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Some Reasons for the Occurrence and Eventual Correction of Children's Naming Errors

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MERRIMAN, WILLIAM E. *Some Reasons for the Occurrence and Eventual Correction of Children's Naming Errors.* CHILD DEVELOPMENT, 1986, **57**, 942–952. Some possible reasons for the occurrence and eventual correction of children's naming errors were evaluated in an experiment in which 2½-, 4-, and 6-year-olds learned 2 artificial object names in succession. The 2½-year-olds generalized names more broadly in reception than did the older children, primarily because of a greater tendency to select objects lacking a property identified in training as being defining. The compatibility of this result with those of previous developmental studies of name and category generalization is discussed. Support for the claim that the acquisition of new names can compel the correction of overextensions was obtained for the older children but not for the 2½-year-olds. Additional evidence suggested that the 2½-year-olds found it difficult to coordinate correction of an old name with construction of a contrastive reference for a new name. Input highlighting a common property of the referents of a new and old name tended to reduce children's tendency to correct the old name and tended to increase their tendency to treat the names as synonyms. Input highlighting a unique property of the new name's referent did not affect children's responses.

The examination of children's naming errors has provided valuable insights into the nature of early lexical development (Anglin, 1977; Clark, 1973; Rescorla, 1980). These errors are of two types—overextension, which is judgment that a word can name something that it cannot (e.g., calling a zebra "doggie"), and underextension, which is judgment that a word cannot name something that it can (e.g., denying that a chihuahua can be called "doggie"). A child may commit both types of errors with the same name (Anglin, 1977). A theory of lexical development should be able to answer at least two questions about such errors: Why do they occur? How are they corrected?

An artificial-name training experiment was conducted to provide data relevant to both questions. In the first phase of the experiment, age-related differences in how broadly children generalize a new name were examined. Such differences must be taken into account in an explanation of why naming errors occur when they do. In the second phase of the experiment, children's tendency to react to the introduction of a new name for an object by deleting that object from the reference of an old name was examined. If this tendency exists, then the acquisition of new names is likely instrumental in children's correction of overextensions. The relation of this tendency to children's age and to variation in the way a new name is introduced was also examined.

Generalization of New Names

The most commonly proposed reason for the occurrence of underextensions is that children sometimes hear a name used in reference to only a small, unrepresentative sample of its acceptable referents before they begin to use the name themselves (Anglin, 1977; Nelson & Bonvillian, 1978). The finding that young children commit more underextensions than do older children (Anglin, 1977; Nelson & Bonvillian, 1978) must be at least partially attributable to the fact that younger

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children have been exposed to smaller, less representative learning samples than have older children. However, differences in generalization tendencies may also contribute to this developmental trend. According to Nelson and Nelson's (1978) cognitive pendulum theory, when learning samples are controlled, children's tendency to generalize a new name increases from 2 to 6 years old. This claim is supported by the results of several name training experiments (see Nelson & Nelson, 1978). According to Nelson and Nelson, because the names that 6-year-olds know tend to be more general, 6-year-olds tend to generalize new names more broadly than do 2-year-olds.

Conflicting predictions concerning name generalization can be derived from Kendler and Guenther's (1980) treatment of category generalization. They argue that from 2 to 6 years, a change from an associative to a symbolic mode of behavioral regulation occurs (Kendler & Kendler, 1975; T. Kendler, 1979). Underextensions are a consequence of initially incomplete representations in the symbolic mode and therefore are committed most frequently by children in the middle of this age range. Overextensions are a consequence of stimulus generalization in the associative mode and therefore decline in frequency over this age range. Thus, category generalization should be broader in 2- than in 4-year-olds. Category generalization in 4- and 6-year-olds should be nearly equal in scope since the developmental decline in overextensions should offset the developmental decline in underextensions. Kendler and Guenther's predictions were confirmed by an experiment in which children had to judge whether pairs of dogs from the same or different subordinate categories were similar.

There are several differences between the paradigm used by Nelson and his colleagues and that used by Kendler and Guenther. Only the former involved naming. Children's naming does not always correspond to other measures of their categorization. For example, young children tend to relate objects thematically, rather than taxonomically, in object sorting but tend to give taxonomically related objects, rather than thematically related objects, the same name (Markman & Hutchinson, 1984). Moreover, Nelson and his colleagues used production as their dependent measure whereas Kendler and Guenther used reception. The present experiment examined whether age-related trends in the receptive generalization of a new name would more closely approximate the trends obtained by Nelson and his colleagues or the trends obtained by Kendler and Guenther.

In order to have a way of identifying overextensions and underextensions in the present experiment, a single object property was designated as the defining property of the trained name. In training, this property was highlighted both verbally and gesturally and a function correlated with this property was demonstrated. Children's generalization of the name was examined for whether it included objects lacking this property, which were considered overextensions, and for whether it excluded objects possessing this property, which were considered underextensions.

Integration of New and Old Names

Children can detect their own underextensions simply by observing others' use of names. However, detection of overextensions depends on receiving information about how names *cannot* be used. Explicit corrections, such as being told, "That's not a dog," convey such information, but children may receive such corrections only occasionally. Thus, some implicit correction may also occur.

Several theorists (Barrett, 1978; Clark, 1973, 1983; Pavlovitch, 1920) have proposed that new names may be interpreted as implicit corrections of old names. For example, children who call zebras "doggies" might stop once they learn to call zebras "zebras," even if no one tells them zebras are not doggies (Clark, 1973). The introduction of new names for what children believe they can already name is likely a frequent event and thus could account for much of the decline observed in overextensions during early childhood. Also, for this corrective process to occur, children must assume that new and old names contrast. The first principle of Clark's (1983) most recent theory of lexical development is that young children have just such a contrastive disposition.

Diary accounts indicate that overextensions tend to subside as new names are acquired (Barrett, 1978; Clark, 1973). However, diary accounts only contain name production data. Children who appear to replace an old name with a new name in production might actually only prefer the new name—without believing the old name to be wrong. Only studies of name reception can indicate whether a child who acquires a new name immediately corrects the reference of an old name and interprets the two names contrastively. Two studies are relevant. Carey and

Bartlett (1978) found that some preschoolers contrasted a new color word with a color word they already knew but that others did not. Mervis (1984; Mervis & Canada, 1981) found that toddlers did not contrast new object names with old object names.

Although the reception studies suggest no strong disposition toward lexical contrast, several questions about the way in which children integrate the reference of new and old names need to be answered. First, the sensitivity of the process to developmental level is not known. Introducing new names might have corrective effects only in older children. The cognitive ability to coordinate beliefs about a new name with beliefs about an old name is necessary—but not sufficient—for children to infer from the introduction of a new name that they have overextended an old name. This ability might not be present at the outset of word learning. Also, children may not consider that the introduction of a new name might necessitate a reinterpretation of an old name until they have had a great many experiences in which an old name is explicitly corrected either at the same time as or shortly after a new name is acquired.

Second, the effect of variation in the input accompanying the introduction of a new name on the name's integration with old names is not well known. Mervis (1984) found that 1- and 2-year-olds would not even learn a new name unless they discovered a unique property of the name's referents. The present experiment examined whether highlighting a unique property of the referent of a new name would increase the tendency of children between 2½ and 6 years old to contrast the new name with an old name. The experiment also examined whether highlighting a common property, one shared by the referents of both the old and new name, would reduce this tendency.

After the first phase of the present experiment, in which children selected the objects that they judged to be referents of the first trained name, a second name was introduced in reference to one of the selected objects. Input accompanying the introduction of the second name varied according to whether a common, a unique, or no property of its referent was highlighted. The experiment also included a control condition in which the second name was introduced in reference to an object children had *not* selected as a referent of the first name. Children's receptive generalization of both the first and second name was then assessed. Analyses of these generalizations indicated whether children reacted to the introduction of the second name by deleting its training referent from the reference of the first name, how the children related the two names (e.g., whether they contrasted them), and whether children who did delete objects from the reference of the first name transferred all deleted objects to the reference of the second name. According to Barrett (1978) and Clark (1973), a complete transfer should occur. Finally, a small group of 2½-year-olds were tested for their reaction to explicit instruction that the first name could not name the training referent of the second name.

Method

Subjects

Participating were 156 children: 60 2½-year-olds (mean age = 2-9, range = 2-5 to 2-11); 48 4-year-olds (mean age = 4-4, range = 3-9 to 4-10); and 48 6-year-olds (mean age = 6-3, range = 5-8 to 6-10). There were equal numbers of boys and girls in every age × instruction condition. The 2½- and 4-year-olds were located through published birth records. The 6-year-olds were kindergarten students from a suburban Minneapolis parochial school. Eight children had to be replaced because of experimenter error, lack of cooperation, or failure in the reception pretest.

Materials

Three different sets of 11 objects were constructed. Each child saw objects from only one set. Within each set, two objects served as training examples. Which of the pair served as the first training example was counterbalanced. The second training example and six other objects comprised the choices in the first reception test. All objects, including the two training examples, comprised the choices in the second reception test.

The object sets were constructed so that no object was a correct referent of a specific name that the children were likely to know. Objects were 4–10 cm long. Set A consisted mostly of spheres to which sponges had been attached. Set B consisted mostly of toy three-wheeled motorcycles from which various parts had been removed (e.g., handlebars) and to which various parts had been added (e.g., a plastic radar dish). Set C consisted mostly of plastic sheets or pockets. Within sets, objects varied in the color, size, and texture of the parts. No child objected to the experimenter's use of the training names in reference to the training examples. Moreover,

only two children were unwilling to generalize the names to objects in the sets.

The two training examples were made to be very similar so that children would generalize a name learned in reference to one training example to the other. The other objects were constructed to bear some similarity to the training examples, except for the **distinctive object**, which lacked one property that all other objects possessed and possessed one property that all other objects lacked. For example, in set B one object lacked wheels and possessed a unique, bottle-shaped part.

An artificial name was invented for each training example. For set A, the names were "pilson" and "tukey"; for B, "mave" and "hust"; for C, "jegger" and "syvane."

A cup of water, paper towel, and some tea leaves (for set A), and a crayon, pencil, and pen (for set C) were used to demonstrate the function of the first training example. A set of 24 pictures of common objects was used in a task that intervened between name training sessions.

Procedure

All subjects were tested individually, the 6-year-olds in a private room at their school and the younger children in a lab room at the university. Only the 2½-year-olds had a parent sit with them during the experiment. Parents were instructed not to assist their child in deciding which objects to pick during testing.

The author served as experimenter. The child and experimenter sat at a table and played with a doll for several minutes. The experimenter told the child a story about how the doll had to go to the store to find spoons for her mother. The child was then shown a tray on which two spoons and the seven objects for the first test were randomly arranged. In order to test the ability to answer reception questions, the child was asked to help the doll find the spoons. All but two of the 2½-year-olds picked out the two spoons and no other object. The tray was removed. The child was told, "The doll has to go back to the store to find all the [first training name (FTN)]s she can. The doll doesn't know what a [FTN] is. We have to show her a [FTN]." The child was shown the first training example and was told, "This is a [FTN]." The experimenter pointed out a physical property of the object and demonstrated its function. This property shall be referred to as the **defining property**. For set A, the defining property was a sponge. Children were told that the pilson (or tukey) could be used to make shapes by dipping its sponge in water and then pressing it on a paper towel. For set B, the defining property was a front wheel. Children were told that the hust (or mave) could be pushed along with its front wheel up in the air. For set C, the defining property was a pocket. Children were told that pencils, pens, and crayons could be put inside the jegger's (or syvane's) pocket. For every set, the experimenter demonstrated the function as he described it. Children were asked to imitate this demonstration. All complied, most with great enthusiasm.

The training example was removed. The child was shown the tray containing the seven test objects and was told, "Give the doll all the [FTN]s you can find." The experimenter recorded the child's selections.

The child looked at pictures for 10 min. This delay was included to improve the analogy between the experimental procedure and the sequence of events in natural word learning. Two related names are seldom introduced in immediate succession. The delay also ensured that the first name was retrieved from long-term rather than from short-term memory during acquisition of the second name.

The child was shown the doll and told that it was "going to learn what a [second training name (STN)] is." The second training example was then shown, unless the child was in the control condition, in which case the **distinctive object** was shown. The child was told, "This is a [STN]." The procedure then varied according to instructional condition:

Control condition and no-property condition.—The experimenter named the object at least three times while the child examined it. When the child finished examining the object, the experimenter removed it, saying, "So that is what a [STN] is." The control condition differed from all other conditions in that the referent of the STN was *not* an object that the children had previously selected as a referent of the FTN. The control condition was included to measure changes in the reference of the FTN that occurred spontaneously over the course of the experiment—that is, changes that were not caused by learning a new name for an object within its reference.

Unique-property condition.—The experimenter pointed out a physical property of the object that was not shared by the first training example and demonstrated its function. The experimenter named the object at least three times while the child examined it. For example, in set A, the experimenter pointed to a part, saying, "A tukey has a furry top. Do you

know what you can do with the top of the tukey? You can sweep up dirt with the top of the tukey." The experimenter demonstrated, then asked the child to imitate.

Common-property condition.—The experimenter pointed out the same physical property and demonstrated the same function that he had for the referent of the FTN. The experimenter delivered exactly the same instructions as he had for the FTN, except that the STN substituted for the FTN.

Explicit-correction condition.—This condition was similar to the no-property condition, except that, in addition to being introduced to the STN several times, children were repeatedly told that the training object was not an FTN. Mothers have been observed to introduce a new name and correct their toddlers' use of an old name at the same time (Gruendel, 1977). This condition was added after the other conditions had been administered. Only the 2½-year-olds received this instruction, because, unlike the older children, they had not responded with contrastive interpretations in the other conditions. This condition was added to determine whether they were even capable of contrasting two names that they had been told were contrastive. For simplicity of exposition, the results of this condition are presented with the results of the main experiment.

After the second training example was removed, the experimenter asked the child, "Remember when we had to help the doll find [FTN]s at the store? Well, she went to another store and wanted to find [FTN]s there, too. Can you help the doll find [FTN]s again?" The child was shown a tray on which all 11 test objects were randomly arranged and was told, "Give the doll all the [FTN]s you can find." The experimenter recorded the child's selections. After the child indicated that he or she had given the doll every FTN, the experimenter put all of the objects back on the tray and told the child, "Give the doll all the [STN]s you can find." The experimenter recorded the child's selections.

The procedure for the 4- and 6-year-olds was the same as that for the 2½-year-olds, except that the ability to answer reception questions was not pretested and the task was not couched in terms of a doll going to the store. Statements and requests about names or objects were made directly to the child. For example, during the comprehension tests, a child was asked to "Pick out all the [whatever name was being tested]s you can find." As already noted, the two older groups did not receive the explicit-correction condition.

Results

Children's name generalization was assessed by analyzing their selections in the first test. Their integration of the two names was then assessed by analyzing changes in FTN generalization from the first to the second test and by analyzing the relations between the sets of objects chosen in response to each name.

Generalization of the First Name

Generalization of the first name was assessed with a 3 (age) × 2 (sex) × 6 (test set: set A—"pilson," set A—"tukey," set B—"hust," set B—"mave," set C—"jegger," set C—"syvane") analysis of variance of the number of objects chosen in the first test. The age effect was significant, $F(2,120) = 3.74$, $p < .05$, as were the test-set effect, $F(5,120) = 2.73$, $p < .05$, and age × test-set interaction, $F(10,120) = 2.40$, $p < .05$. The 2½-year-olds chose more objects (3.36 out of 7) than either the 4-year-olds (2.64) or 6-year-olds (2.79). The test-set main effect was likely due to differences between the sets in average similarity to the training example. The behavior of the 6-year-olds accounted for the interaction; they selected 1.31 more objects in set A than did the 4-year-olds but 0.44 fewer in sets B and C. Although test sets varied in the number of objects possessing the defining property (4, 3, and 5 in sets A, B, and C, respectively), this variation did not account for the interaction. The reason for the interaction is not obvious.

The importance of the defining property in children's name generalization was assessed. A 3 (age) × 2 (sex) × 6 (test set) × 2 (± defining property) analysis of variance of each child's probability of selecting objects that either possessed or lacked the defining property yielded significant effects of age, $F(2,120) = 4.67$, $p < .05$; test set, $F(5,120) = 3.27$, $p < .01$; and property, $F(1,120) = 241.48$, $p < .00001$. Several interactions were significant: age × test set, $F(10,120) = 2.23$, $p < .05$; age × property, $F(2,120) = 8.75$, $p < .001$; test set × property, $F(5,120) = 11.21$, $p < .0001$; age × test set × property, $F(10,120) = 1.92$, $p < 05$; and sex × test set × property, $F(5,120) = 2.99$, $p < .05$.

Although all children were much more likely to select objects that possessed the defining property than objects that lacked it, this differential probability increased with age. The mean probabilities of selecting ob-

jects possessing versus lacking the defining property were .57 versus .33 for the 2½-year-olds, .52 versus .17 for the 4-year-olds, and .59 versus .12 for the 6-year-olds. Trend analyses of the age effect revealed a significant negative linear trend in selection of objects lacking the defining property, $F(1,155) = 12.91$, $p < .01$, but neither the linear nor quadratic trends in the selection of objects possessing the defining property were significant, $F(1,155)$s < 1.00. Kendler and Guenther (1980) also obtained these developmental patterns in overextension and underextension.

The interactions involving test set suggest that the age and age × property effects might not have held for all test sets. However, an age-related decline in selection of objects lacking the defining property was observed in every test set. An analysis of variance of the selections of just these objects revealed an age effect, $F(2,120) = 11.54$, $p < .001$, and no age × test set interaction, $F(10,120) = .63$, $p > .1$. On the other hand, analysis of variance of the selections of objects possessing the defining property yielded no age effect, $F(2,120) = 1.21$, $p > .1$, but produced significant age × test set, $F(10,120) = 3.44$, $p < .001$, and sex × test set, $F(5,120) = 3.13$, $p < .05$, interactions. Thus, test set only affected age trends in the selection of objects possessing the defining property. This effect was strong enough, however, that the overall negative linear age trend did not reach significance in sets A or B.

Integration of the First and Second Names

Instructions in the unique and common-property conditions were valid only if the second training example was among the objects initially selected as referents of the first name. Most children in these conditions selected the second training example in the first test. For the six 2½-year-olds and seven 4-year-olds who did not, one of the objects that the child had selected as a referent of the first name was used in teaching the second name.

Implicit correction of the first name.—After learning the STN, children were asked to select FTNs. Table 1 presents the percentage of children in each condition who no longer selected the training example of the STN as an FTN. For the 4- and 6-year-olds, this correction of the FTN was made more frequently in the no-property, common-property, and unique-property conditions combined than in the control condition, $\chi^2(1, N = 48)$s $= 5.46$ and 14.72, p's $< .05$, respectively. This was not the case for the 2½-year-olds, $\chi^2(1, N = 48) < 1$. The 2½-year-olds in the explicit-correction condition, however, were more likely to correct the FTN than those in either the control condition, $\chi^2(1, N = 24) = 6.17$, $p < .05$, or the combined-treatment condition, $\chi^2(1, N = 48) = 9.34$, $p < .01$.

The tendency to correct the FTN increased with age. Age groups differed significantly in the mean percentage of FTN corrections in the three treatment conditions combined, $\chi^2(2, N = 108) = 20.6$, $p < .01$. All paired comparisons were significant, $\chi^2(1, N = 72)$s > 4.18, $p < .05$.

For the three age groups combined, differences between treatment conditions in the frequency of FTN correction were only marginally significant, $\chi^2(2, N = 108) = 4.60$, $p = .10$. Only the difference between the no-property and the common-property condi-

TABLE 1

CHILDREN WHO DID NOT ACCEPT THE TRAINING REFERENT OF THE SECOND NAME AS A REFERENT OF THE FIRST NAME IN THE SECOND TEST

	Instructional Conditions				
	Property Conditions				
Age (Years)	None	Unique	Common	Control[a]	Explicit Correction
2½	33	17	8	17	67
4	58	42	25	0	...
6	75	75	58	0	...

NOTE.—Data are percentages ($N = 12$ per condition).

[a] Percentages for the control condition are based on selection in the second test of whichever training example had been in the first test, unless that object had not been selected by the child in the first test. In these cases ($N = 5$), an object the child had selected in the first test was randomly chosen and scored for whether the child selected it again. In all five cases, the child selected the designated object again.

tions was significant, $\chi^2(1, N = 72) = 3.89$, $p < .05$.

The semantic relation of the second name to the first.—After selecting FTNs, children were asked to select STNs. Results are shown in Table 2. If children chose mutually exclusive sets of objects in response to the two names, the names were judged to contrast. If children chose sets that shared some but not all members, the names were judged to overlap. If the set selected for the second name included but also exceeded the set selected for the first name, the second name was judged to be superordinate to the first name. If the reverse was the case, the second name was judged to be subordinate to the first name. If the same sets were selected for both names, the names were judged to be synonyms.

For the treatment conditions combined, the older children were more likely to contrast, $\chi^2(2, N = 108) = 24.48$, $p < .01$. This tendency was significantly greater in either of the two older groups than in the 2½-year-olds, $\chi^2(1, N = 72)$s > 12.52, $p < .01$, but was not significantly different between the 4- and 6-year-olds, $\chi^2(1, N = 72) = .88$, $p > .10$. Age groups also differed significantly in their tendencies to posit a relation of synonymy, $\chi^2(2, N = 108) = 14.56$, $p < .01$. This tendency was significantly greater in the 2½-year-olds than in either of the older groups, $\chi^2(1, N = 72)$s > 3.92, $p < .05$, but did not differ between the 4- and 6-year-olds, $\chi^2(1, N = 72) = 1.72$, $p > .10$.

The 2½-year-olds in the explicit-correction condition were more likely to contrast than the 2½-year-olds in the treatment conditions combined, $\chi^2(1, N = 48) = 8.25$, $p < .01$, and were less likely to posit synonymy, $\chi^2(1, N = 48) = 5.80$, $p < .05$. If just the no-property condition is compared to the explicit-correction condition, the difference in the tendency to contrast reaches significance, $\chi^2(1, N = 24) = 5.04$, $p < .05$, but the difference in the tendency to posit synonymy does not, $\chi^2(1, N = 24) = 1.20$, $p > .10$.

For the three age groups combined, treatment groups (excluding the explicit-correction condition) differed significantly in their tendencies to posit a relation of contrast, $\chi^2(2, N = 108) = 9.27$, $p < .01$. Children in the common-property condition were less likely than children in the other two conditions to contrast, $\chi^2(1, N = 72)$s > 4.72, $p < .05$. Children in the other two conditions did not differ significantly, $\chi^2(1, N = 72) = .06$, $p > .10$. Treatment groups also differed significantly in their tendencies to posit a relation of synonymy, $\chi^2(2, N = 108) = 10.96$, $p < .01$. Children in the common-property condition were more likely than those in the other two conditions to posit synonymy, $\chi^2(1, N = 72)$s > 5.30, $p < .05$. Children in the other two conditions did not differ, $\chi^2(1, N = 72) = 0$.

Clark (1973) suggested that children's use of new and old names might overlap initially only with respect to new objects. Of the 108 children in either the common-property,

TABLE 2

POSITING OF EACH KIND OF SEMANTIC RELATION OF THE SECOND NAME TO THE FIRST NAME

AGE (Years) AND CONDITION	SEMANTIC RELATION					
	Contrast	Overlap	Superordinate	Subordinate	Synonymy	Indeterminate
2½:						
No property	8	42	8	8	25	8
Common property ..	8	0	0	17	75	0
Unique property	17	8	8	25	42	0
Explicit correction	50	33	0	8	8	0
4:						
No property	58	17	0	8	17	0
Common property ..	33	8	0	8	42	8
Unique property	67	0	8	17	8	0
6:						
No property	92	0	0	0	8	0
Common property ..	33	42	0	8	17	0
Unique property	75	0	0	17	0	8

NOTE.—Data are percentages ($N = 12$ per condition). Subjects classified as indeterminate denied that the second name applied to any object in the test.

unique-property, or no-property conditions, only three used the two names in this way—that is, allowed the names to overlap only with respect to objects that were seen for the first time in the final test.

Reference transfer.—The last analysis addressed whether children transferred objects other than the STN's training example from the FTN's to the STN's reference. This analysis only included those 33 children in the treatment conditions who corrected the FTN, contrasted the two names, and chose more than one object initially for the FTN. In the second test, these children rejected an average of 44% of the other objects that they had initially selected as FTNs. Children in the control condition rejected only 6% of such objects. These rejection rates differed significantly, $t(67) = 4.34$, $p < .01$. Thus, these children deleted more than just the referent heard called by the STN. However, not all of the objects removed from the FTN's reference were transferred to the STN's reference. Thirty-one percent were not selected as referents of either name. Thus, even if a child contrasted a new name with an old name, the child did not simply transfer part of the reference of the old name to the new name. Some members were "lost." On the other hand, very few members were gained. Of the objects not picked as referents of the FTN in the first test, only 2% were picked as its referents in the second test. The control group also passed over such objects (6% were picked as referents).

Discussion

Generalization of New Names

The developmental trend in receptive name generalization more closely approximated the trend obtained by Kendler and Guenther (1980) for receptive category generalization than it did the trend obtained by Nelson and his colleagues (see Nelson & Nelson, 1978) for productive name generalization. Name generalization declined in scope from age 2½ to age 4, but not from age 4 to age 6. Overextensions declined over the entire age range, but underextensions showed no significant trend.

The divergence from the results obtained by Nelson and his colleagues may reflect the fact that name reception does not involve name retrieval skill whereas name production does (Huttenlocher, 1974). The ability to retrieve names improves during the preschool years, as evidenced by the greater improvement in recall than in recognition during this period (Perlmutter & Lange, 1978; Ratner & Myers, 1981). Moreover, Kay and Anglin (1982) found that 2-year-olds' receptive generalization of new names substantially exceeded their productive generalizations, but Mervis and Pani (1980) found that 5-year-olds' receptive and productive generalizations were similar in scope.

An alternative explanation of the discrepancy is that many of the youngest children in the present experiment failed to learn the trained name and/or failed to inhibit selection during testing. This explanation assumes that children who did not learn the name selected more objects than did children who did learn. However, it is at least as plausible that children who did not learn would refuse to select objects at all. Second, the fact that the objects selected by the youngest children were nearly twice as likely to possess the defining property as were objects that were not selected suggests that many of these children had learned something about the name. Third, Carey (1978) has presented persuasive arguments and evidence that young children can construct a meaning for a new name after a single exposure. Fourth, the suggestion that the youngest children did not inhibit selection is difficult to reconcile with the fact that they actually selected fewer objects than they did not select.

Both name reception and name production can reflect performance factors as well as underlying lexical categories. Further research in which production and reception are directly compared and performance factors are controlled is clearly needed. However, the present results suggest that developmental changes in generalization tendencies are at least partially responsible for the developmental decline that has been observed in receptive overextensions—but not for the developmental decline that has been observed in receptive underextensions.

Despite the convergence with the results of Kendler and Guenther (1980), their explanation in terms of an associative-to-symbolic shift is problematic. First, the reason why incomplete symbolic representations cause underextension is unclear. Many theorists have proposed that a lexical representation is incomplete if it fails to specify a property that is defining (Clark, 1973) or does not assign to a property as much weight as an adult's representation does (Keil & Batterman, 1984; Merriman, 1986). Yet, the consequence of this kind of incompleteness is overextension, not underextension. Second, if toddlers respond only in the associative mode, it is unclear why they produce any underextensions at all.

An alternative explanation is that over the course of development children become better able to learn of and check for defining properties (Horton & Markman, 1980; Keil & Batterman, 1984). The process of checking for such properties may occur after a fast process of determining the overall similarity of a prospective referent to a representation of known referents (Smith, Shoben, & Rips, 1974). Thus, older children overextend a new name less than younger children do because they are more likely to correctly reject objects that are similar to known referents but that lack a defining property. Underextensions do not exhibit a developmental decline because the process of checking for defining properties only works to reject certain objects that were deemed candidates by the first process, not to restore objects that were rejected by the first process.

Integration of New and Old Names

The 4- and 6-year-olds tended to decide that a referent of a new name was no longer a referent of an old name. Thus, for children this age, the acquisition of new names is a likely mechanism for the correction of overextensions. However, the 2½-year-olds tended to decide that a referent of a new name was still a referent of an old name. Many decided that the two names were synonyms. Thus, Barrett's (1978) and Clark's (1983) claim that toddlers' acquisition of new names results in the immediate correction of their overextensions is not supported. This claim has not been supported by other studies (Carey & Bartlett, 1978; Mervis, 1984).[1]

The development of the tendency to contrast a new name with an old name may depend on improvements in conceptual processing. A central theme of theories of cognitive development (Fischer, 1980; Piaget, 1970; Sugarman, 1982) is that the child becomes increasingly capable of coordinating concepts. A child coordinates concepts if the child believes that the nature of one concept affects the nature of another. In the present experiment, only the older children may have coordinated the concepts associated with the two names. Only the older children considered the possibility that information about the new name might necessitate a reinterpretation of the old name.

Even when the 2½-year-olds were explicitly told that the new and old names contrasted, some failed to contrast the names in the reception test. Thus, some 2½-year-olds may not spontaneously correct an old name after learning a new name because they are unable to coordinate the names—that is, they cannot determine a new name's reference and change an old name's reference at the same time. This explanation assumes that the 2½-year-olds understood the explicit correction but could not adhere to it. However, Gruendel (1977) has argued that very young children may misunderstand explicit corrections such as "That's a Y, not an X" to mean "That's a Y and an X." Although Gruendel's argument concerned children nearly a year younger than the youngest in the present experiment, the alternative explanation—that those in the explicit-correction condition who did not contrast simply misunderstood the correction—cannot be ruled out.

Although some children failed to contrast in the explicit-correction condition, it is more significant that more children contrasted in this condition than in the other conditions. Thus, the general failure of the 2½-year-olds in the other conditions to contrast cannot be completely attributed to inability to contrast. The 2½-year-olds simply did not believe that new names contrast with old names. Otherwise, those who could have contrasted in the other conditions would have. Some explanation must be given of how children acquire the belief that new names contrast with old names. Most likely, it is acquired from repeated experience of hearing new names introduced as old names are explicitly corrected.

The generality of older children's contrastive disposition remains to be seen. It may overgeneralize such that noncontrastive names are contrasted. Two factors might limit this error tendency, however. First, if an old name is well established, children may be less willing to delete its members, especially typical ones, and may be more willing to

[1] Mervis and Canada (1981) found that 1- to 2-year-olds tended to interpret new names as being subordinate to old names, but the 2½-year-olds in the present study preferred synonymous or overlap interpretations. However, in Mervis and Canada's study, the children were younger and fewer, the names were real rather than artificial, the names were trained by mothers as they saw fit rather than by an experimenter in a controlled fashion, and the time separating acquisition of the old and new names was much greater. Given these many procedural differences, the commonality in the results—namely, that young children do not contrast new names with old names—is more important than the discrepancy.

make noncontrastive interpretations to avoid this. A child who has used "doggie" for over a year would probably still consider collies to be doggies after learning "collie." Second, noncontrastive relations are often marked in input. For example, superordinate names tend to be used in reference to groups rather than in reference to single objects (White, 1982). Older preschoolers may know the implications of such markings.

One kind of marking did influence name integration in the present experiment. Input emphasizing how the second name had the same defining property as the first name compelled the 2½- and 4-year-olds to increase their synonymous interpretations and the 4- and 6-year-olds to decrease their contrastive interpretations. Thus, all age groups reacted to the specification of a common defining property in input by choosing more common referents for the names than they otherwise would have. The fact that even the 2½-year-olds responded to this input may appear surprising given their lesser sensitivity to input in the first part of the experiment. However, they did show some sensitivity in the first part, just less than the older children. Also, older children may have a disposition against synonymous interpretations. After all, they do know many pairs of names that are not contrastive—but very few, if any, that are synonymous.

The prediction that emphasizing a unique property of the second name would have the opposite effect—that is, of emphasizing a common property—was not confirmed. Several factors could have contributed to this null effect. The number of contrastive interpretations by the 6-year-olds was already near ceiling in the no-property condition. Also, some children may have considered both the defining property of the first name and the highlighted unique property to be defining for the second name. In this case, a subordinate interpretation would have been appropriate. Subordinate interpretations were more common in the unique-property condition (20%) than in the no-property condition (5%). Finally, as already has been argued, some of the youngest children may have been incapable of constructing different references for the two names.

Contrary to both Barrett's (1978) and Clark's (1973) characterization of the name integration process, very few children reacted to the new name by simply assigning it to some part of the reference of the old name. Many objects deleted from the reference of the first name were not transferred to the reference of the second name.

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