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# The Words Children Learn<sup>1</sup>

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## ABSTRACT

The focus in this study of early word learning was on the status of object words in early vocabularies because of the considerable emphasis given to nouns or object words in both traditional part-of-speech analyses and more recent theory and research on lexical principles. Fourteen children were followed from 9 months to 2 years of age, and monthly vocabulary growth was analyzed with the children equated for both onset and achievement in word learning. The main result was that object words represented approximately one-third, on average, of the different words the children learned. Nouns could be considered the largest part-of-speech in their vocabularies only if other part-of-speech category assignments are valid or even possible—neither of which is the case for presyntactic vocabularies. We conclude that object-specific lexical principles cannot explain word learning, if most of the words a child learns are other than names for objects. More general principles are needed, such as the Principle of Relevance offered here, for determining how a pre-syntactic child learns any kind of word.

This study was concerned with object words in children's developing vocabularies for two reasons. The first is the long standing assumption, from traditional part-of-speech analyses, that nouns are the largest class of words children learn. The second is the emphasis on object names in contemporary theory and research on lexical principles for word learning, which, in turn, has been justified in large part by the assumption that nouns are the largest class of words in early vocabularies.

## PARTS OF SPEECH

Part-of-speech is probably one of the most enduring concepts in linguistic theory and analysis. We usually have little difficulty knowing when a word is a noun, a verb, an adjective, a preposition—primarily because these category assignments were ingrained in our early school experiences and every time we've looked up a word in a dictionary. Part-of-speech has a long tradition in efforts to describe the words children learn and, for many years, words in early vocabularies were classified as nouns, verbs, adjectives, prepositions, and the like (summarized in McCarthy, 1946, 1954). Part-of-speech surfaces in contemporary linguistic theory as syntactic categories, defined by the distributions of words and the semantic and syntactic functions they serve. These kinds of category assignments have validity with respect to syntax, and few would argue that one of the tasks confronting a child acquiring a language is to learn the subcategorization rules for different lexical items in a dictionary.

While the words in children's sentences can have part-of-speech membership by virtue of semantic-syntactic subcategorization, the words in early vocabularies before syntax cannot. McCarthy had classified early words as parts of speech in her study of vocabulary, more than 60 years ago, but she, herself, warned (McCarthy, 1930, p. 126):

“In considering the parts of speech as they appear in the child's vocabulary, we are dealing with material that is rather questionable from the psychological standpoint. The question of the part of speech under which the single-word sentence is to be classed, the problem of the inclusion of variants of words, the use of the total number of words, or simply of the number of different words used—all make material of this sort rather elusive.”

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Sharing similar concerns, others have since offered different schemes for characterizing words in pre-syntactic vocabularies. Examples include relational words and substantive words (Bloom, 1973); referential and expressive vocabularies (Nelson, 1973); and social words, object words, and cognitive-relational words (Gopnik, 1988). These schemes have been more or less useful for identifying such things as individual differences and the concepts underlying early words. However, assigning words to even these categories is often problematic, and they have been less successful for describing development over time (Bloom, 1993a).

Depending on syntactic context, words in adult dictionaries can have more than one part-of-speech membership, for example, *hammer* can be either a noun or verb; *down* can be either a preposition or adverb; *more* can be a noun, an adjective, or an adverb. In the absence of syntax, ambiguity is even greater for a child's words. However, the one category that does stand out, potentially at least, for allowing pre-syntactic part-of-speech assignment is that large category of words children learn in association with objects—object names or nouns. This is because nouns can more or less stand on their own in a child discourse: When a child holds up a cup and says "cup," or holds a cup out to be filled and says "juice," it seems fairly clear that the word the child says has a strong association with the object (or substance) even though the child might well have something else in mind in relation to the cup or to the juice. The words *cup* and *juice* name the objects; other words—like *more* or *gone*—are learned to name relations to the object in the child's mental meanings. And, indeed, recognizing this, more recent investigations into early vocabulary acquisition have overcome the discomfort of previous researchers and called a noun a noun (e.g., Bates, Bretherton, & Snyder, 1988; Hampson, 1989; Lieven, Pine, & Barnes, 1992; Pine, 1992a, b). But while nouns may have gained a legitimacy in early child dictionaries, assigning other sorts of words children learn to parts of speech cannot be justified in the absence of syntactic criteria. The question remains, therefore, whether nouns are, indeed, the largest class of words children learn. If they are not, then we need to examine more closely research which seeks to explain word learning on the assumption that they are.

## LEXICAL PRINCIPLES

Object words figure prominently among the lexical principles (assumptions, constraints, or biases) offered to explain children's word learning under the assumption that nouns are the largest class. This perspective on child language research takes its lead from adult theory and approaches the acquisition of language as a logical problem. From an adult perspective, the analogy for a child acquiring words is the dilemma of "radical translation" posed by Quine: How does the linguist-philosopher know the intensional meaning of a word in an unknown language from its extensional use in an ambiguous context? (Quine, 1960). Logically, then, how could a child possibly learn that a word like *cup* 'stands for' the object cup and not just a part of it, one of its properties, or something else that might be related to it? This putative dilemma has prompted many who study lexical acquisition to assume that children could not otherwise learn words without certain principles to give them a head start on word learning to begin with.

The lexical principles which have been proposed predict, for example, that a child hearing a new word is biased to believe that the word is a conventional word in the language; that it is the name for an object; that the word names the whole object and not just a part of it, or a quality of it, or something that it does; that the same word also names similar objects from the same category; that objects in a different category have a different name; and that a new word is the name for a category of objects that does not already have a name (e.g., Clark, 1987; Golinkoff, Hirsh-Pasek, Bailey, & Wenger, 1992; Landau, Smith, & Jones, 1988; Markman, 1989, 1992; Merriman & Bowman, 1989; Waxman & Kosowski, 1990; Waxman & Senghas, 1992; see Golinkoff, Mervis, & Hirsh-Pasek, 1991). Research cited in support of such lexical principles has shown that 2-, 3-, and 4-year old children, children who already have a vocabulary of words, respect these sorts of principles when confronted with a novel word for naming an object in an experimental task.

Lexical principles for word learning make sense because they describe what it means to acquire a language: Languages are conventional by definition; words necessarily set one thing off from another so that we can talk about things in relation to each other; words are economical in referring to the same kinds of things; and so forth. These sorts of lexical principles could be acquired through induction, in the process of development, by learning something about what words are (Nelson, 1988). While lexical principles describe something of what children learn by acquiring words, they may be less satisfactory for explaining how words are learned in the first place. Thus, by the time children have acquired a working vocabulary of words, we might expect they will apply lexical principles for learning new words as, indeed, they have been shown to do in experimental tasks.

The lexical principles motivated by the logical dilemma posed by Quine—and, indeed, most studies of word learning in general, for example, Brown (1958) and MacNamara (1982)—focus exclusively on how children learn names for objects. As an example, one frequently invoked lexical principle was called the "Whole Object Assumption" by Markman (1989) and the "Principle of Object Scope" by Golinkoff, Mervis, & Hirsh-Pacek (1991): On hearing a new word, a child will assume it names a whole object rather than a part of the object, or one of its properties, or something related to it. The claim is sometimes made that one or another of the lexical principles could also account for learning other kinds of words but, so far, the claim has not been empirically tested. Instead, the suggestion was made that a child would have to "override" the whole object assumption in order to learn relational, non-object words like *more*, *down*, *open* (Markman, 1992).

While lexical principles research and theorizing have centered on learning names for objects, some persistent voices have repeatedly reminded the field that one-year-olds are learning a large number of words that are not nouns or names for things in the adult lexicon. And, in fact, for many children, more than half the words they learn are not the names for things (e.g., Bates et al, 1992; Bates, Bretherton, & Snyder, 1988; Bloom, 1973; Gopnik, 1982, 1988; Hampson, 1989; Lieven, Pine, & Barnes, 1992; McCune-Nicolich, 1981; Nelson, 1973; Pine, 1992a,b; Tomasello & Todd, 1983). This result is not new. Even in McCarthy's early study of vocabulary, nouns made up only 44.2% of the different words used by the group of 20 18-month-olds whom she studied (McCarthy, 1930, p. 118). The general assumption has been that nouns are the largest class of words in early vocabularies. But that assumption is correct only if the other part-of-speech categories with which nouns are compared are, indeed, valid for the words children learn before syntax, and all indications are that they are not.

The purpose of the study reported here was to document the words children learn from the beginning of word learning and throughout the pre-syntactic period in the second year. If such lexical principles as have been proposed so far are meaningful, then children ought to learn more object names, and they ought to learn more object names earlier in the developmental period than later. Most studies have sampled children's vocabularies either at a particular age (13 or 20 months, for example) or for a specific number of words (typically the first 50 words). Except for individual diary accounts, few have systematically sampled children's vocabularies over time to chart their growth longitudinally. Accordingly, the questions we asked were: What are the words that children learn? and, To what extent are object names represented in young children's earliest vocabularies, from the beginning to the end of the single-word period?

## METHODS

### *The Children*

The data are from a longitudinal study of 14 infants, from 9 months to about 2 years of age; the focus of the original study was on the acquisition of a vocabulary of words in the second year in the context of other developments in these children's lives. We have already reported elsewhere on the children's word learning in relation to their object play—as a window on developments in cognition (Lifter & Bloom, 1989), and in the context of their affect expression—the system of expression already in place when word learning begins (e.g., Bloom, 1990; Bloom & Beckwith, 1989; Bloom & Capatides, 1987).

The children were 7 girls and 7 boys, all first born, whose mothers were their primary caregivers throughout the period of study. Eight children were Caucasian and four were children of color: 2 African-American; 1 mixed African-American and Puerto Rican Hispanic; 1 mixed Dominican Hispanic, Caucasian, and Native American. These 4 children were also from the poorest families in our sample (with incomes less than \$10,000 in 1982). Except for family names and occasional words like *agua* and *mira!*, American English was the only language spoken in their homes. The children were seen every month, from age 9 months and until they were saying simple sentences with mean length of utterance greater than 1.5 words (mean age = 23 mos., 7 days).

### *Procedures*

The monthly observation sessions were video-recorded in a playroom at Teachers College, Columbia University, and these sessions provided the primary data we used for our studies. In addition, however, we visited the children and video-recorded their family interactions at home every month until they were 15 months old, and then every 3 months thereafter. The same pair of research assistants were responsible for collecting the data in the playroom and in the home visits; they were also in touch by telephone with the mothers in the weeks between sessions. The mothers were asked to keep diaries

of the words their infants said and appeared to understand at home, noting what the situation was and what others might have said. One purpose of the telephone conversations between sessions was to encourage these diaries. In the home visits and when the mothers came in for the playroom visits, the research assistants reviewed the previous month's diary with them to clarify the entries.

A group of toys was on the floor when the infant and mother came into the playroom, and other groups of toys were brought in every 8 minutes according to a schedule, with a snack provided after the first half-hour. The toys were chosen so as to allow the children equal opportunities for both manipulative and enactment play; for example, a set of plastic nesting cups was a manipulative toy and a group of farm animals was presented for enactment play. In addition, because traditionally gender stereotyped toys might have different appeal to boys and girls, we also provided equal opportunities for the children to play with traditional girl toys (e.g., the baby doll), boy toys (e.g., the dump truck), and neutral toys (e.g., the nesting cups). The same toys were presented every month, on the same schedule, to all the children. By the end of each session, the floor of the playroom was littered with toys. In effect, then, we stacked the deck in providing opportunities for the children to learn and say object names.

The children's speech was originally transcribed by hand, after which a second person verified the hand transcription and entered the data into a computer. Disagreements between the two transcription passes were resolved by having both transcribers review the tapes together; if agreement was not reached, the data were entered in phonetic notation. Subsequently, all the transcriptions were reviewed again in the context of editing the computer entries to verify their accuracy for other research in progress (having to do with the relationship of frequency of words in the mothers' speech to the words their children learned). The full details of data collection, processing, and analyses for the studies reported so far—which have had to do with word learning in relation to affect expression, object play, intentionality, and social context—can be found in Bloom, 1993a (see, also, Beckwith, Bloom, Albury, Raqib, & Booth, 1985; and Bloom, 1993b for a detailed account of the video-computer interface we devised for data coding and transcription).

#### *Achievements in Word Learning*

Because of the well-known differences in age of onset and rate of acquisition, we identified two achievements in order to equate the children for onset and level of language development: First Words (FW) and a Vocabulary Spurt (VS). First Words was the first occurrence of at least one phonetically consistent, meaningful, conventional word used 2 different times in a playroom session. The acquisition of new words was tracked from one month to the next in the playroom and a Vocabulary Spurt was identified when the number of new words in a session (1) showed an increase equivalent to at least 3 new words per week, or 12 new words from one month to the next, (2) after the child had already learned at least 20 different words. Mean ages for the 14 children at FW and VS, respectively, were 13 mos., 26 days (range = 10 mos., 5 days to 17 mos., 23 days), and 19 mos., 7 days (range = 13 mos., 2 days to 25 mos., 6 days). Given the criteria we used, all the children showed a vocabulary spurt. However, along with differences in their ages, they also differed in the number of months in the interval between FW and VS and the relative steepness of the increase at VS. The length of the interval between FW and VS varied for the individual children from only 1 month for 1 child to 8 months for 2 of them (the vocabulary growth curves for the individual children are in Bloom, 1993a).

The average rate of increase in new words from FW through the month after VS is represented in Figure 1, which shows the gradual increase in new words from one month to the next until the sharp increase in new words at the vocabulary spurt. The data in Figure 1 consist of the children's words in the playroom: at FW, the month after FW (FW+1), the month before VS (VS-1), VS, the month after VS (VS+1), and the interval between FW+1 and VS-1. In order to report vocabulary learned in the interval between FW+1 and VS-1, which varied for the individual children, the interval was divided into three parts (1, 2, and 3 in Figure 1 and the subsequent figures and table). For 8 children, the interval was 3 months or longer, and the number of words they learned during each 1/3rd of the interval was calculated separately for each child.<sup>2</sup> For 2 children the interval was only one month, and their words in that month were included in the last part of the interval. Four children are not represented in the interval because no months intervened between FW+1 and VS-1. Finally, for one child, only one month intervened between FW and VS, and the words he learned in that month were included at VS-1.

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<sup>2</sup>We thank O. Roger Anderson for suggesting this procedure.

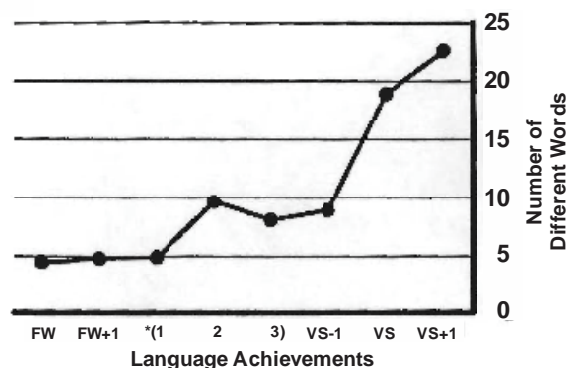


Figure 1. Average number of different words learned each month.  
 (\*Each of the three data points in parentheses represents the average number of new words in 1/3rd of the interval between FW+1 and VS-1.)

Several mothers had recorded words in their diaries at home, before the children said their first words in the playroom. Thus, the session we labeled First Words was not literally the very first time a child might have said a word, but once the children said their first words in the playroom, they continued to say words from then on. Mothers varied in their reliability and the consistency with which they reported words at home, but the criteria for words in the playroom were the same for all the children. We were confident we had indeed captured the rate of vocabulary growth through our monthly sampling, because the children's mean ages at 10 words and then at 50 words in the playroom were, respectively, 15 mos., 14 days and 19 mos., 24 days, virtually the same ages at 10 and 50 words reported in other studies based on diary data (e.g., Menyuk, Liebergott, Schultz, Chesnick, & Ferrier, 1991; Nelson, 1973).

## RESULTS

We will first present the results of the children's monthly progress in word learning in relation to the two achievements: First Words (FW) and the Vocabulary Spurt (VS); the children's vocabularies at the 50-word landmark will be described subsequently. In all the playroom sessions taken together, FW through VS+1, the 14 children together said a total of 11,404 words, with 342 different word types (including person names). All the forms in which a particular word appeared in the different children's vocabularies were counted as a single different word; for example, *Ma*, *Mama*, *Mommy*, and *Ema* (Hebrew) were counted as the single word type *Mama*. Words were not counted when they occurred as imitations, either in the playroom or the diaries.

The primary analyses concerned object words in the children's vocabularies, with results including person names reported secondarily. Words were categorized as object names if a child's word was the name for an object or a common noun in adult speech. Thus, following Lieven, Pine, & Barnes, the category of object words included "all instances of words which would be unambiguously classified as common nouns in the adult language" (1992, p. 296). Two child words, *ticktock* and *choochoo*, were counted because they were evidently names learned by a few of the children for clock and train. Object words were largely names for basic level objects, but also included mass nouns and names of body and object parts like *booboo* and *hole*, and place names like *lap* and *school*. Words which were ambiguous with respect to their status as noun or verb (for example, *ride*, *help*, *peepee*) were not included unless the word could also be the name for an object in the playroom (for example, *slide* and *hammer*).

Results will be presented first for developments around the language achievements FW and VS, beginning with the diary data before FW for those children ( $n = 8$ ) whose mothers reliably reported words their children said at home before their First Words in the playroom, and continuing through the month after VS (VS+1). Findings will be reported for both different word types and total number of word tokens. The children's vocabularies at the 50-word landmark will be described subsequently.

### First Words and Vocabulary Spurt

If object-specific lexical principles help get word learning off the ground, as has been claimed, then we might expect more object words would be learned early in the period with a decrease as children learn to "override" a constraint like the Whole Object Assumption (Markman, 1992). We explored this in several ways. First, we plotted the average percent of object names among the new words learned by the children each month, including the diary data before FW. The result for the 14 children together, in Figure 2, is clear: Object names made up less than 40% on average of the new words they learned from one month to the next.

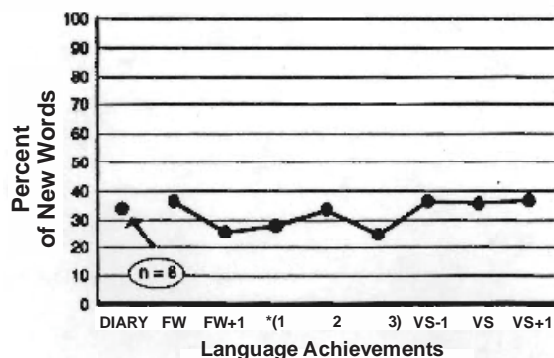


Figure 2. Average percent of new words learned each month that were object words. (\*Each of the three data points in parentheses represents the average percent of new words that were object words in 1/3rd of the interval between FW+1 and VS-1.)

We then looked at the number of object names among all the different words the children were accumulating in their vocabularies from one month to the next. This result is presented in Figure 3, averaged for the group. As can be seen, object names made up less than half of the different words in the children's cumulative vocabularies at each time.

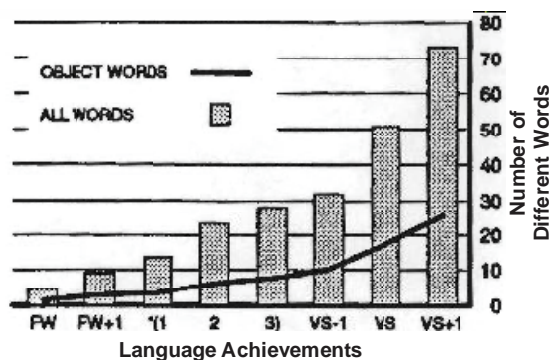


Figure 3. Average number of object words learned in relation to all the words in the children's cumulative vocabularies from month to month. (\*Each of the three data points in parentheses represents the average number of words in 1/3rd of the interval between FW+1 and VS-1.)

The differences among the children in the kinds of words they learned can be seen in Figures 4 and 5, where the percent of object names among the different words in their cumulative vocabularies is plotted individually. For clarity in the presentation, the 7 children who were 19 months or younger at VS are represented in Figure 4, and those older than 19 months at VS are represented in Figure 5. (The fact that many children had only a few words in their vocabularies at FW and FW+1 resulted in exaggerated percentages in the earliest months.)

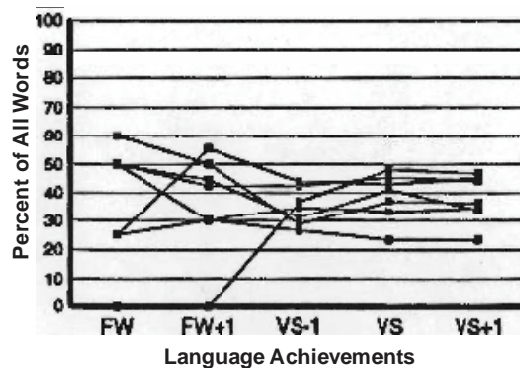


Figure 4. Percent of all words that were object words in the monthly cumulative vocabularies for just the children younger than 19 months at VS (n = 7).

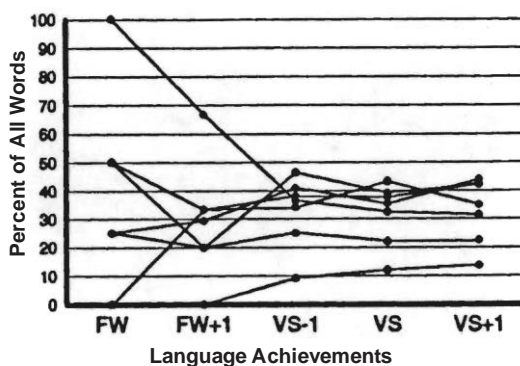


Figure 5. Percent of all words that were object words in the monthly cumulative vocabularies for just the children older than 19 months at VS (n = 7).

The mean percent and standard deviation of different words the children said that were object words each month in the playroom, and the range of percent of object words, are presented in Table 1. Again, object words represented less than half the different words said each month on average. Even after removing the one child who consistently had the lowest percentage of object words each month, the result was the same: On average, 30% to 39% of the different words said each month by the remaining 13 children were object words.

Table 1. Percentage of Different Words that Were Object Words

	FW	FW+1	*(1	2	3)	VS-1	VS	VS+1
Mean	36.4	27.9	26.7	29.6	30.3	33.8	35.0	35.4
SD <sup>a</sup>	27.8	24.7	15.2	14.5	10.0	13.4	13.1	11.9
Range	0-60	0-83	0-43	13-47	13-43	0-54	13-51	16-52

Note. FW = First Words; FW+1 = 1 month after FW; \*1, 2, 3 each = one-third of the interval between FW+1 and VS-1; VS-1 = 1 month before Vocabulary Spurt; VS+1 = 1 month after VS

<sup>a</sup>SDs were relatively high in the early data because percentages tended to be exaggerated with only a few words in a child's vocabulary.

A similar result was obtained for the token count of the more than 11,000 words the children said; on average, 33.3% of tokens were object names. Dividing the continuum of word learning into two periods, we compared tokens in the period encompassing the months FW through VS-1 with tokens at VS and VS+1. On average, 34.8% of word tokens were object words before VS and 32.5% were object words at VS and the month after, consistent with the rates of object names among word types reported in Figures 2 through 5. Thus, in addition to the finding that different object words were not more likely to be learned earlier or later in the period (Figure 2), these children were also not more likely, either before or after VS, to use the object words they knew more often than other words. These results contrast with the report of a relative increase in object words with the vocabulary spurt (based on mothers' diary data, e.g., Goldfield & Reznick, 1990). These results mean that the vocabulary spurt is not a "naming explosion" as it has sometimes been called—first, because it is not an increase in "naming" per se, and second, because vocabularies spurt to varying degrees and do not necessarily 'explode' for all children (as the growth curves for the individual children, in Bloom, 1993a, make clear; see also Goldfield & Reznick, 1990).

Finally, we looked at the representation of both object words and person names among all the types and tokens of words said in the period. Both object words and person names together accounted for 40.6% of types and 43% of tokens.

#### *The 50-word Vocabularies*

When the size of the children's vocabularies reached 50 words, the mean percent of object words was 36.3%, with a range from 10% to 50% for the individual children; object names represented 50% of the 50-word vocabularies for only one child. For the 6 children who were 19 months or younger at 50-words, 39.7% of the words in their 50-word vocabularies were object words, on average; the 8 children who were older than 19 months had an average of 33.8% object words among their first 50 words (the difference between them was not significant,  $p = .324$ ).

The makeup of a child's first 50 words has often been used for assessing vocabulary and comparing individual children; the precedence for this was set by Nelson (1973) and its validity was most recently confirmed by Pine & Lieven (1990). Children differ widely in rate and onset of language learning. This means that measures which equate children for level of language development—either onset and achievement in word learning, like FW and VS, or the size of a child's vocabulary, like 50 words—are more reliable and valid than equating children for age (Bloom & Lahey, 1978). The mean age of the children in our study when their vocabularies reached 50 words was 19 mos., 24 days—very close to their mean age at VS (19 mos., 7 days)—but they ranged in age from 14 to 25 months. Only one child was 19 months old at 50 words. Similar ages and ranges have been reported by others. For example, in her study of 18 children, Nelson (1973) reported a mean age of 19.6 mos. at 50 words, with a range from 14 to 24 mos. And, the mean age at 50 words of the 12 children studied by Lieven, Pine, and Barnes (1992) was 18 mos., 27 days, with a range from 13 to 25 months.

Vocabulary studies that equated children based on age often used ages close to 19 months; for example, children's vocabularies were studied at 20 months by Bates, Bretherton, and Snyder (1988) and Nelson, Hampson, & Shaw (1993). However, the range in ages for the children we studied—at VS or when they reached a vocabulary of 50 words—would predict substantial differences among them in the number of words in their vocabularies when they were each 19 months old, even though 19 months was essentially the mean age for both achievements. Nevertheless, we expect that object names represented less than half the words the children knew when they were 19 months old, given the robustness of the findings regardless of the point in time in their development, or whether we included person names, or looked at types or tokens.

## DISCUSSION

Object names are not privileged for word learning; traditional assumptions notwithstanding, words other than common nouns predominate in children's early vocabularies. Only about 1/3rd of the different words learned by the 14 children in this study were names for things. When person names were included, the result was little more than 40% for both word types and tokens. This result echoes the results from three other recent studies. Common nouns represented 37.7% of words at 20 months for the children studied by Hampson (1989) and 33.2% of the first 50 words of the children studied by Lieven, Pine, & Barnes (1992). In a large cross-sectional study by Bates et al. (1992), for 463 children whose vocabularies ranged from 1 to 50 words, less than 40% of the words their mothers reported were nouns. Individual differences existed among the children in these studies, as in our study, but they were less extreme than in Nelson's



original study (1973), where the class of "nominal" words included a variety of parts of speech (see Lieven, Pine, & Barnes, 1992). For the children we studied, object names were rarely more than 50% of the words they were learning.

Larger percentages of object names have been found for some children's early vocabularies when these were based on mother report measures (diaries or checklists) as in the original Nelson (1973) study. In data reported from two independent studies by Gopnik (1988), more object names were reported in the study that relied on mothers responding to a checklist than in the study of children's spontaneous speech. In the study by Bates, Bretherton, & Snyder (1988), although the children's mothers reported that 56% of the words their children knew were nouns, 46% of words in free speech were nouns at 20 months. And, in another study, Pine concluded that mothers were likely to "under-report instances of other word-classes and thereby underestimate their relative contribution to [a] child's vocabulary" (1992a, p. 84). Mothers might well be more likely to recognize and subsequently recall a child's object words for reasons of relative salience, frequency, or both, when asked to keep a diary or respond to a checklist. Or mothers might be prompted to recall words from children's books which are not in their children's everyday speaking vocabularies.

### *Lexical Principles and Word Learning*

Lexical principles that focus on learning object names clearly do not start the young child off on word learning. The most telling result reported here was that object names were not more likely to appear in children's vocabularies at FW in the playroom, nor in the diaries mothers kept at home before First Words, than they were at VS and VS+1. A related result was reported by Pine and Lieven (1990): Mothers reported fewer object words when their children's vocabularies consisted of 25 words than when vocabularies reached 50 words. In the large cross-sectional study by Bates et al. (1992), the smaller a child's vocabulary, the smaller the percentage of object words mothers reported. This result was true for children with vocabularies of up to 200 words (when approximately 56%, on average, of the words reported were object names), after which the proportion of object words reported leveled off and, eventually, decreased.

### *Possible Socio-economic Factors*

If lexical principles do not explain presyntactic word learning, we have no reason to give them special status for word learning by older children. What, then, does determine the words a child will learn? Differences in social background was suggested as a possible factor by Lieven, Pine, & Barnes (1992), because they had included children from different backgrounds in their study of 50-word vocabularies, but they did not report the contribution from different groups of children to the general results. In the present study, object names made up 36% of the 50-word vocabularies for 3 of our 4 children from the poorest homes, in comparison with 39% of the vocabularies from the other children. The fourth child from a poor home had the lowest percentage of object names among his first 50 words (10%). However, for each of two children whose parents were among the most affluent and highly educated, only 24% of their first 50 words were object names. The 45 children in the Hampson and Nelson studies were described as "white, middle class"; nevertheless, object names represented less than 25% of the vocabularies at 20 months for 16 of these children and the lowest one was 0% (June Hampson, personal communication). As is well known, the variation within groups is typically greater than the differences between them.

### *Pragmatics and Word Learning*

Many have looked to the pragmatic factors embedded in a child's social context for an explanation of the words children learn (e.g., Nelson, Hampson, & Shaw, 1993, and Pine, 1992b, both citing Ninio & Bruner, 1978). Obviously, children would never learn words if they did not hear them spoken in the first place, and the words they hear are most certainly spoken in discourse contexts. Several such contexts have been well documented and include routines like picture-book reading (e.g., Ninio & Bruner, 1978; Snow & Goldfield, 1983), as well as rhyming, singing, and other verbal games (Miller, 1982). The pragmatics of word learning has a long history, and few would question that the words children learn and use are socially situated and pragmatically meaningful (e.g., Dore, 1975, 1985; Griffiths, 1985; Halliday, 1975; McShane, 1980; Ninio & Wheeler, 1984). Indeed, even the prelinguistic sounds of infancy are functionally differentiated on the basis of social cues from a very early age (e.g., K. Bloom, 1990; Delack, 1976; Legerstee, 1991; Legerstee, Pomerleau, Malcuit, & Feider, 1987; Lewis & Freedle, 1973).

Labeling is one pragmatic context typically associated with learning names for things and sometimes occurs during picture-book reading (see, in particular, McShane, 1980; Miller, 1982; Nelson, Hampson, & Shaw, 1993; and Ninio & Bruner, 1978). However, caregivers do not go about routinely labeling objects for their children, and even in the most

literate of homes, picture-book reading takes up only a small part of the day. Everyday contexts for word learning are considerably more varied and complex. In one study of the semantic focus in the speech eight mothers addressed to their children between one and two years of age, "nomination" was rare and amounted to less than 5%, on average, of the speech the children heard; instead, the most frequent category of semantic focus was talk about "activity" (Goddard, Durkin, & Rutter, 1985). Similarly, when the mothers in our study responded to their children's emotional expressions (their smiles, laughs, whines, cries, and the like), they most often talked about actions related to the causes and circumstances of a child's feelings and what to do about them; they rarely named the emotion a child was expressing (Capatides & Bloom, 1993). Similar results have been reported by others (for example, Dunn, Bretherton, & Munn, 1987; Miller & Sperry, 1987).

Documentation of the pragmatic functions a child's words might serve does not, by itself, explain the origins of the words used with those functions. For example, classifying a child's word as a request cannot explain the origin of the meaning of the word; it might explain acquisition of the word *give* (arguably rare in early vocabularies), but not the single-words typically used in the request, like *cookie*, *gone*, or *more*. Other, semantically based functions are invariably necessary for describing early words, and researchers tend to combine pragmatic and semantic criteria; the classification of "social," "naming," and "cognitive-relational" words by Gopnik (1988) is one example. The study by McShane (1980) is another example; he had criticized the semantic account offered in Bloom (1973) but, nevertheless, resorted to the subcategories "recurrence," "nonexistence," "attribute," and "action"—semantic categories originally proposed by Bloom (1970, 1973)—for words in his "communicative" category of "description." In the absence of linguistic (syntactic) criteria, pragmatic classifications cut across all a child's words as is evident in the list of "conversational acts" and "speech acts" identified, respectively, by Dore (1979) and Ninio and Wheeler (1984), and the "social" words identified by Gopnik (1988). In sum, children learn the pragmatic functions of language, to be sure, but these do not explain their word learning any more than do adult parts of speech or object-specific lexical principles.

#### *Other Categories of Words*

In the context of the research reported here, we explored several schemes offered in the literature for the words children learn which are not nouns, and finally settled on classifying words as "person names," "object names," "relational words," "social words," "event words," and "other." However, ambiguity was too great for comfort and we were wary of the psychological reality, for the child, of these and other such categories. Even the group of relational words children learn—words like *more*, *gone*, *up*, and the like (Bloom, 1973)—was not unambiguous. As others have also observed, individual relational words reveal aspects of cognitive development (e.g., Gopnik, 1988; Tomasello & Farrar, 1984), but they do not, together, constitute a category or class of words for a young child, either psychologically or linguistically.

The important point is that early words do not fall into neat, reliable categories. We noted earlier that words in presyntactic vocabularies which are not nouns cannot be reliably classed as traditional parts of speech. If the other words in a child's presyntactic vocabulary resist part-of-speech classification, then nouns cannot be considered the largest class. In fact, for most children—as we have seen from this and other studies cited in the literature—the other words a child learns often make up the larger class of words. But these words cannot be reliably classified according to either linguistic, conceptual, or pragmatic criteria. And even the common nouns children learn do not form a consistent class, because they name basic level object categories like *shoe* but also include words like *lap*, *animal*, and *lunch* (Nelson, Hampson, & Shaw, 1993).

The diversity in young vocabularies is impressive and words like *uhoh*, *hi*, *boom*, *on*, *this*, *moo*, and *yum* were as ubiquitous in our data as words like *box*, *ball*, *girl*, *bottle*, *cookie*, *juice*, and *spoon*. The words learned by 7 or more of the children we studied are listed in Figure 6, and they include such relational words as *more*, *up*, *in*, *on*, and *gone*, and also such socially mediated expressions as *hi*, *bye*, *whew*, and *yes*. According to Markman (1992), in order to learn such words and, eventually, the verbs of the language, a child would have to "override" the "whole-object" constraint she proposed for word learning. However, associating *gone* with the disappearance of juice, or *more* with the recurrence of juice in a glass, is more likely the result of the same factors which contribute to associating *juice* with the liquid that disappears and reappears, gets poured, drunk, spilled and the like. These would include, at least, the representations in a child's intentional state as well as developing concepts in the knowledge base—two factors which contribute to the relevance of words for learning them.

<b>box</b>	<b>cookie</b>						
<b>choochoo</b>	<b>door</b>						
get	<b>eye</b>	<b>banana</b>					
<b>girl</b>	go	boom					
<b>hammer</b>	here	<b>bottle</b>	<b>apple</b>				
<b>horse</b>	moo	<b>cow</b>	<b>boy</b>				<b>baby</b>
in	no more	<b>daddy</b>	that		<b>mommy</b>	<b>ball</b>	
out	on	<b>shoe</b>	this	<b>bead</b>	no	down	
sit	<b>truck</b>	<b>spoon</b>	uhoh	open	oh	<b>juice</b>	
two	woof	there	whee	this	up	more	
	7	6	5	4	3	2	1
	Number of Children						

*Figure 6.* The words learned by 7 or more of the children; highlighted words named things in the playroom (from Bloom, 1993a, where the remaining words learned by only 1 to 6 of the children are reported in an appendix).

### *The Principle of Relevance*

Whatever principles or assumptions are at work for word learning need to be considerably more general than those offered so far to explain how children learn names for objects. One candidate principle is the Principle of Relevance—a basic, elementary generalization about the interaction between the developing mind of the child and a perceptible context that is socially mediated, (Bloom, 1993a). "Relevance is the single property that makes information worth processing and determines the particular assumptions an individual is most likely to construct and process" (Sperber & Wilson, 1986, p. 46). In the successful language-learning scenario, a language tutor shares a child's focus of attention and the word the child hears has relevance because its target is already part of what the child has in mind. What the child is feeling and thinking about that shared focus of attention determines the word's relevance, and the relevance of words determines that they will be learned. Clearly, children hear a good deal of talk that is not relevant to what they have in mind. However, the words they learn will most assuredly be words that are relevant (Bloom, 1973; see, also, Beckwith, 1988, with regard to syntax).

An apt analogy was suggested by Fauconnier for how the representations one already has in mind from the discourse context narrow the possible meanings one might set up on hearing a sentence: "A brick could theoretically occupy any position in a wall, but at any stage of the actual building process, there is only one place for it to go" (1985, pp. 168-9). Like Fauconnier's brick, the word a child hears could theoretically mean any of a number of things. But in enough situations in which the child hears it, the options are already greatly diminished, and the word, like the brick, finds its target (Bloom, 1993a). The elements in the representation a child has in mind when hearing a word narrow the range of possible meanings that the word could have. The Principle of Relevance is a cognitive principle—drawing as it does on developments in mental representation—and it is also quite general in assuring which words will be learned. The result of including the Principle of Relevance in a theory of language acquisition is a developmental account of early word learning that begins with the child and what the child knows, in contrast to specifically lexical principles (biases, assumptions, or constraints) that are logically driven from an adult point of view.

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