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## Overextension in early language development\*

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### ABSTRACT

This research explored overextension in the early vocabularies of six children, followed in a language diary study from 1;0 to 1;8. Results indicated that only one-third of the first 75 words acquired by each child were ever overextended. A small set of high-frequency, early acquired words accounted for a disproportionate number of overextensions. Overextensions were classified into three types: categorical overinclusions, analogical overextensions and predicate statements. Four types of information served as the bases for word applications: perceptual, action-functional, affective and contextual. The use of words to denote associative complexes of a well-organized, systematic character was discussed as a characteristic form of early word usage.

### INTRODUCTION

There has been considerable empirical and theoretical interest in recent years in the topic of overextension in children's early use of words; that is, the use of a word for a broader range of referents than is conventional in adult usage (Anglin 1977, Bloom 1973, Clark 1973). Much of this recent theorizing is based on data from the major diary studies of early vocabularies (Chamberlain 1904, Guillaume 1927, Leopold 1939, Lewis 1951, Moore 1896), which show that overextension occurs in the speech of children in many languages, that many overextensions are common across children (*dog* for a range of animals), and that children gradually refine their overextended usage to conform to conventional adult language.

Despite the considerable amount of literature on overextension, theoretical accounts differ on such fundamental issues as the predominance of overextension in early vocabularies, the types of overextension which occur, the bases on which overextensions are made, and the character of overextension as a conceptual

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process. While this literature will not be reviewed in detail here, some of the major issues will be outlined.

The frequency of overextension is one major issue. Clark (1973) and Werner (1948) share the view that overextension is prototypical of the early word acquisition process, although they acknowledge that not all words are overextended. On the other hand Bloom (1973), Anglin (1977), Barrett (1978), and Nelson (1979) see overextension as one of several relations between child and adult reference occurring in early speech. However, none of these theorists provides any coherent data base or appropriate metric for assessing how prevalent overextension is in the early word-learning period.

Accounts also differ markedly on the types of overextension which occur. Clark (1973) concentrates her discussion on overextensions of the categorical type (*dog* for all four-legged animals). In contrast, Werner (Werner 1948, Werner & Kaplan 1964), Piaget (1951), and Vygotsky (1962) emphasize diffuse, syncretic overextensions: these are groupings based on a 'togetherness of things in a realistic situation', such as Werner (1948) describes for the frequently cited chain complex word *quah*, applied to a duck in a pond, water, milk, picture of an eagle on a coin, and round coin-like objects. Bloom (1973) postulates a developmental sequence in word extension: early idiosyncratic, loosely associated complexes (*quah*); then, correct generalizations; and later, categorical over-inclusions (*dog*). Bowerman (1976) argues that the associative complex rather than the chain complex characterizes much early word use. Anglin (1977) provides another typology of overextension, making the distinction between overextensions based purely on association through contiguity (*Daddy* for father's shoes) and those based on some form of perceptual similarity (*dog* for many animals). The main problem with these conflicting accounts is that they each sample selectively from the diary literature, without specifying their selection criteria, and thus explain different phenomena.

Parallel to the disagreement on types of overextension runs the lack of consensus on the bases of word extensions. Clark (1973) stresses clear, objective perceptual features as the criterial bases for word applications. Nelson (1974) argues that functional characteristics are a major determinant of early word use. In sharp contrast, Werner (1948) emphasizes the importance of affective response, action schemes, and situational context in the child's idiosyncratic extensions of words. Bloom (1973) encompasses both these types of determinants in her account. Anglin (1977), Bowerman (1976), Barrett (1978) and Thomson & Chapman (1976) argue that, while functional extensions may occur, perceptual features are the most frequent bases of word applications. Greenfield (Greenfield & Smith 1976) contends that Werner's global, diffuse complexes are essentially combinatorial utterances, intended to convey a relational or syntactic meaning between referents (e.g. *Daddy* for father's shoes indicates possession, not a fuzzy meaning for the word *Daddy*).

Another controversy in the literature is whether overextensions are symmetrical in comprehension and production. Huttenlocher (1974) has emphasized discrepancies between comprehension and production, citing data indicating that words overextended in production may not necessarily be overextended in comprehension. Thomson & Chapman (1976) have also argued that overextended production words may or may not be overextended in comprehension. Generally, recent theories have recognized that both the comprehension and production systems must be considered in understanding the child's conceptual grasp of word meanings.

Finally, there is little agreement on the character of overextension as a process. While Clark (1973) and Anglin (1977) see overextension as arising from imperfect hypothesis testing of semantic features or conceptual criteria, Werner (1948) sees it as reflecting a basic primitive fusion in the child's mind between objective properties of referents and the child's own subjective responses and situational context. Bloom (1973) sees a change in process from early loose associations to later categorical overextensions. Greenfield (Greenfield & Smith 1976) sees overextensions as interfaced with pre-syntactic attempts to convey relational meaning.

Thus, while overextension is a topic which has captivated many theorists, there is little consensus on the major issues. Furthermore, the empirical basis for theorizing is inadequate. Many of the diaries are incomplete and ambiguous, lacking important information about word comprehension, changes in word meaning, situational context accompanying word use, and so forth. Even the best diaries, such as Leopold's (1939), are limited to studies of single children. Much of the modern empirical work in vocabulary acquisition has been narrowly constrained and of limited scope (Anglin 1977, Gruendel 1977, Thomson & Chapman 1976). None of the major theorists in the area has collected a clearly defined and coherent body of new vocabulary data, comparable in scope to the old diary data, to serve as the basis for exhaustive examination of overextension in early language.

The goal of the present study was to collect a large but clearly defined corpus of vocabulary data using the same methods, criteria and modes of analysis across a group of subjects in order to study overextension systematically. The primary questions motivating the research were the following: (1) What is the relation between overextension and normal extension in early word learning? (2) What are the major types of overextension? (3) What kinds of attributes serve as the bases for word applications? and (4) Is there a developmental sequence in early word learning involving different types of extension?

## METHOD

Six first-born children were studied, three boys and three girls, recruited from hospital birth records. All but two of the parents were college graduates. Each child was studied for at least six months, starting around 1;0 and continuing until 1;6-1;8, when the child had a productive vocabulary of at least 75 words. (Two children fell just short of 75 words, with 73 and 72 words.) Children were visited in their homes for a 1-2 hour session every two weeks.

The primary source of data was a diary of productive language kept by each mother. Mothers were instructed to record every new word the child spoke and to describe the accompanying situation and specific referent involved. After its initial use, repeated uses of a word for the identical referent and any use of the word for a new referent were recorded until the word's application appeared to stabilize. Extensive data on word comprehension were also collected, but will only be touched upon in this report.

While there are drawbacks to the diary method (Nelson 1973), there is no satisfactory alternative for collection of detailed data on early acquisition. The mothers in this study received thorough training in the diary procedure and they were all adequate and conscientious record keepers. Although no formal reliability check of the mothers' accuracy was made, discussions during the home visits helped to ensure that the mothers' judgements were consistent with those of the author. It is important to note that the mothers were repeatedly questioned about erroneous or overextended use of words. Thus, the extent of overextended usage reported here is probably a maximum estimate.

In addition to the diary material, supplementary data were collected in discussions with the mothers and interactions with the children during home visits. Inquiries were made about changes in meaning of words and diary entries were discussed. Certain semantic domains of interest were explored using observations and probes with the children. These data were pooled with the diary data for purposes of the analyses described in this report.

A chronological corpus of the first 75 words spoken by each child was compiled from all the available data and served as the data base for all analyses. Words used in direct imitation only were not included, nor were words used in such a way as to have no discernible referent for the adult observers. Idiosyncratic words were included if their use was considered meaningful. A word had to have a history of at least three recorded utterances to be included in the corpus.

## RESULTS

*Vocabulary acquisition*

In this study, 13.7 months was the mean age of attainment of 10 productive words, 17.3 months of 50 words, and 18.4 months of 75 words. Comparison with

Nelson's (1973) study suggests that as a group the children in the present study were somewhat early speakers. By the end of the project, the children's vocabularies ranged from 72 to 247 words. Five per cent of the total production corpus of 445 words had not been used for at least two months by the end of the study. Object names were the most frequent category of words, particularly ANIMALS (56 of the 445 words) and FOODS (50 words), as in Nelson's (1973) study.

### *Prevalence and distribution of overextension*

In order to examine how prevalent overextension errors were in the total picture of word learning, each word of the total production corpus was rated by the author as either of normal extension or overextended. Normal extension was defined as use of a word for any real, toy or pictorial exemplar which would be deemed appropriate according to adult usage. Overextension was defined as any use of a word incompatible with conventional adult reference, even if the child's intent was sensible (*Dada* for father's shoes). Every recorded application of each word was examined; one overextended application was sufficient to classify the word as overextended, even if the vast majority of times the word was applied it had normal extension.

Of the total production corpus of 445 words, 67% or 297 words were always used in normal extension, while 33% (149 words) were overextended one or more times. Certain semantic categories were more prone to overextension than others, notably LETTERS (100%), VEHICLES (76%) and CLOTHING (62%); only 28% of ANIMAL words were overextended.

There were 12 words present in the corpus of at least four children and overextended by over half the children who used them: *car*, *truck*, *shoe*, *hat*, *Dada*, *baby*, *apple*, *cheese*, *ball*, *cat*, *dog* and *hot*. Together, they aggregated 55 overextended words, or 37% of the 149-word total. The high frequency of these words in early vocabularies and their high likelihood of overextension suggest why they have been cited as overextended so frequently in the diary literature.

### *Types of overextension*

Overextensions were classified into three different types: categorical overinclusions, analogical overextensions and predicate statements. This typology draws on others in the literature but was developed primarily as a way of describing the data most parsimoniously. Because 33 of 149 overextended words had more than one type of overextended application, there were a total of 190 overextended applications. All but two of the 190 applications were classified using the threefold system.

*Categorical overinclusions* (105 applications; 55% of total overextended applications). A categorical overinclusion was defined as the use of a word to label a referent close to the word's standard referent in some clear higher-order

taxonomic category of adult usage. People words accounted for the largest number of categorical overinclusions, with generalization across sex (*Dada* for mother), across age (*baby* for children), and across family boundaries (*Dada* for men generally). VEHICLES and ANIMALS were categories with many categorical overinclusions (*truck* for bus, *horse* for goat). Other common categorical overinclusions involved fruits (*apple* for oranges), footgear (*shoe* for boots), and headgear (*hat* for crown). All six children overextended *hot* to cold objects such as ice cream. Overextensions involving polar action words were also common, such as *thank you* for giving.

*Analogical overextensions* (36 applications; 19% of total). An analogical overextension was inferred when the child appeared to be commenting on a similarity or an analogy between the word's standard referent and the labelled referent, but these referents were not related to one another in any clear categorical sense according to conventional taxonomy. In most analogical overextensions, the inferred similarity was perceptual in character (calling a centipede *comb*, *ticktock* for sound of water dripping), but functional analogy (putting wastebasket on head and saying *hat*) and affective communality (*hot* for prohibited fancy glassware) were also used as the basis of application.

Five children made analogical overextensions of the word *ball* to a variety of round objects; the range of referents extended from close relations of true balls (balloons, marbles), to clear members of other concept categories (apple, egg), to more ambiguous cases (wool pompom, spherical water tank). While some cases seemed to involve genuine perceptual or labelling errors, others appeared to be more clearly analogical in character, e.g. child selected an apple when asked for *apple* and then threw it across the room saying *ball*.

*Predicate statements* (47 applications; 25% of total). An overextension was classified as a predicate statement when it appeared that the child was trying to convey some information about the relationship between the immediate referent and some absent person, object, property or state, rather than labelling the referent itself (*doll* for usual location of doll in the crib when it was absent). Implicit in this assessment was a belief that a child with more advanced syntax and a larger vocabulary would express the same concept in a word combination (*dolly all gone*).

As defined in this typology, predicate statements are relational utterances, in contrast to classificatory statements such as categorical overinclusions and analogical overextensions. The view taken here is that predicate statements are what Greenfield calls COMBINATORIAL productions (Greenfield & Smith 1976), that they are based on association through contiguity (Anglin 1977), and hence in some sense they are not extensions based on a word's referential meaning. However, the application of words in what is here defined as predicate statement usage has been historically seen as evidence of the shifting instability and idiosyncrasy of word meanings (Bloom 1975, Piaget 1951, Vygotsky 1956, Werner &

Kaplan 1964). The present typology is consistent with that of Leopold (1939) who classified such utterances as transfers of reference, indicating that they are different from but nevertheless related to referential extensions.

A major type of predicate statement was the possessive use of people words (*Nonno* for grandfather's apartment building). Other predicate statements involved a comment on a former or usual state of affairs (*cat* for cat's usual location on top of the TV when absent). Some predicate statements revealed the child's anticipations about how events were organized in time (saying *key* as they stood at the door but before mother got keys out). Other applications suggested the child's understanding of the various elements relevant to a particular substance (*water* for turned-off hose and picture of bears tumbling in a washing machine) or to a specific activity (saying *peepee* or *doodoo* for toilets, for people on the toilet, or hearing the toilet flush). Finally a few of these applications appeared to be 'make-believe' statements (saying *nap* while pretending to sleep on the kitchen floor).

### *Bases of applications of words*

All of the production corpus data (both normal extensions and overextensions) were used to examine the various bases of word applications used by the children. There were 390 applications, drawn from 231 of the 445-word total, for which it was possible to infer a single, unconfounded basis of application. Four bases of application were used for the classification: perceptual similarity, action or function similarity, affective similarity and contextual association. The typology draws on other classification schemes in the literature, but was designed empirically to fit the data.

*Perceptual similarity.* There were 229 applications based on unconfounded perceptual similarity, e.g. shoe was not being worn when labelled; these applications included both normal extensions and overextensions. Of these applications, 179 were based on visual similarity (*truck* for toy truck [normal extension], *dog* for picture of wolf [overextension]). There were 28 applications involving the correct or incorrect labelling of an unseen referent on the basis of an isolated auditory input (*dog*, for sound of barking [normal extension], *truck* for bus passing [overextension]). Tactile information served as the basis for 19 applications (*hot* for hot and cold objects, *wet* for wet clothing). Finally, there were two olfactory applications (child smells dog excrement and says *P.U.*) and one kinaesthetic one (child tries to lift heavy bucket and says *heavy*).

*Action or function similarity.* There were 87 applications based on action similarity. Many were correct applications of action words labelling simple, discrete action patterns (*tickle*, *cough*). Others, like *byebye* and *allgone*, seemed to label fundamental relations in time and space (*up* for turning on light switch, getting up on furniture, asking to be picked up, etc.). Similar extensions of action words have been recently described by Gruendel (1977).



There were 13 applications based on functional similarity unconfounded by perceptual similarity. That is, all these applications were overextensions to an incorrect referent (*Dada* for picture of bear with thermometer in his mouth, because father had recently been home ill; *hat* for shirt stuck on the head) (cf. Gruendel 1977).

*Affective similarity.* There were 15 cases in which an inferred affective response on the part of the child provided the basis for word application. Nine of these applications involved labelling of prohibited or frightening objects or events (*hot* for explicitly forbidden non-hot objects; *bad* for spilling, dropping food, cat throwing up on rug and fighting, and touching forbidden things).

*Contextual association.* Contextual association was inferred as the basis of application when a word was used *not* for its standard referent but for a referent normally found in contiguity to it, that is a contextual associate of the standard referent (*nap* for crib blanket, *Lisa* for the swing that friend Lisa had used earlier in day). These 47 applications were discussed above as predicate statement overextensions.

#### *Overextensions in production vs. comprehension*

The issue of overextension in comprehension was not systematically examined in this study. While data on comprehension of words were collected, the diary methodology used for the study and the volume of naturalistic data collected made an intensive investigation of overextension errors in comprehension impracticable. However, some relevant observations from the data can be outlined.

There were numerous examples in the data of clear discrepancies between comprehension and production with regard to overextension. These were most noticeable in cases of categorical overextensions within such taxonomic hierarchies as foods or vehicles. For example, during a home session a child might consistently indicate a toy or picture exemplar in response to its correct name (e.g. *strawberry*), and then within minutes label it with an overextended term (*apple*). A few such cases were reported by the mothers as persisting over time, either with regard to people names (responds to *Mommy* but calls both parents *Daddy*) or in reference to objects (responds to *raisin* but calls them *nana* (banana)). One child showed the striking pattern of responding correctly to five or more vehicle names but calling all the same exemplars *car*.

In addition to these discrepancies involving categorical overinclusions, there were many occasions on which a child used a word in a predicate statement overextension or an analogical overextension to denote a referent for which he comprehended the appropriate label. Saying *Daddy* for father's shoes, *hat* for bucket put on the head, *cat* for top of TV, or *nap* for a blanket all involved overextensions to objects for which the child knew the correct label in comprehension.

While lack of symmetry between comprehension and production appeared to

be the more frequent pattern, there were cases of overextended comprehension observed. These were most evident on occasions when the child was asked to select an object from an array of taxonomically related exemplars, such as being asked for *car* and selecting a toy train. Thus the present study is consistent with Thomson & Chapman (1976) in finding diverse relations between comprehension and production, depending on the word and individual child involved.

### *Developmental course of extension*

As reported above, the majority of words were used correctly. Furthermore, most words were used to denote generalized referent classes, rather than a single, unique referent: 77% of all object words in the corpus had been generalized to more than one referent within one month of acquisition. However, each child had some words which he was slow to generalize. Of the 75 words not generalized within one month of acquisition, 35 of these (47%) were from the first third of each child's corpus. Most of these words denoted some highly valued, familiar and salient object: *Mama*, *Dada* (11 words), the household pet, favourite doll, etc. None of the children used *Mama* and *Dada* in the early months in the amorphous, loosely associated way described by Bloom (1973).

In order to examine the pattern of extension across acquisition, the percentage of words overextended for each third of the corpus for each child was calculated. Averaging across children, the figures indicate that early words were more likely to be overextended than words acquired late in the acquisition period: words 1-25: 45% overextended; words 26-50: 35%; words 51-75: 20%.

While early words were more likely to be overextended, this overextension did not typically occur in the earliest months. The percentage of words currently overextended relative to total words in use was tabulated for the last seven months of acquisition: 11%, 9%, 24%, 29%, 28%, 28%, 24%<sup>1</sup>. These data indicate that while overextension was rather infrequent in the earliest months of vocabulary acquisition, overextended words constituted about one-quarter of words in active use for most of the months of the acquisition period.

Thus, generalization of words to both correct and incorrect referents is a process which accelerates as acquisition proceeds. Just as early words were slow to generalize, so early words were much more likely to have a period of normal or underextended use prior to their overextension than were late words. Sixty-three per cent of overextended words from the first third of the corpus had one month or more of normal usage prior to their overextension, compared to 21% and 8% in the last two-thirds respectively.

To explore the possibility of a developmental sequence in the three types of

[1] A similar pattern was obtained when the data were averaged across children based on chronological age in months. Because the children varied so widely in acquisition rate, reckoning months backward from the end of the project was a way to equate the children somewhat for vocabulary size across time.

TABLE 1. *Percentage of total overextended applications attributable to each type across months*

Type of overextension	Months of acquisition						
	E-6	E-5	E-4	E-3	E-2	E-1	End
Categorical overinclusion	0.33	0.57	0.59	0.50	0.56	0.62	0.70
Predicate statement	0.33	0.28	0.26	0.33	0.25	0.22	0.16
Analogical overextension	0.33	0.14	0.15	0.17	0.19	0.16	0.13

overextension, a tabulation was made of the percentage of total overextended applications attributable to each type of overextension over the last seven months of acquisition. It is clear that categorical overinclusions came to predominate among overextended applications in the early months of vocabulary acquisition. Predicate statements showed some decline in the last months of the period. It is worth noting that for the four children using some word combinations by the end of the study, the peak in new predicate statement applications occurred in the month preceding the onset of word combinations. Analogical overextensions generally constituted less than 20% of overextended applications.

### *Associative complexes*

Because complexive use of words has been widely discussed (Bloom 1973, Bowerman 1976, Brown 1965, Vygotsky 1962, Werner 1948), the production corpus data were examined for both chain complexes and associative complexes. A chain complex is a collection of referents linked by a chain of similarity one to another but with no unifying or consistent features relating each exemplar to a standard (Werner's (1948) *quah* or Bloom's (1973) *nénin*). An associative complex is a collection in which each referent shares some common attribute with the standard but no single feature characterizes all exemplars of the complex.

No words were found manifesting clear chain complex usage, but 58 words (13% of the 445-word corpus total) were used to denote associative complexes. Thus, 39% of the 149 overextended words denoted associative complexes, making this a notable type of early overextension. Inspection revealed that 62% of the associative complex words (36 words) were drawn from the first third of each child's corpus. Forty-three per cent of associative complex words were those cited earlier as high-frequency words commonly overextended (*dog*, *car*, etc.). There were six words used to denote associative complexes by at least three of the children: *daddy*, *key*, *hot*, *mommy*, *hat* and *cheese*. Thus, it appears that there are a set of words present in many early vocabularies which are used multi-functionally as central or organizing concepts for articulation of much of the child's experience.

There were a variety of temporal patterns in associative complex usage. There

were 18 words whose period of associative complex use lasted only one month, followed by correct usage, non-usage or the end of the study. Some of these periods of usage came early in the acquisition period, but half of them occurred after 1;3. To illustrate this type of use, one child used *baby* for himself, his toys, other children, and his father and mother pretending to cry within the first month of acquisition of the word, and then used the word with normal extension for several months.

Another pattern, displayed by 14 words, was use of a word to denote the same associative complex of referents for an extended period of time (2-4 months). For instance, one child used the term *Lardi* for Mr Lamberti the greengrocer delivery man, for his truck, and for many fruits and vegetables for a period of three months. Only four of these 14 associative complexes appeared before 1;3.

There were 18 words denoting associative complexes which were only evident when cumulated over time. For these words, first one and then another attribute was used sequentially as the basis of the word's extension. For example, one child overextended *Daddy* to the following referent sequence: her Mother (1;1-1;2), fathers generally (1;3-1;4); her Father's possessions (1;4-1;5), and pictures of men or animal fathers (1;5-1;6). For several of these words, the first form of use came in the early months (1;0-1;2), but most of the uses came in the last half of the period.

Finally, there were 8 words with a mixed or complex temporal pattern, in which attributes were added or dropped as bases of extension at different periods of time. For instance, one child used *car* for a wide but gradually narrowing range of vehicles from 1;2 to 1;6; during the period 1;3-1;4 he also used *car* for a hole in the sand and for a folded-up beach chair, both of which he sat down in as if to drive.

Inspection of the associative complexes suggested that they were generated by one of three processes which occurred with about equal frequency: (1) the child used more than one of the conjunctive criteria defining the concept in a DISJUNCTIVE fashion, e.g. *Mommy* for women and father; (2) the child used the word in predicate statement overextensions in addition to normal use, e.g. *juice* for juice, oranges, orange juice squeezing machine, empty juice glasses, bottles of juice; or, (3) the child used predicate statement overextensions in addition to other forms of overextended use, e.g. *cheese* for butter and for an open, empty cheese container. It should be noted that associative complexes occurred throughout the acquisition period and showed no temporal concentration.

To explore associative complexes more fully, two examples will be described in some detail. One child used the word *clock* first for an unfamiliar picture of a cuckoo clock and immediately after for his parent's alarm clock; he then extended the word within a month to many clocks and clock pictures, watches and watch pictures, meters, dials, and timers of various sorts, bracelets, a buzzing radio and

telephone, and a chevron-shaped medallion on his dishwasher; finally, he limited the word to clocks and watches, saying *clock-buzz* for the alarm clock and *clock-ticktock* for watches. Tracing the word's history, it is important to note that the child had enjoyed playing with the buzzer on his parents' alarm clock and listening to his father's watch ticking before he ever understood or spoke the word *clock*. From these encounters, he apparently distilled four elements of meaning which he associated with the word *clock* (ticking, dial face, buzzing, being worn on the wrist). Each of these meaning components served as the basis for applications of the word, with some features underlying both normal use and overextensions ('dial' as basis for correct labelling of clocks, categorical overinclusions to meters, and analogical overextension to chevron emblem).

Four children showed a similar pattern with the word *hot*, using it in three different types of application: (1) for temperature extremes, both hot objects (correct applications) and cold objects (categorical overinclusions); (2) for objects associated with hot temperatures, such as cold oven door and questioning if food were hot (predicate statements); and (3) for prohibited or frightening objects, such as fragile glassware or a sharp pin (analogical overextensions). These three types of meaning appeared in a variety of sequences across the four children, but all children used the word correctly by the end of the study. The data suggest that as the children were learning the word *hot* they distilled information about tactile sensation, about the visual appearance of the hot objects they encountered, and about their own affective reaction to a prohibited and frightening situation. These became the meaning elements associated with the word for the children and the bases both for its correct application and its overextension.

In summary, associative complex words such as *hot* and *clock* serve as good illustrations of the general process of early word learning. These words displayed both correct generalizations and various types of overextension, and were extended using a variety of bases of application. While the resulting referent collection is not congruent with the adult concept, such associative complexes are not well characterized as loose, amorphous or tangentially associated agglomerations.

## DISCUSSION

This study explored overextension by charting the distribution of overextension over time and across word classes, by providing a taxonomy of types of overextension, and by examining the bases of application of early words. Results indicated that only about one-third of the first 75 words acquired were ever overextended. A small set of high-frequency, early acquired words accounted for a disproportionate number of overextensions and seemed to serve as focal principles for the children. Approximately one-quarter of observed overextensions consisted of predicate statements, or presyntactic productions based on contextual association of referents. The majority of overextensions were

classificatory or categorical statements; most of these applications linked the labelled referent to a taxonomic or categorical close relation, but some of them linked referents on the basis of a single, isolated analogical characteristic. There were numerous occasions in which overextended terms were used to label referents whose appropriate names were correctly comprehended. There were no clear developmental sequences in types of extension. Perceptual characteristics served as the most prevalent basis for both normal extensions and overextensions, although in many applications perceptual and functional features were confounded. Action patterns were the basis for application of many action words. Contextual association was the basis of the numerous predicate statement overextensions observed. There was a small number of applications based on a clearly defined affective response and another small set based on pure functional criteria, unconfounded by perceptual similarity. The use of words to denote associative complexes of a well-organized, systematic character was found to be a common form of extension. Such complexes were seen as good illustrations of the general process of word learning as conceived here.

The child brings to word learning considerable information about the referents of words: knowledge about the appearance of objects, information about their functions and action properties, affective responses to objects and events, and knowledge about how objects and events are organized in time and space. Whatever pieces of information the child has distilled from his encounters with a particular referent become the meaning components of the word he learns to associate with that referent, and thus the basis on which he applies the word himself. This emphasis on a multiplicity of bases for word applications is consistent with Anglin (1977), whereas previous views have tended to stress the priority of one particular type of information (Brown 1956, Clark 1973, Nelson 1974, Piaget 1951). This general formulation of how word learning proceeds draws on both Piaget's (1951) account of sensory-motor intelligence and Brown's (1956) original-word-game model.

The meaning components associated with a word are taken here to represent the child's concept of the referent denoted by that word. The child's concept generally overlaps with, but is not identical to the equivalent adult concept. This view is congruent with Anglin's (1977) account of the multiple relations between adult and child concept. The child's concept often lacks information criterial for the adult concept (e.g. function of clock is timekeeping), and often includes elements which are part of an adult's knowledge about a referent but not part of his basic concept, as Nelson (1979) has suggested (e.g. affective responses to referent and information about contextual relations of referent). While the child's concept is viewed as a collection of discrete elements, it is assumed that these elements have differential salience and some internal structure, as proposed by Nelson (1974). The data indicate that the child's concept or prototype is multi-modal, as Anglin (1977) has recently proposed.

The data presented here are relevant to Bloom's (1973) developmental sequence hypothesis. No early period of loosely associative word use was observed. Predicate statement overextensions, which most closely resemble such usage, constituted a fairly stable 25-33% of overextensions during most of the acquisition period. Similarly, associative complexes occurred throughout the period studied. Furthermore, no defined period of correct generalization was evident, although overextension was rather infrequent in the earliest months of acquisition. For the last five months of participation, during which approximately one-quarter of active words were overextended each month, categorical overextensions ranged from 59% to 70% of overextended applications. During the period covered by this study there was no evidence for a general decline in categorical overextensions, such as Clark (1973) proposes. The data are consistent with Greenfield's (Greenfield & Smith 1976) analysis of the pre-syntactic role played by predicate statement overextensions. On the other hand, the results reported here do not confirm the earlier literature emphasizing the chain complex as prototypical of early word use (Brown 1965, Werner 1945). Rather, the study supports the view expressed by Bowerman (1976) and Thomson (Thomson & Chapman 1976) that associative complexes are a more common form of early extension. An important component of the present account is a view of such associative complexes as organized and rule-based productions, rather than as loose and tangentially associated agglomerations.

In summary, the data described here support the conclusion that normal extension and overextension are two aspects of the same basic process. In both cases, extension is generated in the same manner, is based on many of the same criteria of application, and takes place over the same period. The view of word learning proposed here is probably closest to that of Leopold (1939), whose data on a single child are similar to the group data presented here. While children do make some errors in their early application of words, these errors are generally rule-governed and systematic. There seems to be striking consistency across children in the types of overextensions they make, the words they overextend, and the bases for word applications. Overextension is seen here as serving a dual function in early language; it is used as a device for expressing categorization and concept formation and it is used in pre-syntactic attempts to convey relational meaning.

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