word. The same comprehension procedure was used as for target word 1.

*Exposure and comprehension: Remaining target words.*—The same procedure was followed for the known and unknown labels for the three remaining target categories, one category at a time.

## RESULTS AND DISCUSSION

Each child completed two comprehension trials for each word, yielding a total of 16 trials (eight for known words, eight for unknown words). For each trial, children were given two opportunities to select items. Responses for a single trial were coded based on the pattern of items chosen for a given comprehension set. Responses were divided into five types. A "basic" response involved selection of the two whole objects from the target category. A "part" response involved selection of the two object parts. A "subordinate" response entailed choosing only one item, and that item had to be one of the whole objects from the target category. A "mixed" response involved selection of one of the whole objects from the target category and one of the object parts. The remaining responses (e.g., any response that included the distractor) were coded as "other" and were not included in the analyses. Thus, the one superordinate response that occurred was included in the "other" category. The one proper name response also was included in the "other" category. (In the latter case, the child stated that the only referent of the target word was one of the exposure items.)

Preliminary analyses indicated that there were no effects of gender, type of category, or order of presentation. Therefore, these variables were excluded from subsequent analyses. The mean and standard deviation for each response type for known and unknown words are provided in Table 2.

The first question addressed is whether children chose the correct objects in response to the questions about the known la-

TABLE 2  
MEAN NUMBER (And Standard Deviation) OF  
EACH RESPONSE TYPE FOR KNOWN AND UNKNOWN  
TARGET WORDS FOR EXPERIMENT 1  
(Out of 8 Possible)

RESPONSE TYPE	WORD TYPE	
	Known	Unknown
Basic level .....	7.38 (.81)	5.00 (1.75)
Part .....	.06 (.25)	.88 (1.15)
Subordinate .....	.06 (.25)	.63 (.63)
Mixed .....	.31 (.60)	.63 (.62)
Other .....	.19 (.40)	.86 (1.15)

bel. Children responded correctly on an average of 7.38 trials out of 8 possible. Thus, children had no difficulty selecting the correct objects for the familiar term.

The main question of interest in this study was how children interpreted the second, novel, term they were offered for the objects whose names they knew. As Table 2 indicates, out of 8 possible responses, a mean of 5.0 responses involved selections of both items in the same basic-level category as the original labeled objects. This result indicates that the children were comfortable interpreting the novel term as a second basic-level label for the target category. Note that, in order to consider a child's response as indicating a basic-level interpretation, the child had to give the experimenter *both* of the items in the same basic-level category for a given trial, and not give the experimenter any of the other items. The other likely alternative response, part responses, was made only an average of 0.88 times out of 8 possible. These results are consistent with the developmental lexical principles framework. In contrast, the findings are inconsistent with the priority of the ME principle.

To examine the relation between word type and response type, a 2 (word type: known vs. unknown)  $\times$  4 (response type: basic-level, part, subordinate, mixed) ANOVA in which both factors were repeated measures was performed. The dependent variable was the number of each response type given by the child for each word type. The main effects of word type,  $F(1, 15) = 9.64$ ,  $p < .01$ , and response type,  $F(3, 45) = 210.45$ ,  $p < .001$ , were significant. Tukey analyses (see Cicchetti, 1972, for application of post hoc comparisons to significant interactions in factorial designs) revealed that

significantly more basic responses were given than all other response types, for both known labels and unknown labels ( $p < .05$ ). The word type  $\times$  response type interaction also was significant,  $F(3, 45) = 24.30$ ,  $p < .001$ . Tukey analyses revealed that children gave significantly more basic responses for the known word than the unknown word and significantly more part, mixed, and subordinate responses for the unknown word than for the known word ( $p < .05$ ). However, inspection of Table 2 indicates that the modal response for both known and unknown words was a basic response. In fact, an analysis of individual patterns of responding indicated that each of the 16 subjects made more basic-level responses than part responses. Furthermore, although there were significantly more part, mixed, and subordinate responses for the unknown words than for the known words, responses of these types were rare in both conditions. None of these means reached even 1 response (out of 8 possible) per child.

The spontaneous productions of all subjects were reviewed for episodes in which the child seemingly rejected the adult input. An episode included all utterances by the child during a single phase of the procedure in which the child explicitly rejected the target word (e.g., by using some form of "no" in response to the adult input). Six episodes were identified. An examination of the children's responses to the "rejected" word when comprehension was tested indicated that the modal response was a basic-level response. Only one of the responses was a part response.

There were seven episodes in which the child used both the target word and the non-target word as labels for the objects. These episodes suggest that the child was deliberately equating the two words for himself or herself.

In summary, the results of this study indicate that children between the ages of 2-8 and 3-0 readily interpreted a novel term as a second label for a basic-level category for which they already had a name. The modal response for the novel words was a basic-level response; such responses occurred an average of 5 times out of 8 possible. The modal response for each of the 16 subjects was a basic-level response. None of the other four response types reached a mean of even 1 response out of 8 possible. Furthermore, in the few cases in which children appeared to verbally reject the novel word, the

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modal response to these words on the comprehension test was a basic-level response.

### Experiment 2

Experiment 1 indicated that children who were close to 3 years of age readily interpreted a novel term as a second basic-level name for a category for which they already had a basic-level label. To determine if young 2-year-olds also were willing to make this type of interpretation of a new label, subjects in the present experiment were between 2-0 and 2-4.

#### METHOD

##### *Subjects*

Subjects were 32 children (16 boys, 16 girls) between the ages of 2-0 and 2-4 (mean age: 2-0.24) recruited from the metropolitan Atlanta area. All children were monolingual speakers of American English. Ethnic composition was the same as in the previous experiment. Five additional children (two boys, three girls) were excluded because of lack of cooperation. In addition, two boys were replaced because their productive vocabulary size (<10 words) was below the fifth percentile for their age (based on the norms for the MacArthur Communicative Development Inventory; see Fenson et al., 1991).

##### *Materials*

The materials for the experimental task were the same as in Experiment 1. In Experiment 2, however, each child was shown only two of the four categories (either truck and flower or shoe and shovel). Equal numbers of boys and girls saw each category combination. The materials for the warm-up task involved two child-sized shirts and two detached shirt sleeves.

The productive vocabulary list included in the MacArthur Communicative Development Inventory: Words and Sentences (Fenson et al., 1991) was used to provide an estimate of the child's productive vocabulary size. This list includes 680 words.

##### *Procedure*

###### Warm-Up Task

The warm-up task, similar to that used in Experiment 1, was designed to illustrate the part-whole distinction and to assure children that part responses were acceptable. The two shirts and two sleeves were placed on the table in front of the child. The experimenter then asked the child to point to a

shirt. If the child's choice was correct, the experimenter asked the child if there was another shirt. If the child's second choice was correct, the experimenter again laid out both the shirts and the sleeves on the table and repeated the procedure, this time asking for sleeves. All subjects who were willing to respond at all chose the shirts for the first two trials and the sleeves for the last two trials. For the few children who were reluctant to do the warm-up task, the experimenter demonstrated the correct answers. Finally, for all subjects, the experimenter ended the warm-up task by saying, "See. Sometimes I ask for shirts and sometimes I ask for sleeves."

###### Experimental Task

The experimental task was identical to that used in Experiment 1, except that each child saw only two categories. In addition, half of the subjects were given three input statements per target word (as in Experiment 1); the remaining subjects were given five input statements per target word. This manipulation was counterbalanced across all other factors in the design.

#### RESULTS AND DISCUSSION

The possible response types were the same as in Experiment 1. Preliminary analyses indicated that there were no effects of gender, stimulus category, number of input sentences, or order of presentation. None of these variables was included in subsequent analyses.

The first question addressed is whether children gave the correct objects in response to the questions about the known label. Of 4 possible responses, children obtained a mean of 3.00 correct. Thus, children had no difficulty selecting the correct objects for the familiar term.

The main question of interest was how children interpreted the second, novel, term they were offered for the objects whose names they already knew. As Table 3 indicates, out of 4 possible responses, a mean of 1.75 responses involved selections of both items in the same basic-level category as the original labeled objects. This type of response was the modal response for unknown words and occurred more than twice as often as any of the four other types of responses. An analysis of individual patterns of responding indicated that, of the 32 subjects, 24 made more basic-level responses than part responses; seven subjects made more part responses than basic-level responses,

TABLE 3

MEAN NUMBER (And Standard Deviation) OF EACH RESPONSE TYPE FOR KNOWN AND UNKNOWN TARGET WORDS FOR EXPERIMENT 2 (Out of 4 Possible)

RESPONSE TYPE	WORD TYPE	
	Known	Unknown
Basic level .....	3.00 (1.19)	1.75 (1.22)
Part .....	.25 (.51)	.63 (.94)
Subordinate .....	.16 (.45)	.13 (.34)
Mixed .....	.40 (.76)	.75 (.84)
Other .....	.19 (.49)	.74 (.77)

and one subject made the same number of part responses and basic-level responses. Thus, even these very young 2-year-olds were comfortable interpreting novel terms as second basic-level labels for categories for which the children already knew a basic-level name. Note that, as in Experiment 1, for a child's response on a given trial to be considered as indicating a basic-level interpretation, the child had to give the experimenter *both* of the items in the same basic-level category and none of the additional items. The other likely alternative response, part responses, amounted to a mean of only .63 responses out of 4 possible. Once again, the children's performance is consistent with that predicted by the developmental lexical principles framework but does not support the priority of the ME principle.

To examine the relation between word type and response type, a 2 (word type: known vs. unknown)  $\times$  4 (response type: basic-level, part, subordinate, mixed) ANOVA in which both factors were repeated measures was performed. The dependent variable was the number of each response type given by the child for each word type. The main effects of word type,  $F(1, 31) = 9.85$ ,  $p < .01$ , and response type,  $F(3, 93) = 50.37$ ,  $p < .001$ , were significant. Tukey analyses ( $p < .05$ ) revealed that significantly more basic-level responses were made than all other response types, for both the known words and the unknown words. The word type  $\times$  response type interaction also was significant,  $F(3, 93) = 18.45$ ,  $p < .001$ . Tukey analyses revealed a similar pattern of responses to that in Experiment 1. Children made significantly more basic-level responses for the known words and significantly more part responses and mixed responses for the unknown words. Once again, responses other

than basic-level ones were infrequent in both conditions.

The spontaneous productions of all subjects were reviewed for episodes in which the child appeared to reject the adult label. The same criterion was used as in Experiment 1. Four such episodes were identified. As in Experiment 1, the modal response on the comprehension test for these "rejected" words was a basic-level response. No part responses occurred. In addition, there were two episodes in which children used both the target and the nontarget labels for the same objects, suggesting that these children were trying to equate the terms.

In summary, the results of this study indicate that even young 2-year-olds are willing to interpret a novel term as a second basic-level label for a category for which they already knew a basic-level name. The modal response for the novel word, as in Experiment 1, was a basic-level response. These results are consistent with the findings of Taylor and Gelman's (1988) study of young 2-year-olds. In that study, even in cases in which children already knew the name of an object, the modal response to a new label applied to one category member was to interpret the new label as a name for the same category (in our terminology, a basic-level response). In both sets of studies, target-word responses that were not at the basic level were more common when the target word was a second label for an object which the child already could name. However, this result does not negate the importance of the finding that the modal response continued to be a basic-level response.

### Experiment 3

The results of Experiments 1 and 2 indicate that 2-year-olds are comfortable extending novel words to the same exemplars to which they extend the known basic-level category name. However, these findings may be affected by experimental artifacts. The four main methodological concerns involved the manner in which the stimuli were presented during the exposure phase, the use of two experimenters, the question of whether the subjects knew to which object a given part belonged, and the choice of superordinate distractor items.

To address these concerns, several changes were made in the method used in the present experiment. First, the procedure for introducing the objects was changed. In the first two studies, the experimenters pre-

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sented two objects at a time, gestured in their general direction, and then produced a label. In ordinary discourse, this type of situation is not likely to happen if the word produced is a part label. In the present study, the experimenter presented one object at a time and did not gesture at all. This type of situation should be more conducive to a part interpretation of a novel word. Second, it is possible that the subjects in the first two experiments thought that the two experimenters used different words in the presence of the same objects because the experimenters were speakers of different dialects. To preclude this possibility, the present study involved only one experimenter.

Third, although unlikely, it was possible that the children did not know to which objects the parts belonged and therefore did not choose the parts because they did not realize that the parts came from the target objects. In the present study, a posttest was conducted to make sure that the subjects could match the parts to the appropriate objects.

Fourth, although in Experiments 1 and 2 the children selected the same stimuli in response to the known and unknown words, this tendency may have been due to the superordinate distractors included. In particular, these distractors were not from categories closely related to the target categories. The decision to use such distractors had been deliberate, because we were concerned that, if closely related distractor categories were used, 2-year-olds would in fact consider members of the distractor categories to be members of the target categories. For example, it is not unusual for 2-year-olds to consider cars and trucks to form a single category (Hall, Waxman, & Hurwitz, 1993; Mervis, 1984). In the present experiment, we chose to take this risk, in order to provide the children with the opportunity to treat the novel label as referring to an intermediate-level category (e.g., four-wheeled vehicles).

### METHOD

#### *Subjects*

Participants were 10 children (five boys, five girls) between the ages of 2;8 and 3;0 (mean: 2;8.24). All children were from middle-class families residing in the metropolitan Atlanta area and were monolingual speakers of American English. Ethnic composition was the same as in the previous experiments.

#### *Materials*

The objects included in the warm-up task were the same as in Experiment 1.

The exposure sets and the known and unknown labels were the same as those used in Experiments 1 and 2. In the present experiment, however, the objects in the comprehension sets differed in two important ways from those in Experiments 1 and 2. The basic-level items for each target category included four different subordinates, two of which were used only on the comprehension trials. Furthermore, the superordinate distractors were from categories closely related to the target categories. For example, at the basic level this experiment included four different subordinates of the category truck (see Table 4). At the superordinate level, cars were used as the distractor items.

#### *Procedure*

Children were tested individually by one female experimenter. A second experimenter recorded the child's responses as well as any utterances produced by the child referring to the stimuli. The second experimenter was seated behind the child, out of his or her view.

#### *Warm-Up Task*

The warm-up task for this experiment was the same as that used in Experiment 1. All children completed the warm-up task successfully without assistance from the experimenter.

#### *Experimental Task*

The experimental task included the same four phases as in Experiments 1 and 2. However, several changes were made to provide a more stringent test of the hypothesis. First, a single experimenter presented all the stimuli. Second, in the exposure phase, each object was presented individually. Only two input sentences were provided per target word, and no gestures were used by the experimenter.

#### *Follow-Up Task*

At the end of the experimental tasks, one exposure object and one corresponding part from each category were re-presented to the child. To assess whether children recognized the disembodied parts as parts of the target objects, subjects were asked to indicate where on the exposure object the part belonged. All children responded correctly for all categories.

TABLE 4  
OBJECTS INCLUDED IN EXPOSURE AND COMPREHENSION SETS FOR EXPERIMENT 3

Category	Exemplar 1	Exemplar 2		
<b>Exposure:</b>				
Truck/lorry .....	Pickup truck	Cement truck		
Flower/blossom .....	Tulip	Daisy		
Shoe/morba .....	Maryjane	Sneaker		
Shovel/nupa .....	Sand shovel	Trowel		
	Targets Trial 1	Targets Trial 2	Parts	Distractor
<b>Comprehension:</b>				
Truck/lorry .....	Pickup truck Sanitation truck	Cement truck Dump truck	Truck cab Van cab	Car ...
Flower/blossom .....	Tulip Rose	Daisy Violet	Daisy petal Rose petal	Fir tree ...
Shoe/morba .....	Maryjane Hightop	Sneaker Moccasin	Sneaker upper Oxford upper	Sock ...
Shovel/nupa .....	Sand shovel Trowel	Flat shovel Garden shovel	Loop handle Straight handle	Rake ...

RESULTS AND DISCUSSION

The possible response types were the same as those in Experiments 1 and 2. Preliminary analyses indicated that there were no effects of gender, stimulus category, or presentation order for known and unknown words. The mean and standard deviation for each response type for known and unknown words are provided in Table 5.

The first question addressed is whether children gave the correct objects in response to the questions about the known label. Of 8 possible responses (2 per category), children selected the 2 exemplars of the basic-level categories and no other objects a mean of 4.80 times. In addition, children also selected the two exemplars of the basic-level

category and the close superordinate distractor a mean of 2.0 times. For example, four of the 10 children selected the car in addition to the trucks in response to a request for the trucks. Such child-basic responses by 2-year-olds have been well documented and indicate that children's basic-level categories often are broader than those of adults (Banigan & Mervis, 1988; Mervis, 1984, 1987; see also Hall et al., 1993). Adding together the number of responses which included only the adult basic-level objects with those that included the child basic-level objects as well results in a mean of 6.80 basic-level responses out of 8 possible. Further support for the claim that the "superordinate" responses actually represented child-basic responses comes from the distribution of these responses across the four target categories. These responses occurred for the three target categories for which it would be reasonable to include the superordinate distractor in the same child-basic category. In contrast, these responses never occurred for the fourth target category, shoe. In this case, the closely related distractor, a sock, was thematically related to the shoe category but was not enough like a shoe to be expected to be included in a child-basic category. In sum, children seemed to have little difficulty selecting the correct referents for the known labels.

The main question of interest in this study was how children interpreted a second, novel term for objects whose names

TABLE 5  
MEAN NUMBER (And Standard Deviation) OF EACH RESPONSE TYPE FOR KNOWN AND UNKNOWN TARGET WORDS FOR EXPERIMENT 3 (Out of 8 Possible)

RESPONSE TYPE	WORD TYPE	
	Known	Unknown
Basic level .....	4.80 (2.30)	4.40 (2.34)
Part .....	.10 (.32)	.10 (.32)
Superordinate .....	2.00 (1.82)	2.10 (1.60)
Mixed .....	.60 (.84)	.50 (.85)
Other .....	.50 (.70)	.90 (1.05)

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they already knew. As Table 5 indicates, out of 8 possible responses, a mean of 4.40 responses were selections of both items in the same basic-level category as the original labeled objects (and no other items). Here, as in response to the known label, children sometimes selected not only the adult-basic referents but also the child-basic referents (mean = 2.10 responses). For example, four of the 10 subjects selected the car and the two trucks included in a single trial as "lorries." Adding these two means together yields a mean of 6.50 out of 8 possible responses. Once again, these child-basic responses occurred for three of the four target categories but did not occur for the shoe category. In most cases, children either made child-basic responses for both the known and the unknown names for a single category or did not make child-basic responses for either. Thus, the combined mean indicates that children were comfortable interpreting novel terms as having the same referents as the known terms. An analysis of individual patterns of responding indicated that basic-level responses (including both adult-basic and child-basic categories) were the modal response for each of the 10 subjects.

The other likely alternative response the child could have made would have been to interpret the novel term as the name of the salient part of the object. However, even though the discourse context was altered so as not to bias the child against construals of the novel term as the name for a salient part, part responses occurred only a mean of .10 times out of 8 possible.

To examine the relation between word type and response type, a 2 (word type: known vs. unknown)  $\times$  4 (response type: basic-level, part, subordinate, mixed) ANOVA in which both factors were repeated measures was performed. The dependent variable was the number of each response type given by the child for each word type. Neither the main effect of word type,  $F(1, 9) = 2.25$ , nor the interaction between word type and response type,  $F(3, 27) = 0.18$ , was significant. The main effect of response type,  $F(3, 27) = 17.47$ ,  $p < .001$ , was significant. Tukey analyses revealed that significantly more basic responses were given than all other response types ( $p < .05$ ).

The spontaneous productions of all subjects were reviewed for episodes in which the child seemingly rejected the adult input.

The same criteria as in Experiments 1 and 2 were used for "rejection." There was only one such episode. On the comprehension test, this child made basic-level responses for both trials involving the "rejected" word.

### General Discussion

Two basic frameworks for lexical principles (Golinkoff et al., 1994; Markman, 1989) have been proposed. In many cases, these frameworks make the same predictions about the interpretation of a novel word. For example, in cases in which a novel term is produced in the presence of an object for which a 2-year-old does not know a name, both frameworks predict that the child will interpret the new word as the name of the (basic-level) category to which the previously nameless object belongs. This interpretation has been shown to be correct (Golinkoff et al., 1992). However, this interpretation is based on different principles within the two approaches. Within Markman's framework, the primary principle involved in this decision is ME. The motivation behind this principle is negative: to avoid second labels for objects for which the child already has a name. Within the developmental lexical principles framework (Golinkoff et al., 1994; Mervis & Bertrand, 1993), the primary principle involved is N3C. The motivation behind this principle is positive: to find labels for unnamed objects.

In other word-learning situations, the two frameworks offer different predictions. Such a situation occurs when the child hears a new term, and he or she already has a name for each of the objects present. In this situation, ME is expected to take precedence over the Whole Object principle. In particular, Markman (1989, p. 201) states, "Children hearing a label applied to a familiar object should, on the basis of mutual exclusivity of labels, reject the term as a label for the whole and assume that it refers to the part [of the object] instead." In contrast, because the N3C principle applies only if there is an object available for which the child does not yet have a name, that principle will not be used in the present situation. Golinkoff et al. (1994) have argued that, instead, the child will pay particular attention to linguistic and nonlinguistic input in this type of situation. If the input is relatively neutral, the child is likely to treat the new term as a second label for the object for which he or she already had a name.

The experiments reported in this paper were designed to address this second type of situation. The results of all three experiments converged on a single outcome: A novel term heard in the presence of only objects for which the child already has a name will most likely be interpreted as a second basic-level name for the category to which the object(s) belongs. This finding was obtained both for children who had just turned 2 years of age and for children who were close to 3 years of age. In all three experiments, subjects made significantly more basic-level responses than part responses. This finding is robust; analyses of individual patterns of responding revealed that, of the 58 subjects who participated in the three experiments, 50 made more basic-level responses than part responses, one made equal numbers of basic-level and part responses, and only seven made more part responses than basic-level responses.<sup>3</sup>

We have argued that our results indicate that 2-year-olds are comfortable treating a novel term as a second basic-level name for an object for which they already have a basic-level name. Our experiments were designed to rule out the possibility that the novel terms were interpreted as subordinate-level names, intermediate-level names, or superordinate-level names; as proper names; or as part names. One possibility that was not definitively ruled out by these studies, however, was that children interpreted the novel terms as names for the substance of which the items were made. This interpretation is unlikely, for at least three reasons. First, if children interpreted the novel terms as substance names, responses should have included both parts and whole objects made of the same substance. This type of response did not occur. Second, Soja, Carey, and Spelke (1991) have argued that children

younger than 3 years of age are able to learn names for nonsolid substances, but not for solid substances. All the stimuli used in the present studies were made of solid substances. Third, Hall et al. (1993) reported that 2-year-olds interpreted both novel nouns and novel adjectives used in the presence of objects for which the subjects already had a name as object names rather than as names for the (solid) substances from which the objects were made. Given the nature of their stimulus sets, it is impossible to determine the hierarchical level to which the child assigned the new term. However, Hall et al. (1993, p. 1663) raise the possibility that 2-year-olds “simply may require explicit mention of the familiar basic-level count noun in order to be willing to assume lexical contrast, and thus to move beyond interpreting a novel word as referring to a (basic-level) object kind.” This possibility fits well with the emphasis placed by the developmental lexical principles framework on the importance of linguistic and nonlinguistic input for determining the interpretation of a novel term in this type of situation.

In conclusion, a major difference between Markman’s (1989) framework and the developmental lexical principles framework (Golinkoff et al., 1994; Mervis & Bertrand, 1993), involves the relative power allocated to lexical principles and to input in determining the meanings of novel terms. Mutual Exclusivity is an extremely powerful principle, intended to override the Whole Object principle in cases in which the two conflict (Markman, 1989; Woodward & Markman, 1991). Although input may eventually play a role, this role has not been elaborated, and preliminary statements suggest that extensive input would be needed to override ME (Markman, 1989, p. 197).<sup>4</sup> In contrast, N3C is a relatively weak principle

<sup>3</sup> To ensure that children were not making basic-level responses simply because they were unwilling to select parts within the type of comprehension paradigm used in the present experiments, this paradigm was used to test an additional group of 11 2-year-olds (range: 1;11 to 2;6) for comprehension of three part names (hand, wheel, zipper) expected to be familiar to 2-year-olds. Children made part responses on 91% of the trials. Thus, the predominance of basic-level responses in Experiments 1–3 is not an artifact of children’s unwillingness to select parts in this type of comprehension paradigm.

<sup>4</sup> Merriman and Bowman (1989) have stated that ME should be treated as a default assumption. In particular, ME is assumed if there is no strong conflicting evidence. Merriman (1991) has described several situations in which input might override ME. None of these situations is applicable to the present studies. As MacWhinney (1991, p. 194) stated in his response to Woodward and Markman (1991), it is important for ME to “generate detailed experimental predictions.” As these predictions are generated within the context of ME as a default assumption, they may well converge with those from the developmental lexical principles framework (Golinkoff et al., 1994).

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which does not have occasion to override the Object Scope principle. When no object for which the child does not have a name is available, N3C is not involved in determining the initial referent of a novel term; this task is left primarily to linguistic and/or non-linguistic input. Both ME and N3C lead to the same interpretation when an object for which the child does not yet have a name is available. Our findings, derived from situations in which no such object was available, suggest that, rather than designing a framework in which principles are given most of the power, there is reason to consider allocating a significant portion of this power to the input instead.

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