

Infants' disambiguation of novel object words*

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ABSTRACT

When preschool-aged children are presented with two objects, one familiar and one unfamiliar, and asked for the referent of a novel word, they will consistently map the novel word to the novel object, a tendency called the *disambiguation effect*. In this study, we examined the relation between vocabulary size and the disambiguation response tendency during late infancy. Sixteen- to 22-month-old infants were presented with a novel object along with two familiar objects and asked to choose the referents of familiar and novel words. The infants who consistently chose the novel object in the presence of a novel word had significantly higher productive vocabularies than those who did not. These two groups, however, did not differ in age or on familiar word trials. These results suggest that emergence of the disambiguation effect in late infancy is related to productive vocabulary size rather than age.

Young children are amazingly adept word learners. Between the ages of 18 months and 6 years, children acquire approximately five to six new

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words a day, a remarkable feat considering the formidable demands of the word learning task (Anglin 1993, Carey 1978, 1982). Upon hearing a new word, children must link the word to the appropriate referent and then generalize that word to other instances of the referent. This task is even more complex when one considers the highly inductive nature of the word-mapping task – even in ostensive labelling situations, there is a multitude of possible referents for any new word.

How then do children learn words so quickly and seemingly effortlessly? A great deal of empirical attention has been devoted to investigating this question with focus placed on children's reliance on external sources of guidance such as pragmatic cues and lexical form class (e.g., Hall & Graham, in press, Tomasello & Akhtar 1995), internal expectations children might have about word reference such as the whole object assumption (e.g., Golinkoff, Mervis & Hirsh-Pasek 1994, Markman 1989), and the interaction between the two. In the study described in this paper, we examined the emergence of one bias that infants may bring to the task of word learning; namely, the expectation that novel words map on to novel objects.

When children as young as 2 years of age are presented with two objects, one familiar (e.g., a dog) and one unfamiliar (e.g., an aardvark), and asked for the referent of a novel word, they will consistently map the novel word to the novel object (Golinkoff, Hirsh-Pasek, Bailey & Wenger 1992, Heiback & Markman 1987, Hutchinson 1986, Markman & Wachtel 1988, Merriman & Bowman 1989, Merriman & Schuster 1991). Merriman & Bowman (1989) have labelled this tendency to select the unnamed object the *disambiguation effect* as it is thought to resolve the ambiguity of word meanings. Although researchers generally agree that young children do exhibit the disambiguation effect by mapping novel words to novel objects without a specific word-referent link, there is much debate about the underlying nature of this effect.

Researchers have posited a number of different mechanisms that motivate children to map novel words to novel objects. Markman has proposed that young word learners are guided by a Mutual Exclusivity constraint and thereby assume that objects can have only one name (Markman 1989, Markman & Wachtel 1988, see also Merriman 1991, Merriman & Bowman 1989). As such, children will map the novel name to a novel object because they avoid mapping a second label to an already-labelled object. In contrast, Golinkoff *et al.* (1994) argue that children adhere to the Novel Name-Nameless Category principle (N3C), which states that novel words map to previously unnamed objects. According to this principle, children will map a novel word to a

novel object because they are motivated to label the unnamed category, rather than because they refuse to assign two labels to one object (as in Mutual Exclusivity). Finally, two principles from Clark's (1983, 1987) framework have been invoked to explain the disambiguation effect (Merriman & Bowman 1989). According to Clark, children honour the Contrast principle which leads them to avoid interpreting a subsequently-learned word for an object as having the same meaning as one acquired previously. In addition, Clark proposes that children have a general motive to fill lexical gaps, which are objects or events for which they do not have a label. Thus, a new label should map on to a new object as children assume that the meaning of a new word differs from the meaning of previously known words and they perceive a 'lexical gap' that they are motivated to fill.

Closely related to the debate concerning the mechanisms underlying the disambiguation effect is the controversy over when this tendency appears in development (see Merriman & Bowman (1989) for an extended discussion of this issue). Markman and her colleagues argue that Mutual Exclusivity operates early in lexical development and offer as evidence the finding that 16- and 24-month-old children show more difficulty learning a second label for a familiar object than a first label for an unfamiliar object (Liitschwager & Markman 1994, Woodward & Markman, in press). Merriman and colleagues propose that Mutual Exclusivity develops and grows stronger during early childhood (Merriman & Bowman 1989, Merriman & Schuster 1991) although recent evidence indicates that even some young 2-year-olds exhibit this bias (Merriman & Stevenson 1997). Similarly, Golinkoff and colleagues argue that infants at the beginning of lexical acquisition should not honour the principle of N3C. They propose that this ability develops around the middle of the second year (Golinkoff *et al.* 1994).

The aim of the present study is to examine whether or not the disambiguation response tendency is present during late infancy. It is clear that the ability to map a novel word to a novel object without a specific word-referent link is an efficient means of acquiring new words. As such, this tendency conceivably could be responsible for the rapid and seemingly effortless acquisition of new words during infancy. However, whether this strategy arises out of word learning experience or actually drives early lexical acquisition is difficult to ascertain, as the majority of studies examining the disambiguation effect include children well beyond the period of rapid vocabulary expansion that occurs around 18 months of age.

In fact, only one published study to date has directly addressed whether children younger than two years of age exhibit the disambiguation

tendency and whether this effect varies as a function of productive vocabulary size. Mervis & Bertrand (1994) presented 16- to 20-month-old infants with five objects, four for which the infant was expected to comprehend the label and one for which the infant was not expected to have a name. The infant was asked for one of the known objects (e.g., 'May I have the kitty?') and for the unknown object (e.g., 'May I have the lep?'), in a counter-balanced order. If the infants did not correctly choose the unknown object when asked, the experimenter picked up and labelled the unknown object for the child and then allowed him or her to play with it. While the child was playing with the novel object, the experimenter labelled the object three more times. After completing two such trials, infants were presented with comprehension/generalization trials to determine whether they would extend the novel words to a new member of the same category.

Mervis & Bertrand (1994) found that half of their sample (16 of 32 infants) were able to map either three or four of the four new words to the unknown objects. These infants also generalized the novel words to new exemplars of the same categories. The other half of the sample chose the correct referent for either none or one of the novel words and did not generalize the label, as one might expect. Those infants who were able to map the novel words had significantly larger vocabularies than infants who did not, but differed neither in age nor in gender. In a subsequent longitudinal study, Mervis & Bertrand followed those sixteen infants who initially did not exhibit the disambiguation effect. Infants were monitored weekly until they had achieved a vocabulary spurt (defined as 10 new words in a 14-day period), and then re-tested on the disambiguation task. When re-tested, twelve infants correctly chose the novel object on three ($n = 7$) or four ($n = 5$) novel word trials. The remaining four children correctly mapped the novel word to the novel object on two trials. Thus, Mervis & Bertrand concluded that the achievement of the vocabulary spurt and the ability to map novel words to novel objects emerge around the same time in development.

Based on these findings, Mervis & Bertrand (1994) propose that the disambiguation effect is not available at the beginning of lexical acquisition but instead emerges around the time of the vocabulary spurt. However, there are methodological issues with their study that lead to alternative explanations for their findings. First, by providing corrective feedback to the children (i.e., by indicating and labelling the unknown object), Mervis & Bertrand trained their subjects that the novel words were associated with the novel objects. As such, it is possible that some of the infants who chose the novel objects may have been those best able to learn this association and may not have

possessed any bias or pre-existing expectation about novel word reference. Second, Mervis & Bertrand did not establish whether or not those infants in Study 1 who were able to map the novel words had indeed achieved a vocabulary spurt prior to their participation in the experiment. It is possible that some of these children had not experienced a vocabulary spurt, thereby calling into question the conclusion that only children who have achieved a vocabulary spurt exhibit the disambiguation bias. Further, in Study 2, 25% of the infants who had achieved the vocabulary spurt only mapped a novel word to a novel object on two out of four trials, which suggests that simply achieving the vocabulary spurt may not be sufficient to exhibit the disambiguation effect. Finally, Mervis & Bertrand presented the infants with five objects on each trial which simply may have overloaded some infants' processing abilities, thereby obscuring their ability to map the novel words. There is evidence indicating that the number of choice objects in a test set can reduce 24-month-old children's tendency to map a novel word on to a novel object (Hutchinson 1986).

In the present study, we pursued the question of infants' ability to disambiguate the reference of novel words during late infancy. Specifically, we examined two issues: (1) whether infants around 18 months of age exhibit the disambiguation effect without any training or reinforcement; and (2) whether this ability varies with vocabulary size or age. We tested infants ranging in age from 16 to 22 months as there is a great deal of variability in both vocabulary size and lexical stage during this period (e.g., Gopnik & Meltzoff 1987, Poulin-Dubois, Graham & Sippola 1995).

We presented infants with a stringent disambiguation task similar to that used with older children (e.g., Merriman & Schuster 1991). Specifically, infants were presented with object sets composed of two familiar objects (e.g., keys and a spoon; a toy rabbit and a toy dog) and one unfamiliar object (e.g., a garlic press; a toy bison). Infants were asked for the referent of one of the familiar labels ('Give me the dog') and for the unfamiliar object using a novel label ('Give me the gonk'). Once the infant had handed any object to the experimenter, the experimenter simply said 'Okay, thank you' and proceeded to the next trial. This procedure has two notable improvements over that used in Mervis & Bertrand's (1994) study. First, no corrective feedback was provided to the infants. Second, in order to reduce the processing demands of the task, we presented infants with test sets consisting of three objects, as opposed to the five object arrays used by Mervis & Bertrand. Objects in our sets were also all from one ontological kind. That is, in a given set, all three objects were animate surrogates or

TABLE 1. *Novel objects presented in disambiguation task*

Animates	Novel label	Inanimates	Novel label
orange furry creature with purple hair	gonk	garlic press	gop
bison	zav	covered bottle-opener	fic
rubber seal-like creature covered in long spindles	lep	whisk	nam

inanimate artefacts. Again, this was intended to reduce processing demands of the task. Using animate surrogates and inanimates also allowed us to examine whether the disambiguation effect extended across ontological kinds. Previous studies have typically used only unfamiliar artefacts in disambiguation tasks (e.g., Golinkoff *et. al.* 1992, Mervis & Bertrand 1994).

METHOD

Participants

Thirty infants, 16 boys and 14 girls, (mean age = 19.59 months; SD = 1.90; range = 16.00 to 22.62 months) were tested in this experiment. Four additional infants were tested but were excluded from the sample as they did not complete at least 75% of the trials in the experiment. Infants were all from homes in which English was the primary language spoken.

Materials and apparatus

The stimuli were grouped into six object sets, three sets of animate-like creatures (animals) and three sets of inanimate objects (household utensils). Each object set included two familiar objects and one unfamiliar object (see Table 1 for a list of the novel stimuli). Familiar objects included items such as a teddy bear, a stuffed rabbit, a small cow, a dog, a bird, a horse, keys, a spoon, a baby bottle and a cup. Parents were asked beforehand to verify that their infant comprehended the labels for the familiar objects and that the unfamiliar objects were indeed unfamiliar. Substitutions of the familiar objects were made if parents indicated that their infant did not know the label for an object. A small toy slide attached to a board was also used to keep infants interested in the procedure. The MacArthur Communicative Development

Inventory: Words and Sentences (MCDI; Fenson *et al.* 1991) was used to assess the infants' expressive vocabularies.

Design and procedure

Infants were brought into the laboratory and seated either in a baby seat attached to a table or on their parent's lap. The experimenter sat directly across the table from the infant. Parents were given the MCDI to complete while their infant was being tested, if the infants were seated in the baby seat. If the infant was seated on the parent's lap, the parent filled out the MCDI after the disambiguation task was completed.

Infants were presented with both the animate and inanimate sets of objects. Which type of object set they received first was counter-balanced across participants. At the beginning of each trial, the experimenter placed all three items in a given set on a tray and presented them to the infant for a short exposure period. The infant was permitted to examine the objects for approximately three minutes. The objects were then lined up on the tray and the infant was asked for one of the familiar objects ('Give me the dog') or for the unfamiliar object using a novel label ('Give me the gonk'). To avoid providing any nonlinguistic cues regarding the intended referent of the labels, the experimenter looked at the infant, and not at the object array, when requesting word referents. Infants were encouraged to put the object they chose down the toy slide. Once the infant handed any object to the experimenter or put an object down the toy slide, she simply said 'Okay, thank you' and proceeded to the next trial. No corrective feedback was provided. The order of requesting the familiar and unfamiliar objects was counterbalanced across trials.

The experimenter scored each infant's choice on the familiar word and novel word trials. The first object pointed to or touched was considered to be the infant's choice. A random selection of 32% of the sessions was coded from the videotapes by a second observer blind to the hypotheses of the study. A 94.29% level of agreement was reached. Any disagreements were subsequently discussed and resolved.

RESULTS

Performance on familiar word trials

To examine infants' understanding of the task demands, we first examined infants' mean percentage choices of familiar objects when asked for the referents of familiar words. We could not have expected infants to map the novel words to the novel objects if they did not select the correct familiar objects when they were asked for them by name.

Chance-level responding was 33%, given the presence of three objects from which to choose. Infants selected the correct referent of a familiar word ($M = 87.78\%$, $SD = 20.98$) significantly more often than would be expected by chance alone, $t(29) = 14.30$, $p < 0.0001$, 1-tailed test. This finding indicates that infants clearly understood the task instructions.

Performance on novel word trials

If the infants in this study did exhibit the disambiguation tendency, they should have chosen the novel object when asked for the referent of a novel word more than would be expected by chance alone (33%). As a group, infants did map the novel label to the novel objects ($M = 51.00\%$, $SD = 22.22$) significantly more often than would be expected by chance alone, $t(29) = 4.44$, $p < 0.001$, 1-tailed test.

Because infants' choice of the novel objects might have been due to a general bias to select salient objects, we compared the percentage of novel object choices when objects were the target word referents versus when they were foils. Infants chose the novel object when asked for the referent of a novel word ($M = 51.00\%$, $SD = 22.22$) significantly more often than when the same novel object was a foil for the familiar label ($M = 6.33\%$, $SD = 13.93$; $t(29) = 9.03$, $p < 0.00001$, 2-tailed test), thereby ruling out a simple novelty effect.

We then compared infants' choices of the novel animate surrogates and novel artefacts to examine whether the disambiguation tendency extended across ontological kinds. A 2 (Order: Animates first vs. Inanimates first) \times 2 (Category: Animate vs. Inanimate) analysis of variance yielded no main effect of nor any interactions with object type, suggesting that infants were as likely to map the familiar and novel words to the animals as to the artefacts. The main effect of order was also not significant.

We computed correlations to assess the influence of vocabulary size and age on infants' tendency to map the novel words to the novel objects. Productive vocabulary ranged from 3 to 673 words ($M = 149.00$, $SD = 141.15$). Although, as a group, infants did map the novel words to the novel objects significantly more often than would be expected by chance alone, some infants appeared better able to accomplish this task than others: There was a significant positive correlation between vocabulary size and percentage of choices of the novel object on novel word trials ($r = 0.50$, $p < 0.01$). The correlation with age was not significant ($r = 0.24$, $p < 0.20$). Although age alone was not significantly related to the percentage of choices of the novel object, age may have indirectly contributed to the significant correlation with vocabulary size (as age and vocabulary size have been

found to be correlated). To assess this possibility, we re-computed the correlation between vocabulary size and the percentage of novel object choices with the effects of age partialled out. Consistent with the previous correlation, vocabulary size and the percentage of choices of the novel object were significantly correlated ($r = 0.49, p < 0.01$).

Comparison of Novel word-mappers and Non-mappers

The results of the above correlations indicated variability in infants' tendency to map the novel words to the novel objects as a function of vocabulary size. To further examine the influence of vocabulary and other variables on infants' disambiguation response tendencies, we classified individual infants into two groups based on their performance on the novel word trials: Novel word-mappers and Non-mappers. Those infants who correctly chose the novel object on at least 66.67% of the trials were considered Novel word-mappers. This pattern of responding would be expected to occur by chance alone less than 7.7% of the time, as 66.67% corresponds to four out of six trials. Using this criterion, 13 infants were classified as Novel Word-mappers and 17 infants were classified as Non-mappers.¹ Novel Word-mappers ($M = 237.23$ words, $SD = 168.55$) had significantly larger expressive vocabularies than Non-mappers ($M = 81.53$ words, $SD = 60.37$), $t(14.37) = 3.18, p < 0.01$, 2-tailed, corrected for unequal variances. These two groups, however, did not differ significantly in age, percentage of names in vocabulary, or on performance on the familiar word trials (see Table 2).

We also examined whether those infants who exhibited this effect had also achieved a vocabulary spurt, in light of Mervis & Bertrand's (1994) proposal that the disambiguation effect is tied to the vocabulary spurt. As a marker of the vocabulary spurt, we used the criterion of 50 productive words, a measure commonly used in cross-sectional studies (e.g., Lucariello 1987, Nelson 1973, Waxman & Hall 1993, but see Goldfield & Reznick 1996 for a critique). This criterion has also received support from longitudinal studies. For example, Bloom, Tinker & Margulis (1993) found that infants in their longitudinal study achieved the vocabulary spurt and productive vocabularies of 50 words around the same age (but see Anisfeld, Hoberman & Rosenberg 1994). Only 6 infants in this study had not reached the 50-word criterion and

[1] There were 5 infants who correctly chose the novel object on 50–60% of the trials. Although these infants do not meet the criterion for Novel word-mapper, it is likely that they are in a transitional period between Non-mapper and Novel word-mapper.

TABLE 2. *Comparisons of Novel word-mappers and Non-mappers*

	Novel word-mappers (n = 13)	Non-mappers (n = 17)	
Percent choices of novel objects on novel word trials	72.18% (10.17)	34.80% (13.20)	$t(28) = 8.46, p > 0.0001$
Percent choices of correct familiar objects on familiar word trials	91.28% (12.81)	85.10% (25.63)	$t(28) = 0.79, p > 0.40$
Age	19.94 months (1.37)	19.32 months (2.24)	$t(26.89) = -0.92, p > 0.35^*$
Productive vocabulary	237.23 words (168.55)	81.53 words (60.37)	$t(14.37) = -3.18, p > 0.01^*$
Percent names in vocabulary	59.74% (7.45)	55.19% (20.42)	$t(21.20) = -0.85, p > 40^*$

* *t*-test corrected for unequal variances

all 6 were classified as Non-mappers. Twenty-four infants had productive vocabularies greater than 50 words. These infants fell approximately equally into the Non-mapper group (n = 11) and Novel-word-mapper group (n = 13; $\chi^2(1, N = 24) = 0.17, p > 0.65$).

DISCUSSION

In this study, infants were presented with a novel object along with two familiar objects and were asked to choose the referents of familiar and novel words. As a group, infants chose the novel object when asked for the referent of a novel word on approximately half the trials, more often than would be expected by chance alone. Infants used this strategy with both animate-like and inanimate categories of objects, indicating that the disambiguation effect is a powerful word-learning strategy that can be applied when learning labels for objects of both types. This finding is consistent with research indicating that animate and inanimate objects are not treated differently in the presence of novel count nouns (e.g., Hall 1994, Liitschwager & Markman 1993). Further analyses

revealed that those infants who exhibited a consistent disambiguation bias differed in productive vocabulary size, but not in age or on performance on the familiar word trials, from those infants who did not exhibit this bias.

The results of this study suggest that the disambiguation response tendency emerges in late infancy and appears to be tied to vocabulary development, rather than age. Those infants who reliably chose the novel object in the presence of a novel word had larger productive vocabularies than those who did not. In order to map the novel word on to the novel object, infants had to rely upon a pre-existing bias or expectation about novel word reference, as we did not provide them with any cues, pragmatic or otherwise, as to the intended referent of the novel words (i.e., the experimenter looked at the infant's face, and not at the objects, when making requests). Those infants who did not exhibit this tendency may not possess any such expectation or may require at least some pragmatic cues in order to disambiguate novel word reference. Recent research suggests that infants with larger vocabularies are better able to learn novel words in the absence of pragmatic cues, suggesting that these cues may become less important with more word-learning experience (Graham 1995). Furthermore, the infants who did not consistently exhibit the disambiguation effect still had a significant number of words in their productive vocabularies, suggesting that the disambiguation response tendency is not necessary for the acquisition of the early lexicon.

In general, the present findings are consistent with those of Mervis & Bertrand (1994). There is, however, one key difference between the results of the present study and those of Mervis & Bertrand: the Non-mappers in our study had a much larger vocabulary than those in Mervis & Bertrand's study. In their study, the average vocabulary of infants who did not reliably map the novel words to the novel objects was 45 words, compared to an average of 82 words for the Non-mappers in our study. In fact, the average vocabulary of our Non-mappers is close to that of their Novel word-mappers (95 words, Expt. 1). One obvious difference between our study and that of Mervis & Bertrand is that we did not offer any corrective feedback to infants. As discussed earlier, Mervis & Bertrand may have actually trained an association between the novel word and the novel objects in some infants. As such, their group of Novel word-mappers might have consisted of infants who mapped the novel word to the novel object because they possess a pre-existing expectation about novel word reference and infants who mapped the novel word to the novel object because they were taught this association during the experiment. It is conceivable that those

infants who learned this association during the experiment had smaller vocabularies than those who possessed a pre-existing expectation.

Despite these discrepancies, the results of both the present study and that of Mervis & Bertrand (1994) indicate that the disambiguation response tendency is not prevalent amongst infants at the very beginnings of lexical development. How, then, might infants acquire the bias that novel words map on to novel objects? Mervis & Bertrand argue that the development of this expectation is linked to the vocabulary spurt. This conclusion is based on their finding that once the Non-mappers from their first study had achieved a vocabulary spurt (defined as the acquisition of 10 new words in a 14-day period), they were able to map the novel words to the novel objects. However, four of the sixteen infants who had achieved the vocabulary spurt only mapped the novel word to the novel object on two out of four trials, indicating that infants could evidence the vocabulary spurt without the disambiguation effect.

Although not a direct test of this proposal, our results offer some clarification regarding the nature of the possible relation between the vocabulary spurt and the emergence of the disambiguation tendency. In our study, half the infants who had vocabularies greater than 50 words (and thus were considered to have had a vocabulary spurt) did not map the novel words on to the novel objects in a consistent fashion. This suggests that infants can have a vocabulary spurt without also having the expectation that novel words map to novel objects. The opposite relation, however, does not appear to hold as all of the Novel-word mappers met the criteria for the vocabulary spurt. Furthermore, all of the infants who were classified as pre-vocabulary spurt were considered Non-mappers. This asymmetry suggests that the achievement of the vocabulary spurt may be necessary, but not sufficient, for the emergence of the disambiguation response tendency. The proposal of a necessary relation between these two achievements is consistent with recent theoretical explanations of the vocabulary spurt. Gopnik & Meltzoff (1987, 1997), for example, have argued that the vocabulary spurt reflects a 'nominal insight', that is, an awareness that all objects have a name. Thus, one can imagine that the understanding that each object must have a label could be a prerequisite for the disambiguation response tendency, which is the expectation that novel words map on to novel objects. Our conclusions regarding a necessary but not sufficient linkage between the vocabulary spurt and the disambiguation response tendency should be considered preliminary in light of evidence that some infants show a vocabulary spurt well after they have attained 50 words (Mervis & Bertrand 1995a) and in light of more general

criticisms of the use of productive vocabulary size as an index of the vocabulary spurt (Goldfield & Reznick 1996).

However, if the nominal insight that is proposed to underlie the vocabulary spurt contributes, but is not sufficient for, the development of the disambiguation tendency, other factors must be involved in this ability. There is evidence to suggest that nonverbal cognitive factors, such as categorization, are also linked to the development of the ability to map novel words to objects without a specific word-referent linkage. In their study, Mervis & Bertrand (1994) found that those infants who mapped the novel words to the novel objects and had achieved a vocabulary spurt were more likely to exhibit two-category exhaustive sorting than those who did not. This linkage between nonverbal categorization and the disambiguation effect has also been shown with young children with Down syndrome (Mervis & Bertrand 1995*b*). Interestingly, studies have found a strong relation between categorization skills and the onset of the vocabulary spurt (e.g., Gopnik & Meltzoff 1992, Poulin-Dubois *et al.* 1995). Given that the vocabulary spurt and categorization skills seem to develop concurrently, it is difficult to tease apart the unique contribution that nonverbal categorization abilities may make to the development of the disambiguation response tendency.

There is an additional development that occurs during the second year of life which may contribute to the disambiguation effect, namely, children's emerging sensitivity to the meanings encoded by different lexical form classes. Although there is ample evidence that young children tend to interpret novel words from any lexical category as referring to object categories (e.g., Hall 1991, Waxman & Markow 1995), there is some research to suggest that infants begin to exhibit an understanding of the links between different lexical form classes and meanings during the second year of life (e.g., Katz, Baker & Macnamara 1974). For example, Waxman & Markow (in press) have found that 21-month-olds can distinguish between count nouns and adjectives. We propose, admittedly speculatively, that the understanding that words from different lexical form classes encode different meanings may contribute to the achievement of the disambiguation effect. That is, the knowledge that count nouns map on to objects (as opposed to adjectives which map on to properties) may, in conjunction with the nominal insight of the vocabulary spurt and the development of categorization skills, contribute to the ability to map novel words to objects without a specific word-referent linkage. This proposal is currently being tested in our laboratory.

The results of the present studies, when considered in conjunction with other recent empirical work, add to our understanding of the

emergence of the disambiguation effect in infancy and early childhood. Our study and that of Mervis & Bertrand (1994) suggest that this ability emerges during late infancy and varies as a function of productive vocabulary size. This ability continues to be quite variable at two years of age. In a number of studies, Merriman and his colleagues have found that 2-year-olds' tendency to map novel words on to novel objects both can be strengthened and weakened by a number of factors (Merriman & Bowman 1989, see also Merriman 1991 for a discussion). For example, Merriman & Marazita (1995) found 2-year-old children's tendency to map a novel word to a novel object was strengthened by pre-exposure to similar sounding words. In an earlier study, Merriman & Schuster (1991) found that both 2- and 4-year-old children exhibited a weaker disambiguation effect when presented with an atypical example of a familiar object and a novel object. In the same study, they found that when the token novelty of the unfamiliar objects was reduced by pre-exposure, 2-year-olds' tendency to map the novel word to the novel object was weakened. By three to four years of age, the disambiguation response tendency seems quite robust and even extends to action words (Golinkoff, Jacquet, Hirsh-Pasek & Nandakumar 1996, Merriman, Marazita & Jarvis 1993, Expt. 1).

In sum, this study adds to our growing understanding of word learning during the second year of life. Infants exhibit an emerging ability to map novel word on to novel objects, without a specific word-referent linkage established by an adult. Future research focusing on the conditions under which infants can and cannot exhibit the disambiguation effect will help to clarify the underlying mechanisms responsible for this word learning strategy.

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