

1991

Maternal input in the introduction of novel hierarchically organized concepts.

Laurel M. Long
University of Massachusetts Amherst

Follow this and additional works at: <https://scholarworks.umass.edu/theses>

Long, Laurel M., "Maternal input in the introduction of novel hierarchically organized concepts." (1991).
Masters Theses 1911 - February 2014. 2196.
<https://doi.org/10.7275/7675889>

This thesis is brought to you for free and open access by ScholarWorks@UMass Amherst. It has been accepted for inclusion in Masters Theses 1911 - February 2014 by an authorized administrator of ScholarWorks@UMass Amherst. For more information, please contact scholarworks@library.umass.edu.



312066013478499

MATERNAL INPUT IN THE INTRODUCTION OF NOVEL HIERARCHICALLY
ORGANIZED CONCEPTS

A Thesis Presented

by

LAUREL M. LONG

Submitted to the Graduate School of the
University of Massachusetts in partial fulfillment
of the requirements for the degree of

MASTER OF SCIENCE

September 1991

Department of Psychology

MATERNAL INPUT IN THE INTRODUCTION OF NOVEL HIERARCHICALLY
ORGANIZED CONCEPTS

A Thesis Presented

by

LAUREL M. LONG

Approved as to style and content by:

Carolyn B. Mervis
Carolyn B. Mervis, Chair

Charles E. Clifton, Jr.
Charles E. Clifton, Jr., Member

Nancy A. Myers
Nancy A. Myers, Member

Melinda A. Novak
Melinda A. Novak, Chair
Psychology

ACKNOWLEDGMENTS

This work represents the culmination of a long and often arduous process. Along the way, there were many people who helped to make the completion of this project become a reality and who deserve, at the very least, mention on this page. Carolyn Mervis served as my advisor on this project; without her support and guidance this project would not have been possible. Nancy Myers and Chuck Clifton were patient, supportive, and thoughtful committee members who truly served "above and beyond the call". I cannot thank them enough. Kathy Johnson generously devoted her time and energy over a period of more than a year helping to run all of the subjects for this study. Pat Collins and Robin Morris, caring friends and colleagues, provided me with a comfortable place to test out an idea, to let off steam, to laugh, or to cry when I needed to. Leslie Sawin, Brenda Meehan-Waters, and Deborah Modrak gave me emotional support, caring, and encouragement at times when I needed it most. Paula Bailey's help and caring guidance helped me to see my way through the final, and most difficult, stages of this project. Finally, words cannot express my gratitude to my partner Deborah Stein for her patience, for her willingness to defer so much to my need for time to work on this project, and for the years of constant support and caring; her faith and encouragement saw me through the worst times.

TABLE OF CONTENTS

	<u>Page</u>
ACKNOWLEDGMENTS	iii
LIST OF TABLES	v
 Chapter	
I. INTRODUCTION	1
II. METHOD	12
III. DATA PREPARATION AND CLASSIFICATION	19
IV. RESULTS AND DISCUSSION	31
V. GENERAL DISCUSSION	93
 APPENDICES	
A. CODING MANUAL	105
B. ATTRIBUTE RATINGS	177
C. CODING RELIABILITY SCORES	182
REFERENCES	186

LIST OF TABLES

Table	Page
1. List of Stimuli	15
2. Mean Proportion of Total Maternal Statements Relevant to a Content Category	33
3. Mean Frequency of Spontaneous Content Category Statements Produced By The Child	36
4. Mean Percent of Maternal Codable Statements Elicited by the Child.	38
5. Target Labels in a Content Category Statement Expressed as a Proportion of All Target Labels Used	41
6. Mean Proportion of Maternal Content Category Statements that Contain a Target Label	44
7. Number of Mothers Who Provided Both Target and Basic Level Labels in Ostension When Teaching Subordinate and Superordinate Concepts	46
8. Number of Mothers (Out of 24) Who Provided Each Type of Inclusion Information	51
9. Number of Mothers Who Provided Inclusion Information When Teaching Subordinate and Superordiante Concepts	52
10. Mean Frequency of Use of Each Type of Inclusion Information for Superordinate Level Concepts	54
11. Mean Frequency of use of each type of inclusion information for Subordiante Level Concepts	55
12. Mean Proportions of Inclusion Provided for Superordiante Concepts Broken Down by Type of Inclusion Information	57
13. Mean Proportions of Inclusion Provided for Subordiante Concepts Broken Down by Type of Inclusion Information.	58
14. Projected Percent Underestimation of Inclusion Information Provided if Membership Statements Are Not Considered As Instances of Incusion.	59
15. Projected Percent Underestimation of Inclusion Information Provided if Joint Productions Are Not Considered As Instances of Incusion	60
16. Maternal Use of the "Kind of" Construction in Inclusion Statements	62
17. Number of Concepts for Which Mothers Provided Typical Attribute Information	66

18.	Number and Proportion of Mothers Who Provided Typical Attribute Information	67
19.	Number of Concepts for Which Mothers Provided Informative Attributes.	73
20.	Number of Unique Maximally Informative Function Attributes Mentioned	75
21.	Informative Function Attributes Provided for Superordinate Concepts.....	76
22.	Informative Function Attributes Provided for Subordinate Concepts.....	77
23.	Number of Unique Maximally Informative Form Attributes Mentioned.....	78
24.	Informative Form Attributes Provided For Superordinate Concepts	79
25.	Informative Form Attributes Provided for Subordinate Concepts	80
26.	Optimal Method of Introduction of Typical Attribute Information.	82
27.	Proximity of Target Label to Typical Attributes.....	84
28.	Target Labels Provided In or Adjacent to Typical Attributes.	86
29.	Function Information Provided as a Property of a Category	87

CHAPTER I

INTRODUCTION

Categorization is essential for cognition. Without some means of organizing the myriad of stimuli which impinge on our senses, human thought would be virtually impossible. It is well documented that taxonomic organization is utilized by adults in a variety of tasks (see Smith & Medin, 1981, for a review), and it is postulated that a part of memory consists of taxonomically organized concepts (Tulving, 1972). Standard concept taxonomies are considered to contain several levels of abstraction which are organized in a class inclusion hierarchy. Psychologists usually consider three levels of abstraction (or generality) with respect to natural concepts: superordinate, basic, and subordinate level concepts. Superordinate level categories (e.g., vehicle) are the most general or inclusive categories. Subordinate level categories (e.g., convertible) are the most specific categories. Basic level categories (e.g., car) are of intermediate generality, falling between the generality of the superordinate level and the specificity of the subordinate level. Taxonomic organization is an efficient system of organizing knowledge. If, for example, one encounters a novel exemplar from a familiar category, one can infer that the exemplar has certain properties known to be relevant to membership in that category and all categories superordinate to it. The development of this taxonomic organization must be an important question of interest to developmental psychologists who wish to understand how children come to organize their knowledge in the same manner as adults do. An examination of the nature of the input that the child receives with respect to hierarchical organization is central to any investigation of the organization of the young child's knowledge base.

In the remaining sections, the child's acquisition of hierarchically organized concepts and the roles that concept-structure and maternal input may play in concept acquisition will be addressed. The first section addresses the acquisition of basic level categories. The remaining sections address the acquisition of superordinate and subordinate level categories. The importance of maternal input and maternal input strategies for superordinate and subordinate category acquisition will be stressed. The present study, which examines the information that mothers provide for their children about hierarchically organized concepts, will be discussed.

Acquisition of Basic Level Categories

Children appear to acquire basic level terms easily. Children's earliest words are basic level terms (Brown, 1958; Anglin, 1977). However, young children appear to have some difficulty acquiring terms at either the subordinate (Mervis & Crisafi, 1982) or superordinate levels of abstraction (Horton & Markman, 1980; Mervis & Crisafi, 1982). There are two factors which may contribute to the primacy of the basic level with respect to order of acquisition. The first is the structure of basic level categories. The second is the linguistic input that the child receives relative to the objects in his or her environment. The role of each of these factors in the early acquisition of basic level categories will be considered separately.

The work of Rosch and her colleagues (Rosch & Mervis, 1975; Rosch, Mervis, Gray, Johnson & Boyes-Braem, 1976) suggests that there are structural properties of the basic level which would make it the easiest level for children to learn. Members of basic level categories (e.g., chair) share many attributes with other members of the same basic level category (e.g., many different types of chairs share certain properties). At the same time, members of one basic level category share few, if any, properties with related basic level categories. In the terms of Rosch et al., at the basic level within-category similarity is maximized relative to extra-category similarity.

As a result, basic level terms provide the most information for the least amount of cognitive effort. Members of a superordinate category may have few perceptual or functional attributes in common. At the subordinate level, members share many attributes with members of the same subordinate category but also have many attributes in common with members of related subordinate level categories. For example, all armchairs are very similar to one another; they are also very similar to all other kinds of chairs. Concept acquisition requires that the child learn the relevant form and function attribute correlations; this should be easiest at the basic level.

The second factor in the early acquisition of basic level terms is the linguistic input that the child receives. If the child's input is restricted to basic level terms the apparent primacy of the basic level is not particularly surprising. There is some empirical evidence in favor of such an input hypothesis. A number of studies have found that mothers tend to label objects for their children with basic level terms. Shipley, Kuhn, and Madden, (1983) asked mothers of young children (1;9 - 4;9) to label pictures for their children as they would when reading a book. They found that basic level terms were the most frequently used labels. Ninio (1980) reports that mothers tend to label objects at the basic level almost exclusively when reading books with their toddlers. Wales, Coleman, and Pattison (1983) examined the variation in maternal labels as a function of the age of the listener. They found that mothers were more likely to label an object with a basic level term when addressing a 2-year-old child than when addressing an older child or adult.

In summary, the work of Rosch et al. (Rosch & Mervis, 1975; Rosch, et al., 1976) suggests that there are structural properties of the basic level which could make it easier for the child to acquire basic level terms than terms at either the superordinate or subordinate levels. The research on maternal labeling strategies suggests that mothers use basic level terms when labeling objects for their children. It would appear then that both structural properties of the basic level and maternal labeling strategies

may play a role in the early acquisition of basic level terms, although concept structure may be more important than input at this level (Mervis, 1988a,b). The question remains, however, how children acquire the more difficult superordinate and subordinate level terms. Let us consider the task that the child faces in trying to learn superordinate and subordinate level terms.

Acquisition of Superordinate and Subordinate Categories

Unlike basic level categories, superordinate and subordinate level categories are not so obvious. The correlated form and function attributes are more difficult to detect at these levels, and it may be difficult to determine which of the attributes of a particular object are relevant for superordinate category membership. The child must learn, for example, what the relevant properties are that result in the superordinate term being applied to such different objects as a spoon, a bowl, and a pot. At the subordinate level, the task is to determine which attributes, from a potentially large group of shared attributes, serve to distinguish one subordinate category from another.

The child's task is further complicated by the fact that more than one label can be applied to the same object. For example, it may be unclear to the child why the terms "poodle" (subordinate) and "dog" (basic) can be applied to the same animal. In addition, several different subordinates (each with a different subordinate label) will be labelled with the same basic level term. The child must determine that "poodle", "Pekinese", and "collie" are terms that apply to particular types of animals, whereas "dog" is a term that applies to all three types of animals.

Because there is relatively little structural information about category membership at the superordinate and subordinate levels, adult (particularly maternal) input is likely to play a crucial role in the acquisition of categories at these levels. What types of information do mothers provide for their children about hierarchically related

concepts? How could mothers help their children to learn superordinate and subordinate level concepts?

Maternal Input Strategies

Two general classes of maternal input strategies would be of use to the child. First, the mother could employ strategies that would help the child to learn the properties (including parts and function) that are relevant for the application of a particular label. Mothers could point out one or more properties that result in the application of one subordinate level term rather than another, or that result in the superordinate term being applied to a variety of different objects.

The second general strategy that mothers can employ is one that stresses that two (or more) labels can be applied appropriately to a single object. Blewitt (1983) examined the labeling practices of preschool teachers when addressing 2- to 4-year-old children. She identified a particular strategy used by the teachers when presenting a superordinate or subordinate label. The teachers would introduce the unfamiliar term by relating it to the basic level terms with which the child already was familiar. Blewitt termed this strategy "anchoring at the basic level". Shipley, Kuhn, and Madden (1983) report a similar finding when mothers are asked to name pictures of objects for their 2- to 4-year-old children. Using old knowledge to interpret new information is a strategy that is not restricted to parental labeling practices; for example, Clark (1974) suggests that linking old knowledge with new information is a strategy that adults employ in sentence comprehension.

To date, only one study has attempted to examine the role of parental input in the acquisition of hierarchically organized concepts. Callanan (1985) asked mothers to attempt to teach their children subordinate and basic, or basic and superordinate level concepts. The concepts that were taught to the child were always intended to be unfamiliar to the child, but the familiarity of the basic level varied. For example,

mothers were asked to teach their children a new basic level term from a superordinate category that was already known by the child, and one from a superordinate that was unfamiliar to the child. Callanan found that mothers tended to introduce new superordinate categories by relating them to basic level categories, even when the basic level category was unfamiliar to the child. When teaching basic and subordinate categories, mothers simply labelled the category for their children, without providing additional inclusion information. She concluded that children must learn basic and subordinate level categories through ostensive labeling, but that mothers provide additional inclusion information that may help children to learn superordinate categories by anchoring the new categories to familiar basic level categories. However, the findings of the Callanan study must be interpreted cautiously because there are serious methodological problems in the study. These problems result from: 1) the use of separate studies to examine the teaching of superordinate and subordinate level concepts; 2) the selection of the concepts used; 3) the instructions given to the mother; 4) the content of the interaction that Callanan used in her analysis; and 5) the criteria Callanan employed in her classification of membership statements. Each of these problems will be addressed separately.

Methodological Consideration of Callanan (1985)

Callanan's Two Studies

Callanan conducted two studies to examine the teaching of superordinate and subordinate level concepts. In her first study, mothers were asked to teach their children basic and superordinate level concepts; in the second study, mothers taught basic and subordinate level concepts. A more accurate description of maternal labeling practices as a function of the level of the concept to be taught would be provided by a single within-subjects design in which a mother is asked to teach her child new concepts at all levels. The use of a within-subjects design is necessary to make accurate

comparisons of the labeling practices employed by a particular mother at the superordinate level with those employed when introducing subordinate level categories.

Selection of the Concepts

If mothers are to teach their children particular concepts, it is necessary to determine that the concepts in question are not already familiar to the child. Callanan selected the superordinate concepts to be taught in her study based on familiarity data collected from 3-year-olds. This may prove problematic, since the children in the Callanan study ranged from two to four years of age. Callanan classified the remaining concepts in her study as familiar or unfamiliar using production data obtained from a separate sample of 2- to 4-year-old children. Since it is well documented that comprehension of concept labels precedes the production of those labels (see Clark, 1982 for a review), it is likely that the concepts intended to be unfamiliar to the child (for example, sled, mixer, camel) were, in fact, familiar to many of the children in the study. If one or more of the concepts used in the Callanan study were already known to any particular child, this may well have affected the labeling strategies of the mother. If a mother believes that her child already knows a particular concept, there is no reason to expect her to use simplification strategies like anchoring at the basic level; these types of strategies will be most useful to the child who is encountering new information (and these strategies may, in fact, be inappropriate under other conditions). To ensure that the concepts are unfamiliar, it is necessary to obtain direct data on each child's ability to comprehend the concepts in question.

Instructions to the Mother

The mothers in the Callanan study were instructed to "teach" their children the concepts in question. A subtle difference in the instructions to the mother to "teach" versus "help your child to learn" could potentially result in very different input strategies. While it is clear that mothers do provide their children with information

about the meaning of particular words, it is not clear to what extent mothers attempt explicitly to instruct their children in the normal course of day to day interactions.

Classification of the Maternal Input

To analyze the content of the mother-child interaction that occurred during the concept instruction, Callanan classified the content of the mother's speech to the child into categories designed to capture the different kinds of information that the mothers were providing for their children. However, she failed to consider the input of the child in the interaction. Children, even at age 2, are very good at eliciting information from those around them. It is also possible that the child is providing a good deal of the simplification strategies him/her self. For example, if a child labels a particular object with the familiar basic level term, and the mother replies with a superordinate or subordinate label that is also relevant to the object, then the new label has, in effect, been anchored for the child at the basic level. In this case, however, the anchoring is provided by the child, not the mother.

Classification Criteria

Callanan employed very rigid criteria in her classification of maternal speech. This problem is most apparent in her classification of inclusion statements. She considered as inclusion only those statements of the form "An X is a Y" and "An X is a kind of Y". Her coding system did allow for membership statements (e.g., This is a car. It's a vehicle.), but she did not consider membership statements in her analysis of the inclusion information provided by the child. This is an important oversight as membership statements provide the child with implicit information regarding the hierarchical inclusion relation by indicating to the child that labels at two different hierarchical levels can be applied to the same object. In addition, she failed to include all of the possible forms of membership statements, and was unable to consider those cases where part of the membership statement was provided by the child. As a result, Callanan may have underestimated the extent to which mothers provide inclusion

information. The importance of these criticisms will be apparent in the discussion of the coding system used in the present study.

The Present Study

This study was designed to examine the input that the child receives relevant to hierarchically organized concepts. While this study is primarily descriptive in nature, even descriptive research must specify what it is attempting to describe. It was suggested earlier that two general types of maternal strategies may provide the child with information useful for the acquisition of superordinate and subordinate level terms. The verbal content of the mother-child interaction was examined to determine if mothers use these types of strategies, and what role the child may play in maternal selection and use of these strategies.

The first type of strategy concerns the properties that are relevant for the application of a particular label. There are three ways that the mother can provide the child with information concerning the properties or attributes that are relevant for the application of a particular label. First, the mother can simply provide the child with a verbal description of the relevant attributes. For example, "This is a kitchen utensil because you use it to cook with." Second, the mother can provide the child with a demonstration of a relevant attribute. For example, the mother could demonstrate that a bowl, a spoon, and a pot can all be used to prepare or eat food, thereby demonstrating a function relevant to the superordinate category "kitchen utensil". Third, the mother can provide a verbal description concurrent with a demonstration of the relevant attribute. For example, the mother could explain that a bowl, a spoon, and a pot can all be used to prepare food or eat food concurrent with a demonstration of that function. Mervis (1985) suggests that this strategy should be the most efficient of a number of available strategies in helping the child learn the attributes that are important (from an adult

perspective) in selecting the label that can be appropriately applied to a particular object or group of objects.

The second type of strategy is one that stresses that two (or more) labels can be applied appropriately to a single object. The mother can do this in three ways. First, she can label an object that the child knows the basic level term for with a superordinate or subordinate label. This provides the child with minimal information that another label is appropriate for that object. Second, she can anchor the new term at the basic level, linking the new term with the familiar basic level term. Anchoring is provided in two types of statements:

1) Inclusion statements of the forms:

a) "An X is a Y."

b) "An X is a kind of Y."

2) Membership statements of the following general forms:

a) "This is an X. It's a Y."

b) "It's an X and a Y."

Inclusion statements of the form a) and membership statements of forms a) and b) listed above provide the child with explicit information that the two labels are appropriate for a single object, and with implicit information about the inclusion relationship that exists between the two concepts. Inclusion statements of form b) provide the child with explicit information about the inclusion relationship. Mervis (1988) suggests that these statements would be particularly helpful in the acquisition of superordinate and subordinate categories. There is little empirical evidence concerning the usefulness of this construction. Horton and Markman (1980) found that when 6-to 14- year olds were only provided category labels they were unable to correctly interpret the class-inclusion relationships in a novel hierarchy. However, when the children were provided with information of the general form "Oaks and pines are two kinds of trees." they were able to interpret the class inclusion relation. More

recently, Callanan (1989) found that 3- and 5-year-old children were correctly able to interpret novel superordinate labels if the label was used in a "kind of" inclusion statement containing a basic level label that was familiar to the child.

The present study examined the content of the verbal and nonverbal interaction between a mother and child when the mother is attempting to help her child to learn novel superordinate and subordinate level concepts. It was predicted that mothers would use the two types of strategies discussed earlier to provide their children with information concerning the application of the new concept labels. Contrary to the findings of Callanan, it was predicted that mothers would provide their children with inclusion information when introducing subordinate concepts as well as superordinate concepts. It was also predicted that mothers would provide their children with information concerning the properties that are relevant for the application of the superordinate and subordinate concept labels.

CHAPTER II

METHOD

Subjects

Twenty-four children (12 boys, 12 girls) and their mothers participated in the study. The children were 32-34 months old at the time of participation ($M = 33;09$). The study was conducted at the Child Study Center in Springfield, Massachusetts. Names of potential subjects were obtained from City Hall birth records. The mothers were sent a letter describing the study. They were then contacted by telephone; at that time, any questions that they had regarding the study were answered before they were asked to participate.

An additional 62 children (24 girls and 38 boys) participated in the experimental session but were excluded from the study. Thirty seven of the children (13 girls and 24 boys) were excluded because a sufficient number of children had already been tested on the teaching set(s) identified as unfamiliar for the child. Six girls and 5 boys were considered untestable because too many of the concepts were familiar to the child. An additional 5 girls and 9 boys were excluded for one of the following reasons: 1) experimenter error, 2) mother error (the mother either taught a superordinate in reference to only one of the exemplars or she used "tow truck" when teaching the concept "wrecker"), or 3) failure to complete the session.

Materials

A total of eight concepts, four superordinate and four subordinate, was used. Each mother was asked to help her child learn four of the concepts, two superordinate and two subordinate. The four superordinate concepts were kitchen utensil, vehicle, habitat, and

jewelry. The four subordinate concepts were ladle, wrecker, aframe, and locket. In an effort to eliminate any potential differences between the concepts at the two levels that may be due to the linguistic form of the concept label, the concepts selected for use in this study were ones that do not have a compound noun label.¹ Six different teaching sets, each containing four of the eight concepts, were used. The sets were constructed such that each concept appeared in three of the six sets with the constraint that a superordinate and its related subordinate (e.g., kitchen utensil and ladle) did not appear in the same set. Each child was taught the four concepts in one of the test sets. Each set was taught to four children (2 boys and 2 girls). Each concept, then, was taught to a total of 12 children (6 boys and 6 girls).

For each concept in the set, the mother was provided with the concept name typewritten on a 3" x 5" index card and three objects which were realistic representations of good examples of the concept to be taught. Where size constraints precluded the use of the actual object (such as with the concept "vehicle") the exemplars used were in toy or miniature form. For each concept, a total of 11 objects was used: 5 different examples of the concept in question (3 for the teaching session and 1 each for the pretest and posttest) and 6 distractors. The distractors were divided into two sets of three objects. Each distractor set was used in the pretest for half of the children (6 boys and 6 girls) and in the posttest for the remaining children. Four additional concepts, two superordinate (animal and fruit) and two subordinate (rocker and sneaker), and three distractors for each concepts were used in the pretest. The four additional concepts were ones that the child was expected already to know. These were included to allow the child to be correct on at least four of the pretest trials. The distractor objects were members of categories that were related to the target concept

1. While the superordinate term "kitchen utensil" is a compound noun, it is not of the noun-noun compound form that contains a basic level label and that has been shown to facilitate categorical distinctions at the subordinate level (Waxman & Shipley, 1987).

(the concept that was taught). The distractors for a particular concept shared at least one relevant property with the concept. For example, the distractors for the concept "kitchen utensil" (napkin, stove, refrigerator, baby bottle, trivet) were things that one would find in the kitchen, even though they are not considered kitchen utensils.

The eight concepts, the objects used in teaching the concepts, the pretest and posttest examples of the concept, and the pretest and posttest distractors are listed in Table 1.

Procedure

Teaching sessions were conducted in a laboratory room equipped for that purpose. To minimize distractions for the child, the only furnishings in the room were a shelf holding an intercom, a tape recorder, a shelving unit mounted on casters and with a solid back to store the stimuli, and wall to wall carpeting. One wall of the room contained a one-way mirror into an adjacent room. An intercom system connected the two rooms.

The mother and child were greeted by a receptionist and the two experimenters in a reception room near the lab room. The study was described briefly to the mother, any questions she had were answered, and she was asked to sign a consent form. After the child seemed comfortable, mother and child were escorted into the lab room. The first experimenter then administered a comprehension pre-test to determine that the items to be taught were unfamiliar to the child. After the pretest, the teaching session took place, followed by a comprehension posttest.

During the experimental session, the second experimenter was in the adjacent room observing the session from behind the one-way mirror. During the teaching session, the second experimenter made an audiotaped commentary describing the nonverbal aspects of the mother-child interaction. The teaching session was audiotape recorded by the first experimenter from inside the lab room.

Table 1: List of Stimuli

<u>Concept</u>	<u>Pretest/Posttest Distractors</u>		<u>Concept Exemplars in Teaching Session</u>
	<u>Set 1</u>	<u>Set 2</u>	
Habitat	school store airplane hangar	fire station gas station diner	house barn cage
Jewelry	mittens purse ski hat	belt baseball cap sunglasses	necklace ring bracelet
Kitchen Utensil	trivet potholder stove	refrigerator napkin baby bottle	spoon bowl pot
Vehicle	barbeque grill vacuum cleaner lawnmower	fertilizer spreader teacart wheelbarrow	car plane dumptruck
Aframe	igloo cave ranch house	castle mobile home colonial house	3 aframes
Ladle	slotted spoon potato masher tongs	baster rubber spatula metal spreader	3 ladles
Locket	pendant necklace charm bracelet brooch	earrings tieclip necklace	3 lockets
Wrecker	fire engine garbage truck moving van	flatbed truck king cab cement mixer	3 wreckers

Pretest

On each of twelve trials, four objects (one example of the concept in question and three distractors) were placed in front of the child. The child was asked "Is there an X? Do you see an X?", where X was the concept label to be taught. If the child did not respond by touching, pointing to or otherwise indicating one of the objects within 5 - 10 seconds, the experimenter repeated the question. The experimenter then told the child "It's okay if you don't see an X. If you don't see one you can just say 'I don't know'." and the experimenter repeated the question. If the child did not respond within 5 - 10 seconds the experimenter attempted to prompt the child (e.g., "Can you show your Mommy the X?", "Can you point to [touch] the X with your [hand/finger/toe/shoe]?"). If the child again did not respond within 5 - 10 seconds, the experimenter removed the objects, ending the trial, and the trial was scored as "No Response". If the child indicated any object other than the example of the target concept, then the concept was scored as "Unfamiliar". If the child touched, pointed to, or otherwise indicated the target object, then that concept was scored as "Familiar". If the concept wrecker was scored "Unfamiliar" on the basis of the child's response, the experimenter said to the mother, "Some children know another word for this: T-O-W-T-R-U-C-K (the Experimenter spelled the word). Do you think [child's name] knows that word?". If the mother indicated that her child knew "towtruck" it was noted on the scoring sheet and "wrecker" was scored as "Familiar" for that child. Each child received the 12 pretest concepts in a different random order with the constraint that a superordinate and its related subordinate were not presented consecutively. The position of the placement of the target object in the array presented to the child was varied on each trials. Based on the results of the pretest, the experimenter selected a test set to be used with that child during the teaching session in which all four of the concepts were unfamiliar to the child.

Concept Learning Session

After completion of the pretest, the mother was given the following instructions:

We're interested in what mothers normally do when they try to help their children learn new words. Please try to interact with [child's name] as you would at home if you were trying to help [child's name] learn a new word. I'm going to give you a card with a word on it and some objects that you can use in trying to help [child's name] learn this word. Take as much time as you like, just tell me when you're finished. Here's the first word.

The mother was then given the index card with the first label and the three corresponding objects listed in Table 1. Once the mother began talking to her child, the experimenter intervened as little as possible. When the mother indicated that she had completed the instruction for one concept, the index card and the objects were removed and placed out of the child's sight. The mother was then given the index card and the relevant objects for the second concept. This procedure was repeated for the third and fourth concepts. The order in which the mother was asked to help her child to learn the four concepts was random for each mother-child pair. Any mother-child pair that did not complete all four concepts was eliminated from the study.

Posttest

Upon completion of the teaching session, a comprehension posttest was administered to the child to assess the effectiveness of the mother's instruction. The procedure for the posttest was identical to that of the pretest. The posttest did not prove to provide reliable data and was eliminated from the data analysis.²

2. We were unable to obtain responses on the posttest trials that we considered reliable. Many of the children would not wait for the experimenter to complete the question "Do you see an X?" before choosing one or more of the objects; the children would often touch or pick up one or more of the objects as soon as the experimenter had placed them in front of

After completion of the posttest, the mother and child were thanked for their participation, the purpose of the study was explained to the mother, any questions that the mother had were answered for her, and the child was given a book to take home.

the child. Repeated attempts to get the child to listen to the question before responding often were not successful. It proved to be unreasonable to expect that children of this age would cooperate in this constrained situation after an extended experimental session in which they had been allowed to manipulate the objects freely.

CHAPTER III

DATA PREPARATION AND CLASSIFICATION

There were four steps in the process of preparation and classification of the data for analysis. First, transcripts were prepared for each subject for each of the four concepts employed in the concept learning session. Second, transcription reliability was established for each of the transcripts. Third, the content of the interaction as provided in the transcripts was coded using an elaborate classification system designed for that purpose. Fourth, reliability was established for each of the codes used in the classification system.

Transcript Preparation and Transcription Reliability

For each concept for each subject, a transcript was prepared based on the audiotape and the commentary tape for the concept learning session. All transcripts were prepared by the same person. To ensure reliability of transcription, the person who did the transcription and a second person listened to each tape and compared the content of the audiotape and the transcript. All disagreements concerning transcription were discussed and corrections made to the transcript where the two judges agreed on the change. Where there were disagreements that could not be resolved, the relevant portion of the transcript was surrounded by square brackets []. Bracketed sections were most often function words (e.g., articles and conjunctions).

Classification of the Content of the Interaction

An elaborate coding system was employed to classify the content of the interaction between the mother and child with respect to the acquisition of novel superordinate and

subordinate terms. The present study utilized a subset of the complete classification scheme detailed in the coding system. A summary of the codes employed in the present study is provided in the following section and the manual for the complete coding system is presented in Appendix A.

Prior to coding, each transcript was examined to select out of the entire corpus those statements relevant to the present study. A multi-step decision process was used to identify codable statements. The statement selection process is detailed in Appendix A. Each statement was then assigned a series of codes.

Two general categories of codes were assigned to each statement: 1) statement identification codes; and 2) information content description codes. Each statement was first assigned seven identification codes. The first identification code indicated whether the statement was produced by the mother, the child, or whether the statement was produced jointly by the mother and the child (e.g., a yes-no question and its associated response, if appropriate, were considered to be jointly produced statements as were membership statements where each of the utterances that comprise the membership statement was produced by one of the members of the dyad). For jointly produced statements, it was noted whether the initial production was by the mother or the child. The second identification code pertained to the production status of the statement. This code indicated whether a statement was produced spontaneously, in response to an attempt to elicit information, or was an imitation of a production by the other member of the dyad. The third identification code elaborated on the production status information to indicate the purpose of the statement, i.e., whether the statement was a request for information, a response to an elicitation, or a spontaneous production or imitation. The remaining four identification codes provided information about the reference contained in the statement. These codes indicated: 1) whether the statement contained a label; 2) the level of the label used if any; 3) whether the statement contained the target word;

and 4) the distance from the present statement to the nearest referential use of the target label.

Each statement was then assigned a series of codes pertaining to the information content of the statement. Each statement was first assigned a content category code. Six content categories were identified pertaining to the types of information that were considered to be informative with respect to the acquisition of hierarchically organized concepts. The six content categories were: 1) ostension; 2) inclusion; 3) function; 4) form; 5) form and function; and 6) other uses of a label. Each statement was then assigned a series of content category description codes that provided more detailed information concerning the information content of the statement. The six content categories and the relevant content category description codes are described briefly in the following sections.

Ostension

Ostension can be generally defined as the provision of an object label in reference to an object or a group of objects where the label is clearly referential and the purpose of the statement is to provide a label for an object or group of objects. Ostensive statements are deictic statements of the general form "That is an X" (where X is a label) or deictic phrases of the general form "X" or "[determiner/quantifier] X" where the X label is provided for a single object or for a group of objects. The yes/no form of the deictic statement (i.e., the deictic statement with subject-verb inversion and marked with a question intonation) was considered as an instance of Ostension provided that the question was responded to appropriately. Deictic statements or phrases marked with a question intonation were considered instances of Ostension. Tag questions that were the interrogative form of deictic statements or phrases (e.g., That's a ladle, isn't it?) were also considered instances of Ostension. With the exception of compound nouns (e.g., gravy ladle), a deictic utterance or phrase containing an adjective or noun that modifies the label (e.g., This is a big ladle.) were considered as statements that provide Form

information (see description of the content category Form that follows) and not as instances of Ostension.

Ostension statements were assigned description codes to identify the referent(s) of the statement and whether the statement was an instance of positive ostension (e.g., That's an X.) or negative ostension (e.g., That's not an X.).

Inclusion

Inclusion statements are statements that provide information about the inclusion relation that pertains between members of hierarchically related categories by providing labels at two different hierarchical levels for the same referent(s). Two types of inclusion statement were identified: explicit inclusion statements and membership statements. Explicit inclusion statements are of the general form "An X is a Y" where X and Y are the two labels provided for the object referent(s) (e.g. "A car is a vehicle"). The use of the "is a" construction makes explicit the inclusion relation that pertains between the two object categories named by the labels. Membership statements are those that provide implicit information pertaining to the hierarchical relationship between members of object categories. Membership statements consist of a single utterance or combination of adjacent utterances that provide labels at two different levels. Membership statements have three general forms: 1) This is an X. It's a Y.; 2) It's an X and a Y.; and 3) An X is a kind of Y. The latter form, although it uses the "is a" construction typical of explicit inclusion statements, is generally considered a membership statement as the "is a" relation is modified by the expression "kind of".

Inclusion statements were assigned four description codes. The first code identified the type of inclusion statement (explicit or membership) and indicated whether the statement was the production of one member of the dyad or was produced by the two members of the dyad jointly. The second code indicated the number of lower level (X) labels that preceded or followed the higher level label (Y). The third code specified the referent of the X label(s) (i.e., a single label applied to a single referent, a single

label applied to multiple referents, multiple referents each with a unique label, or multiple referents all with the same label). The fourth code indicated the level of the second label provided. The level of the first label was coded by the section that coded reference in the statement.

Function

Function statements are those that provide information about the uses of objects (actions that one performs on or with the objects or that the objects themselves can perform) and the locations where objects are used. Function statements can occur in the form of a declarative statement (e.g., "We use that to pour soup.", referent: ladle), a tag question (e.g., "We use that to pour soup, don't we?", referent: ladle), or in the form of a yes-no question (e.g., "Do we use that to pour soup?", referent: ladle).

Each function statement was assigned seven additional descriptive codes. The first code identified the level (higher or lower) to which the function pertained. Higher level functions are those that are true of most members of at least one of the intermediate level categories contained within the relevant superordinate, or that are true of most members of the relevant superordinate category. For example, "People or animals live in habitats." is a higher level function for the category "habitat"; it is a function relevant to all members of the superordinate category "habitat". Lower level functions are those that are generally relevant to members of basic level or lower level categories, and that are not generally true of most members of categories higher than the basic level. For example, "You use this to scoop up soup." is a lower level function for the concept "ladle"; it is specifically relevant to soup ladles, but can be true for any ladle (any ladle can be used for scooping up soup). However, the attribute "scoop up soup" is true of only some members of a few categories at higher levels (e.g., only some members of the intermediate category "dishware", and of the superordinate category "kitchen utensil" are used to scoop up soup).

The second function description code specified the type of function information that was provided. This code specified whether the function information provided was general or specific and whether the attribute pertained to: 1) an action or use of the object; 2) a location where one would use the object; or 3) both locative information and information concerning a use/action of the object. (See Appendix A for a complete description of the types of function attribute information coded.)

The third function description code specified whether the mentioned function attribute was typical, atypical, or idiosyncratic with respect to the target concept. Typical function attributes are those that are true of most, but not necessarily all, members of the concept in question (e.g., the function statement "We use these to make food." is true of most members of the superordinate category "kitchen utensil"). Atypical function attributes are those that are true of some, but not most, members of the concept in question (e.g., the function statement "We use this to eat cereal" is true of only some members of the category "kitchen utensil"). Idiosyncratic function attributes are those that are not generally true of members of the concept in question, but that can be applied to the concept or to a specific member of the category (e.g., the function statement "I wear this on my head." in reference to a bowl is considered an idiosyncratic function with respect to the superordinate category "kitchen utensil").

The fourth function description code identified the manner in which the range of concept exemplars to which the attribute can be applied was specified in the statement. This code indicated whether the mentioned function attribute was provided as a property of an object (e.g., "This ladle is used for scooping up soup.") or as a property of a category of objects of which the object referent of the statement is a member (e.g., "A house is a habitat that people live in."). This code also indicated whether the mentioned property was provided for a single object referent or for multiple object referents. If the function attribute was provided as a property of a category, the fifth function

description code identified the level of the category to which the function attribute was applied.

The sixth function description code described the manner in which the function information was introduced. This code indicated whether the attribute information was provided as: 1) a verbal description of the attribute; 2) a verbal description concurrent with a physical demonstration of the attribute (e.g., M demonstrates that the hook on a wrecker is used to hook onto a car as she says "It's got a hook to pick up the broken car".); or 3) a demonstration of the attribute without any verbal description.

The seventh function code indicated whether the statement was a positive function statement or a negation of a function. Positive function statements are those in which the function attribute was provided as a function that can be applied to the concept exemplar that is the referent of the statement (e.g., "We use that for scooping up soup" is a positive function attribute provided for the referent ladle). Negation of function statements indicated that the function attribute is not applicable to the concept exemplar that is the referent of the statement (e.g., "We don't use that for scooping up soup" is a negation of function for the referent ladle).

Form

Form statements are those that provide information concerning perceptual properties or parts of objects. As was described earlier for the content category Function, form statements can be in the form of a declarative statement, a tag question, or a yes-no question. Five additional descriptive codes were assigned to each form statement.

The first form description code indicated the type of form attribute provided. This code specified the nature of the perceptual information provided. The form attribute was identified as one of the following types: 1) size attribute; 2) color attribute; 3) shape attribute; 4) part of the object provided as a part (e.g., hook, roof); 5) part of object provided as a location (e.g., front, back, side); 6) function of a

part (e.g., the door opens); 7) material(s) that an object is made of; 8) a general appearance description mentioning that an object or group of objects is "the same" or "different" (e.g., "These are all the same." or "These are all different things."); 9) other adjective descriptor that did not pertain to any of the above mentioned categories (e.g. "This ladle is cold".); 10) description by analogy (e.g., "These look like houses" provided for a frames).

The second form description code indicated the "criteriality" of the form attribute as it can be applied to the target concept. The form attribute was identified as "criterial", "other relevant", or "idiosyncratic". Criterial form attributes are those which are true of most, but not necessarily all, members of the target concept, and which are important to the concept (e.g., "bent" is a criterial attribute for the concept "ladle"). Other relevant form attributes are those which are true of some, but not necessarily all, members of the target concept, and which are not important to the concept in question (e.g., color). Idiosyncratic form attributes are those which are not generally applicable to the target concept, or are specific to a particular person, situation, or object. (e.g., the attribute "square" for the concept "necklace").

The third form description code indicated the manner in which the range of concept exemplars to which the attribute can be applied was specified. As for the content category Function, this code indicated whether the mentioned attribute was provided as: 1) a property of an object with a single referent; 2) a property of an object with multiple referents; 3) a property of a category with a single object referent; or 4) a property of a category with multiple referents. If the form attribute was provided as a property of a category, the fourth form description code identified the level of the category for which the attribute was provided.

The fifth form description code indicated the method of introduction of the form information. As for the concept category function, this code indicated whether the attribute information was provided as: 1) a verbal description only; 2) a verbal

description with a concurrent demonstration of the attribute; or 3) as a demonstration of the attribute property without a verbal description.

The sixth form description code indicated whether the form statement provided information about a positive form attribute or a negation of a form attribute. Positive form attribute statements are those that indicate that the mentioned form attribute is one that can be applied to the concept exemplar that is the referent of the statement (e.g., "This ladle is bent"). Negation of form statements indicate that the form attribute is not applicable to the exemplar that is the referent of the statement (e.g., "This ladle isn't plastic.").

Form and Function

Form and function statements are single statements or a combination of adjacent statements containing information about a form attribute and the function attribute that pertains to the mentioned form attribute (e.g., "This ladle has a round part on the bottom so that we can use it to scoop with."). Generally, the form attribute is the perceptual property of the object that affords the mentioned function (e.g., the rounded bowl at the bottom of a ladle affords scooping liquids). To be considered as an instance of Form and Function, the relation between the mentioned form attribute and the mentioned function attribute must be specified in the statement. Form and Function statements can take the form of declarative statements, tag questions, and yes-no questions.

Form and Function statements were assigned two sets of description codes, form description codes and function description codes. The description codes detailed earlier for the content category form were assigned according to the form information contained in the form and function statement. The description codes detailed earlier for the content category function were assigned according to the function information contained in the statement.

Other Use of Label

This category was used to code four non-ostensive uses of a label: 1) non-ostensive referential uses of a label; 2) attempts to elicit a nonreferential production; 3) attempts to elicit an imitation; and 4) nonreferential uses of a label. Non-ostensive uses of a label included those cases where a label was provided for which there was a specified or clearly identifiable referent, but the label was not provided in the form of a deictic utterance or phrase (e.g., See this ladle I have in my hand?). Attempts to elicit a non-referential production of a label occurred when one person attempted to elicit a production of a label for which there was no specified referent (e.g., Can you say the new word?). Attempts to elicit an imitation can occur in the form of an explicit request that the other person imitate the word or in the form of a prompt where the word to be imitated is used to prompt an imitation. Nonreferential uses of a label included those uses of a label for which there was not a specified or clearly identifiable referent and which were not attempts to elicit an imitation of the label.

Additional Classification of Attribute Information

For each of the eight concepts, a list of all form and function attributes provided by the mother was compiled. The lists for each mother were combined to yield a list of all attribute information ever mentioned for each of the concepts. A list of unique attributes for each concept was then constructed (e.g., the various expressions that mothers used to indicate that one wears jewelry were combined under the attribute "wear" for the concept "jewelry"). Two judges then rated each of the attributes for: 1) level to which the attribute pertains, and 2) typicality of the attribute with respect to the concept being taught . (These codes were described in detail earlier in this chapter and are presented in the description of the coding system in Appendix A.)

Two judges then examined the attribute lists and classified the attributes according to the informativeness of the attribute with respect to the target concept. Each

attribute was classified into one of the following categories: 1) maximally informative (MI); 2) informative (I); 3) not level appropriate (NLA); or 4) irrelevant (IR).

Maximally informative attributes (MI) are those that are typical of the concept in question, are level appropriate (i.e., higher level attributes are considered appropriate for superordinate concepts, lower level attributes for subordinates), and that serve to distinguish members of the target concept from members of related categories.

Informative attributes (I) are those that are typical and level appropriate for the concept and that are adequately specific to be informative about the concept. Informative attributes were further classified as informative restrictive (IR) and informative general (IG). Informative restrictive attributes are those that may serve to limit the possible range of category exemplars to members of the target concept or related concepts. For example, the attribute "in the kitchen" for the concept "kitchen utensil" serves to restrict the domain of possible exemplars to members of categories that one typically finds in the kitchen (e.g., food, appliances). Informative general attributes are those attributes that are typical and level appropriate but that are too general to distinguish members of the concept from members of wide range of other related categories. For example, the function attribute "moves" is typical of and level appropriate for the concept "vehicle", but it is too general to restrict the domain of possible exemplars of the concept from members of the wide range of categories of animate and inanimate objects that also move. Not level appropriate (NLA) attributes are those that are true of members of concepts within the same superordinate category, but that are considered appropriate to concepts at a level other than the target level. For superordinate concepts, attributes identified as lower level attributes are considered not level appropriate and for subordinates higher level attributes are not level appropriate. For example, the attribute "cook with" is level appropriate when applied to the concept "kitchen utensil" but not when applied to the concept "ladle"; and "used for cereal" would be considered a lower level function that is generally true of the basic level categories

bowl and spoon but that is not level appropriate for the superordinate concept "kitchen utensil" (for which the spoon and bowl were used as concept exemplars during the concept learning session). Irrelevant attributes (IR) are those that are not necessarily true of members of the target concept (atypical attributes) or that are too general to be useful (e.g., the attribute "not round" is considered irrelevant for the concept "aframe").

A list of the form and function attributes and the relevant typicality, level and informativeness ratings is presented in Appendix B.

Reliability of Coding

One person coded all 96 of the transcripts. Coding reliability was assessed by having a second person code one randomly selected transcript for each of the eight concepts. A reliability for each of the codes was obtained by computing the ratio of agreements minus disagreements over agreements plus disagreements. This ratio reflected the proportion of all statements coded for which both raters assigned the same code. Reliability scores for each of the codes used are reported in Appendix C for each of the eight concepts, for level (collapsed over concepts within a level) and for all concepts combined. In all cases the reliability scores reflected agreement of at least 90 percent.

CHAPTER IV

RESULTS AND DISCUSSION

Overview of the Chapter

This chapter is organized into five sections. The first section presents a general description of the types of information that mothers provided for the novel concepts and of the child's contribution to the concept learning session. The second section addresses the labeling practices that mothers employed. The third and fourth sections provide detailed analyses of the maternal input that should be important for the child in the acquisition of the novel concepts. In particular, the third section addresses maternal provision of information about the inclusion relationship that pertains for members of hierarchically related categories. The fourth section addresses the information that the mothers provided for their children about the form and function attributes that are relevant to category membership. The fifth section provides a summary of the results presented in the preceding sections. A general discussion of the results of the study and an interpretation of the findings are provided in the following chapter.

General Description

This section presents a preliminary examination of the informational content of the concept learning session. There were two questions of interest in the general description of the content of the concept learning session. First, what type of information do mothers provide for their children when helping them to learn novel superordinate and subordinate concepts? And second, what does the child contribute to

the concept learning session by either spontaneously providing relevant information or eliciting that information from the mother?

Type of Information Provided by the Mothers

An initial overview of the type of information provided by the mothers is provided in Table 2. For each of the concepts within a level and for each of the levels collapsed over concept, Table 2 presents the mean proportion of maternal codable statements that were relevant to each of the content categories. An examination of the concept data in Table 2 shows that some variability exists among the concepts within a level in the amount of information provided relevant to a given content category. For example, ostension statements produced for the superordinate concept "jewelry" account for 42% of all statements produced for that concept whereas only 29% of the statements produced for the concept "habitat" were ostensions. At the subordinate level, 47% of the statements produced for the concept "aframe" were form statements whereas form statements account for only 18% of those produced for the concept "wrecker".

While within-level differences among the concepts are not specifically of interest for the present study and are not directly analyzed, this pattern recurs throughout the analyses to be reported in the sections to follow and will become an issue of particular interest in the analyses of the form and function attribute information provided. These differences are pointed out at this point simply to draw the reader's attention to this recurring pattern.

A breakdown of the total codable statements produced by the mothers that are relevant to each of the content categories is presented in Table 2. To examine the variations in the type of information provided for the two levels, a 2 (level) x 4 (content category) ANOVA was performed on the data presented in Table 2. Statements relevant to the "Other Use of Label" category were eliminated from this analysis as these statements do not provide an easily specifiable type of information to the child. There was a significant main effect of level [$F(1,23) = 9.30, p = .006$], a significant main

Table 2: Mean Proportion of Total Maternal Statements Relevant to a Content Category

<u>CONCEPT</u>	<u>CONTENT CATEGORY</u>				
	<u>Ostension</u>	<u>Inclusion</u>	<u>Function</u>	<u>Form</u>	<u>Other Label</u>
Habitat	0.29	0.05	0.37	0.15	0.14
Jewelry	0.42	0.06	0.13	0.09	0.30
Kitchen	0.28	0.08	0.45	0.00	0.19
Vehicle	0.38	0.08	0.23	0.07	0.24
Superordinate Level	0.34	0.07	0.29	0.08	0.22
Aframe	0.26	0.08	0.10	0.47	0.09
Ladle	0.40	0.02	0.29	0.15	0.14
Locket	0.29	0.06	0.40	0.13	0.12
Wrecker	0.25	0.12	0.28	0.18	0.17
Subordinate Level	0.30	0.07	0.27	0.23	0.13

effect of content category [$F(13,69) = 22.78, p < .001$] and a significant level by content category interaction [$F(3,69) = 9.64, p < .001$]. To further examine these effects two sets of planned comparisons were employed. For these sets of contrasts, and for all post-hoc comparisons reported subsequently, the Bonferroni procedure was employed to control the familywise error rate for the set of comparisons; each set of contrasts was defined as a family of comparisons and the acceptable familywise error rate was set at $p = .05$ with a criterion of p/k (where k is the number of contrasts in a family) considered the acceptable Type 1 error rate for any single contrast. For the following set of contrasts, all comparisons reported as significant were significant with $p \leq .004$ for any single comparison within a level.

To further examine the significant effect of content category, a set of planned contrasts compared all possible pairs of content categories separately for each of the two levels. At the superordinate level, a significantly greater proportion of maternal statements were ostensions (34%) or function statements (29%) than either inclusion (7%) or form statements (8%). The proportion of maternal statements relevant to ostension did not differ significantly from function, and inclusion did not differ from form. At the subordinate level, a greater proportion of maternal statements were ostension (30%) than inclusion (7%), but ostension did not differ from either function (27%) or form (23%). Maternal provision of inclusion information did not differ significantly from that of either function information or form information. Maternal use of form and function did not differ.

As a follow-up to the significant level by content category interaction, the amount of information provided for each content category expressed as a proportion of the total statements (e.g., ostension statements/total statements) was compared for the two levels. The two levels differed only in the relative amount of form information provided; mothers provided significantly more form information for subordinates than for superordinates. [$t(23) = 4.177, p < .001$]. The two levels did not differ

significantly in maternal use of information relevant to any of the remaining three content categories.

The Child's Contribution to the Concept Learning Session

It was suggested earlier that the information that the child provides in the concept learning situation must be considered if we are to provide an accurate characterization of the input that the child receives. Specifically it was suggested that the child could play a role in "anchoring" the novel terms at the basic level. Discussion of the child's role in the anchoring strategy will be deferred until the presentation of the analysis of the inclusion information provided. Additionally it was suggested that the child could elicit a great deal of the information provided by the mother, thus affecting the type of information that the mothers provided for the novel concepts.

The mean frequency of spontaneous content category statements produced by the child is presented in Table 3 by concept and by level. From even a quick examination of Table 3, it is clear that the child spontaneously provided very little of the informational content in the concept learning situation. A review of the concept data showed that the children spontaneously produced fewer than 4 statements relevant to any content category for any of the eight concepts. Considering the level data, we observe that, on the average, the child spontaneously produced 2.44 or fewer statements for any of the content categories. The patterns are remarkably similar for the two levels; at both the superordinate and subordinate levels, function statements were the most frequent of the child's productions followed by ostension, form, other label, and inclusion in descending order of frequency. While, on the average, more statements relevant to each of the content categories were produced for the superordinate concepts than for subordinate concepts, even the most dramatic difference is only .6 (superordinate ostensions minus subordinate ostensions). Thus, the children provided little of the informational content of the concept learning session although the patterns of child production were similar for the two levels.

Table 3: Mean Frequency of Spontaneous Content Category Statements Produced By The Child

<u>CONCEPT</u>	<u>CONTENT CATEGORY</u>				
	<u>Ostension</u>	<u>Inclusion*</u>	<u>Function</u>	<u>Form</u>	<u>Other Label</u>
Habitat	3.25	0.00	2.00	2.55	1.33
Jewelry	1.00	0.00	2.00	1.50	1.50
Kitchen	1.20	0.00	2.00	0.00	1.50
Vehicle	3.33	0.00	3.75	3.00	1.60
Superordinate Level	2.20	0.00	2.44	1.76	1.48
Aframe	1.25	0.00	2.00	2.20	1.25
Ladle	1.50	0.00	1.16	2.00	0.00
Locket	2.00	0.00	3.00	2.25	1.00
Wrecker	1.66	0.00	1.80	0.14	1.66
Subordinate Level	1.60	0.00	1.99	1.65	0.98

* Jointly produced inclusion statements are not included here.

To examine the role of the child in eliciting information from the mother, the mean proportions of all maternal productions that were elicited by the child (total maternal statements that were elicited/total maternal statements) were computed for each level. On the average, only 3% of maternal productions at either level were elicited by the child. Thus, overall, only a small proportion of all maternal productions occurred in response to the child's request for information. While children may be very good at eliciting information from those around them, they do not appear to elicit a great deal of information in this situation.

In spite of the small proportion of maternal productions elicited by the child it was of interest to determine the type of information that the children requested when they did so. To examine the type of information that the children elicited from their mothers, the proportion of maternal productions relevant to each content category (e.g. elicited maternal ostensions/total maternal ostensions) was computed for each of the concepts and for each level collapsed over concept. The data are presented in Table 4. If we examine the level data, we note that again the patterns are remarkably similar for the content categories at the two levels. The greatest proportion of child-elicited maternal productions were ostensions followed by form statements; 5% of maternal ostensions and 3% of maternal form statements at both levels were elicited.

To determine whether maternal statements elicited by the child make a significant contribution to total maternal productions, a set of six paired comparisons was conducted for each level comparing total maternal productions with spontaneous (non-elicited) maternal productions. The tests were conducted for each content category within a level and for the total number of statements produced for that level. Elicited statements made a significant contribution to maternal ostensions at both the superordinate [$t(23) = 4.237, p < .001$] and subordinate levels [$t(23) = 3.808, p = .001$]. Elicited statements also made a significant contribution to the total number of maternal statements at both levels [$t(23) = 4.963, p < .001$ for the superordinate test,

Table 4: Mean Percent of Maternal Codable Statements Elicited by the Child

<u>Concept</u>	<u>Ostension</u>	<u>Inclusion</u>	<u>Function</u>	<u>Form</u>	<u>Other Label</u>	<u>Total Statements</u>
Aframe	1 %	4 %	0 %	2 %	0 %	2 %
Ladle	5 %	0 %	4 %	0 %	0 %	3 %
Locket	5 %	0 %	4 %	6 %	2 %	4 %
Wrecker	7 %	2 %	1 %	3 %	3 %	4 %
Sub. Level	5 %	2 %	2 %	3 %	1 %	3 %
Habitat	6 %	0 %	2 %	5 %	1 %	5 %
Jewelry	9 %	4 %	0 %	3 %	2 %	5 %
Kitchen	3 %	0 %	2 %	0 %	0 %	2 %
Vehicle	2 %	3 %	1 %	3 %	0 %	1 %
Super. Level	5 %	2 %	1 %	3 %	1 %	3 %

and $t(23) = 4.860$, $p < .001$ for the subordinate test]. All other tests yielded non-significant results.

Labeling Practices

The reader will recall that the instructions to the mother were to "help her child learn a new word." Underlying the use of this "word learning" instruction was the assumption that concept acquisition would be inherent within the process. A discussion of the complex interaction of word learning and concept acquisition is beyond the scope of the present study and any consideration of this issue as it pertains to the present study will be postponed until the following chapter. For the purposes of the present study, it was assumed that for concepts of this type and for children at this age, word learning and concept acquisition are so intertwined that it is unwise to attempt to address them as independent processes.

In general, the goal of the analyses of maternal labeling practices was to determine how the mothers used the novel label in the concept learning situation. Specifically it was of interest to determine the informational context in which mothers employed the target label; that is, to discover whether mothers used the target label solely for the purpose of labeling objects or while in the process of providing other information about the novel concept. Additionally, it was of interest to separate specifically referential uses of the target label from all (referential and nonreferential combined) uses of the label as it was assumed that referential uses of a novel label would be more helpful for the child in the process of determining which properties are relevant for the appropriate extension and intension of the novel categories.

Maternal Use of the Target Label

All maternal uses of the target label were tallied. Use of the target label was then broken down by the type of content category statement that contained the target label and whether the label was used referentially. Of the many possible presentations of the

labeling data, three proportion measures of maternal labeling patterns were employed. Each measure was selected to address a particular aspect of maternal use of the target label. Thus, the overall description of the maternal labeling practices is provided by combining the results obtained from the three perspectives.

The analysis of maternal labeling patterns begins with an initial consideration of the informational context (i.e., content category) in which the mothers used the label. The first of the labeling measures was the mean proportion of the total uses of the target label that pertained to each of the content categories (e.g., function statements containing the target label/total uses of the target label); the data are presented in Table 5 by concept and by level. To examine variation in maternal labeling patterns as a function of the level of the target label and the informational context (content category) in which the label was employed, the data were analyzed in a 2 (level) x 4 (content category) ANOVA. As with the analyses presented in the preceding sections, the other use of label category was eliminated from this analysis. The analysis yielded a significant main effect of content category [$F(3,69) = 49.12, p < .001$] and a significant level x content category interaction [$F(3,69) = 12.37, p < .001$]. Post hoc comparisons both within and between levels were conducted using paired samples *t*-tests. The Bonferroni criterion was employed to control the familywise error rate for each set of contrasts; all comparisons reported as significant were at $p < .013$ for between level comparisons and $p < .004$ for the within-level comparisons.

The results indicated that at both levels significantly more target labels were employed in ostension statements than in any other type of statement. Forty-seven percent of all subordinate level labels and 33% of superordinate labels were used in ostensive statements. At the superordinate level, target labels were employed significantly more often in inclusion statements (17%) and function statements (17%) than form statements (1%); inclusion and function clearly did not differ. This result is not surprising in that form attribute information is not particularly important for

Table 5: Target Labels In a Content Category Statement Expressed as Proportion of All Target Labels Used

<u>CONCEPT</u>	<u>Ostension</u>	<u>CONTENT CATEGORY</u>				<u>Other Label</u>
		<u>Inclusion</u>	<u>Function</u>	<u>Form</u>		
Habitat	0.33	0.16	0.30	0.01		0.20
Jewelry	0.35	0.11	0.07	0.01		0.46
Kitchen	0.24	0.28	0.23	0.00		0.25
Vehicle	0.39	0.20	0.08	0.00		0.33
Superordinates	0.33	0.18	0.17	0.01		0.31
Aframe	0.45	0.23	0.01	0.06		0.25
Ladle	0.67	0.03	0.06	0.04		0.20
Locket	0.44	0.04	0.22	0.06		0.24
Wrecker	0.32	0.19	0.11	0.08		0.30
Subordinates	0.47	0.12	0.10	0.06		0.25

membership in categories at the superordinate level. It is also not surprising that these differences do not obtain at the subordinate level. For subordinates, the use of the target label in inclusion statements (12%) did not differ significantly from either function (10%) or form (6%), and the use of the subordinate label in the two types of attribute statements did not differ.

The between-level comparisons indicated that a significantly greater proportion of the total target labels were employed in ostensive statements for subordinates than for superordinates (47% and 33% respectively). A significantly greater proportion of all labels used appeared in form attribute statements for subordinate concepts (6%) than for superordinates (1%). The two levels did not differ in the proportion of the total target labels used in inclusion statements or in function attribute statements. Again, structural differences in the concepts at the two levels corresponded to observed differences in maternal input as a function of the level of the novel concept. Specifically, the greater importance of form information for membership in subordinate level categories than for superordinate level categories was reflected in maternal use of the target label.

The results of the analysis of the breakdown of the use of target label by content category revealed that of all maternal uses of the target label, mothers used the target more often for the purpose of labeling objects than for providing any other type of information about the novel concepts. However, mothers did employ the target label to introduce inclusion information that specified the relation between members of hierarchically-related categories at both levels; 18% of all superordinate labels and 12% of subordinate labels were used in this context. Additionally, mothers provided some attribute information concurrent with a target label; however, this pattern varied with the level of the concept.

In the second analysis of the labeling data, maternal use of the label is placed in the context of the overall informational content of the concept learning situation. For

each content category, the second labeling measure expresses use of the target label in that type of statement as a proportion of the total codable statements produced (e.g., function statements containing a target label/total codable statements). This measure provides us with the most general view of maternal labeling relative to all maternal input provided. The data are presented in Table 6. There are two lines in Table 6 for each concept; the first line contains the data for the proportion of content category statements that contain any use of the target label, the second line contains the proportion of content category statements containing a referential use of the target label. This presentation enables a direct comparison of all uses of the target label with specifically referential uses of the label.

If we sum over content category for each of the levels in Table 6, we observe that statements containing a target label accounted for only 29% of all statements for superordinate concepts and 28% for subordinate concepts. Non-ostensive uses of a target label accounted for 10% or less of all maternal productions at both levels, and target ostensions accounted for only 10% of the statements produced for superordinate concepts and 13% of those produced for subordinate concepts. The picture is worse for attribute statements that contain a target label; at both levels, 4% or fewer of the total productions were attribute statements that contained a target label or referential use of the label. The importance of this finding will become apparent in the discussion of the proximity of attribute information to the target concept label to be presented in a later section.

To examine variation in maternal labeling patterns as a function of the level of the target label and the informational context (content category) in which the label was employed, the data were analyzed in a 2 (level) x 4 (content category) ANOVA. The analysis yielded a significant main effect of content category [$F(3,69) = 38.30, p < .001$] and a significant level x content category interaction [$F(3,69) = 6.49, p \leq .001$]. Post hoc comparisons both within and between levels were conducted using paired

Table 6: Mean Proportion of Maternal Content Category Statements that Contain a Target Label

<u>CONCEPT</u>	<u>LABEL IN CC STATEMENT</u>	<u>CONTENT CATEGORY</u>				
		<u>Ostension</u>	<u>Inclusion</u>	<u>Function</u>	<u>Form</u>	<u>Other Label</u>
Habitat	Target	0.09	0.04	0.08	0.00	0.05
	Referential Target	0.08	0.04	0.06	0.00	0.02
Jewelry	Target	0.13	0.05	0.03	0.01	0.17
	Referential Target	0.12	0.05	0.01	0.01	0.09
Kitchen	Target	0.05	0.05	0.04	0.00	0.05
	Referential Target	0.05	0.05	0.02	0.00	0.02
Vehicle	Target	0.13	0.07	0.02	0.00	0.11
	Referential Target	0.11	0.07	0.02	0.00	0.04
Super. Level	Target	0.10	0.05	0.04	< 0.01	0.10
	Referential Target	0.09	0.05	0.03	0.00	0.04
Aframe	Target	0.11	0.04	0.00	0.00	0.05
	Referential Target	0.10	0.04	0.00	0.01	0.03
Ladle	Target	0.20	0.01	0.01	0.01	0.05
	Referential Target	0.19	0.01	0.01	0.01	0.03
Locket	Target	0.12	0.01	0.06	0.02	0.07
	Referential Target	0.11	0.01	0.03	0.02	0.02
Wrecker	Target	0.11	0.06	0.04	0.03	0.11
	Referential Target	0.11	0.06	0.02	0.02	0.05
Sub. Level	Target	0.14	0.03	0.03	0.02	0.07
	Referential Target	0.13	0.03	0.02	0.02	0.03

samples *t*-tests. The Bonferroni criterion was employed to control the familywise error rate for each set of contrasts as described in the preceding analyses.

Target ostensions accounted for a greater proportion of all statements produced for subordinate level concepts (.13) than for superordinate concepts [$t(23) = 3.172, p = .004$]. Proportionately more form attribute statements containing a target label were produced for subordinate concepts (.02) than for superordinates ($<.01$) [$t(23) = 2.839, p = .009$]. Inclusion and function statements containing a target label did not differ at the two levels.

Within-level comparisons for the superordinate concepts indicated that ostensions with a target label accounted for a greater proportion of the total production for superordinate concepts (.10) than either inclusion (.05) or form attribute statements ($<.01$). A significantly greater proportion of all statements produced for the superordinate concepts were inclusion or function statements with a target label than were form statements. At the subordinate level, ostensions with a target label (.13) accounted for a significantly greater proportion of the total statements than did inclusion (.03), function (.03), or form (.02) statements containing a target label. Inclusion, function, and form did not differ significantly.

Maternal Use of Both the Target and Basic Level Labels

It was suggested in the introduction that a maternal input strategy of particular interest in the present study was one that provides the child with information about the appropriateness of two labels at different hierarchical levels for the same referent(s). The use of both the basic level and target level labels in ostensive statements for the same object referent(s) provides the child with implicit information that both labels can be appropriately applied to a single object or group of objects. Table 7 presents the number of mothers who provided both target and basic level ostension for the novel concepts at the two levels; the data are subdivided by the number of concepts at each level for which the mothers employed this target + basic labeling pattern. A cursory

TABLE 7: Number of Mothers Who Provided Both Target and Basic Level Labels in
Ostension When Teaching Subordinate and Superordinate Concepts

		Number of Superordinate Concepts that the labels were used for			
		0	1	2	TOTALS
Number of Subordinate Concepts that the labels were used for	0	3	4	7	14
	1	1	7	1	9
	2	0	1	0	1
	TOTALS	4	12	8	24

examination of the cell entries in Table 7 shows that none of the mothers employed this target + basic labeling pattern for both concepts at both levels and only 9 of the 24 mothers did so for at least one concept at each level. As the marginal totals for the subordinate concepts reveal, only 10 of the 24 mothers provided their children with target and basic level ostensive labels for at least one subordinate concept and only 1 mother did so for both subordinates. Considering the superordinate marginal totals, we note that as compared to the subordinate data, twice as many (20 of the 24) mothers provided labels at both levels for at least one of the superordinate concepts; only 8 mothers did so for both superordinates. To determine whether the use of this labeling pattern varied as a function of level, a target + basic labeling score was constructed for each mother by assigning a value of -1 for each subordinate concept for which she employed the target + basic pattern and a value of +1 for each superordinate for which she provided the target and basic labels. The values were summed to yield a target+basic score in the range of -2 to +2. A Wilcoxon Signed Rank (WSR) test was employed to test the null hypothesis that the two levels did not differ in the use of this labeling pattern. The result of the test indicated that more mothers employed the target+basic labeling pattern for superordinate concepts than for subordinate concepts [$I = 8$, $p < .002$].

Multiple Referent Strategy

Callanan (1985) observed that mothers often provided novel superordinate labels in reference to groups of objects. In a subsequent study (Callanan, 1989) she found that children were able to use this "multiple referent" information to infer that a new word labeled a superordinate category. It was of interest to determine whether mothers in the present study employed a "multiple referent" strategy. To examine the use of this type of labeling strategy, the frequency of target level ostensions to single object and to groups were compared for the two levels using paired samples t -tests. For the superordinate concepts, mothers provided similar amounts of target ostension reference to single objects ($M = 2.62$) and to groups of objects ($M = 2.71$) [$t(23) = -.139$, $p =$

.891]. For the subordinate concepts, mothers provided more target ostension for single objects ($M = 5.33$) than for groups of objects ($M = 2.83$) [$t(23) = 3.087, p = .005$]. The two levels did not differ in the amount of target ostension to groups of objects [$t(23) = .239, p = .813$]. The results indicate that mother provided target ostension in reference to groups of objects for both superordinate and subordinate level concepts. For the superordinate concepts, the use of the target label in reference to a group of objects from different basic level categories that are familiar to the child may help the child infer that the new term labels a more general category at a higher level. In contrast, this interpretation is not possible for target ostensions with the novel subordinate label in reference to a groups of objects. For the subordinate concepts, there is no information available to distinguish the familiar basic level term and the novel subordinate label.

Inclusion

Inclusion statements provide the child with information about the inclusion relationship that pertains between members of hierarchically-related categories. This type of information should be particularly useful to the child attempting to learn novel superordinate and subordinate concepts. Given both the design and the outcome of Callanan's (1982) work with respect to inclusion information provided by the mothers, the analysis of the inclusion information provided in the present study was of particular interest. Two sets of analyses were performed on the inclusion data. The first set of analyses addressed three general questions. First, do mothers provide inclusion information when introducing novel superordinate and subordinate concepts? Second, does the use of inclusion vary as a function of the level of the concept introduced? Third, what type of inclusion information do mothers provide? The second set of analyses examined in further detail three specific aspects of the maternal input relevant to inclusion. The first of these specific analyses addressed maternal use of the "kind of"

construction in inclusion statements. The second analysis examined maternal use of compound labels as a means of providing inclusion information. The final analysis determined whether mothers employed the "target + basic" labeling strategy in conjunction with inclusion statements to provide their children with two different types of input regarding the appropriateness of two labels at different hierarchical levels for the same referent(s).

The inclusion measure was a frequency count of inclusion statements produced by the mother for each of the concepts and for each level. Explicit inclusion statements, membership statements, and joint membership statements where the mother produced the target label were included in the tally. Non-basic to target level inclusion statements (e.g., subordinate to superordinate inclusion) or basic to non-target (e.g., basic to superordinate inclusion when teaching a subordinate concept) were produced by four mothers and accounted for a total of 7 statements. One instance of subordinate to superordinate inclusion and one instance of basic to superordinate inclusion were produced for the concept "locket"; one instance of intermediate to superordinate inclusion was provided for the concept "habitat" and four cases of basic to superordinate inclusion were produced for "kitchen utensil". Statements containing novel compounds (e.g., "wrecker truck") also were not included in the inclusion frequency measure; the use of novel compound labels was analyzed separately.

Maternal Provision of Inclusion Information

The first analysis of the inclusion data addressed the general question of whether mothers provided inclusion information for their children when introducing the novel concepts. The number of mothers who provided some form of inclusion information is presented in Table 8. Twenty-one of the 24 mothers (87.5%) provided some form of inclusion information for concepts at the superordinate level; 14 of 24 mothers (58.3%) did so for subordinate concepts. A sign test was conducted on the data in Table 8 to determine whether this sample of mothers supported the hypothesis that mothers,

in general, provide inclusion information for their children when teaching novel hierarchically related concepts. It was hypothesized that mothers would be as likely as to provide inclusion information as they would be to fail to provide inclusion information for their children; thus, a probability of .5 was identified as the level of chance performance. The sign tests (conducted separately for each level) indicated that the number of mothers who provided inclusion information for superordinate concepts was significantly greater than would be expected by chance ($p < .001$), but this was not true for subordinates ($p = .12$).

In Table 9, maternal use of inclusion is broken down by the number of concepts at each level for which the mother provided inclusion information. The entries in parentheses in Table 9 are the proportion of all mothers who are represented in a cell. An examination of the data in Table 9 reveals that mothers did not consistently employ an inclusion input strategy either within or between levels. For example, of the 21 mothers who provided inclusion information for at least one superordinate concept, only 1 mother employed inclusion for all 4 concepts that she taught. As the tests in the preceding analysis were conducted separately for each level, it was not possible to determine whether mothers employed different input strategies with respect to inclusion information for the two levels. To examine whether maternal provision of inclusion information differed as a function of the level of the target concept, an overall inclusion score was created for each mother (using the data presented in Table 9) by assigning a value of +1 for each superordinate concept for which the mother provided inclusion information and a value of -1 for each subordinate concept for which the mother provided inclusion. Thus, a mother's inclusion score reflected her use of inclusion for both hierarchical levels. This score can then be tested against a hypothesized value of zero. The direction of the difference away from zero is an indication of whether mothers provide inclusion for superordinates but not for subordinates (a positive difference) or for subordinates but not for superordinates

TABLE 8: Number of Mothers (Out of 24) Who Provided Each Type of Inclusion Information

<u>Concept</u>	<u>Type of Inclusion Information Provided</u>								
	EXPLICIT			MEMBERSHIP			ANY INCLUSION (Explicit + Membership)		
	<u>Single</u>	<u>Joint</u>	<u>Total</u>	<u>Single</u>	<u>Joint</u>	<u>Total</u>	<u>Single</u>	<u>Joint</u>	<u>Total</u>
Aframe	0	0	0	5	1	5	5	1	5
Ladle	0	0	0	1	1	2	1	1	2
Locket	0	0	0	3	0	3	3	0	3
Wrecker	0	0	0	7	2	7	7	2	7
Subordinate Level Total	0	0	0	14	4	14	14	4	14
Habitat	3	2	3	7	1	8	8	3	8
Jewelry	0	0	0	7	4	8	7	4	8
Kitchen	0	0	0	5	2	6	5	1	6
Vehicle	7	0	7	5	4	8	9	4	11
Superordinate Level Total	10	2	10	17	8	19	20	10	21

TABLE 9: Number of Mothers Who Provided Inclusion When Teaching Subordinate and Superordinate Concepts

		Number of Superordinate Concepts that inclusion was provided for			
		0	1	2	TOTALS
Number of Subordinate Concepts that inclusion was provided for	0	2 (8.3%)*	3 (12.5%)	5 (20.8%)	10 (41.7%)
	1	0 (0%)	7 (29.2%)	4 (16.6%)	11 (45.8%)
	2	1 (4.2%)	1 (4.2%)	1 (4.2%)	3 (12.5%)
	TOTALS	3 (12.5%)	11 (45.8%)	10 (41.7%)	24 (100%)

* Entries in parentheses are the proportion of all mothers represented in a cell.

(a negative difference). A non-significant difference from zero cannot be interpreted with respect to the hypothesis of a difference as a function of hierarchical level, as a non-significant result could mean either that mothers provide inclusion for both the superordinate and subordinate levels or that they do not provide that information for either level. The results of a WSR test applied to the overall inclusion data indicated that mothers used inclusion significantly more for superordinates than for subordinates [$T = 37.5$, $p < .001$]. A paired samples t -test comparing frequency of inclusion as a function of hierarchical level had a similar result; mothers provided more inclusion information for superordinates than for subordinates [mean difference = 3.214, t , (23) = 3.62 $p < .001$]. The mean frequency of inclusion is presented in Table 10 for superordinate concepts and in Table 11 for subordinate concepts.

Type of Inclusion Information Provided

It also was of interest to examine the type of inclusion information that mothers provided for their children. Maternal use of inclusion is presented in Tables 10 and 11, broken down by type of inclusion statement (explicit or membership) and whether that statement was produced by the mother alone (single) or both members jointly (joint). An examination of the level data for the use of explicit inclusion statements in Tables 10 and 11 revealed that mothers provided little explicit inclusion information for superordinates (mean_(concept) single = .75, mean_(concept) joint = .12, mean total = .87) and none for subordinates. If we return to the concept data in Table 8 we note that all of these explicit inclusion statements were provided for two of the superordinate concepts; 3 of 12 mothers used explicit inclusion for the concept "habitat" and 7 of 12 mothers did so for the concept "vehicle". While it is impossible to separate the effects of mothers from the effects of concepts in the present study, the variation in the use of explicit inclusion information observed among the concepts within the superordinate level suggests that there may be differences among categories within a level that affect maternal use of inclusion.

**TABLE 10: Mean Frequency of Use of Each Type of Inclusion Information for
Superordinate Level Concepts**

Concept	Type of Inclusion Information Provided								
	EXPLICIT			MEMBERSHIP			ANY INCLUSION (Explicit + Membership)		
	Single	Joint	Total	Single	Joint	Total	Single	Joint	Total
HABITAT									
Mean (Type) ¹	2.00	1.50	3.00	1.57	4.00	1.88	2.12	2.33	3.00
Mean (Inclusion) ²	.75	.38	1.12	1.38	.50	1.88	2.12	.88	3.00
Mean (Concept) ³	.50	.25	.75	.92	.33	1.25	1.42	.58	2.00
JEWELRY									
Mean (Type)	0	0	0	2.57	1.75	3.12	2.57	1.75	3.12
Mean (Inclusion)	0	0	0	2.25	.88	3.12	2.25	.88	3.12
Mean (Concept)	0	0	0	1.50	.58	2.08	1.50	.58	2.08
KITCHEN									
Mean (Type)	0	0	0	2.40	1.00	2.33	2.40	1.00	2.33
Mean (Inclusion)	0	0	0	2.00	.40	2.33	2.00	.40	2.33
Mean (Concept)	0	0	0	1.00	.17	1.17	1.00	.17	1.17
VEHICLE									
Mean (Type)	1.71	0	1.71	1.60	1.25	1.62	2.22	1.25	2.27
Mean (Inclusion)	1.09	0	1.09	.73	.45	1.18	1.82	.45	2.27
Mean (Concept)	1.00	0	1.00	.67	.42	1.08	1.67	.42	2.08
SUPERORDINATE LEVEL TOTAL									
Mean (Type)	1.80	1.50	2.10	2.94	2.12	3.53	3.40	2.00	4.19
Mean (Inclusion)	.86	.14	1.00	2.38	.81	3.19	3.24	.95	4.19
Mean (Concept)	.75	.12	.87	2.08	.71	2.79	2.83	.83	3.67

¹ This mean is calculated for the mothers who provide that type of inclusion information (See Table 8 for N)

² This mean is calculated for the mothers who provide inclusion of any kind (See Table 8 for N).

³ This mean is calculated for all mothers who taught that concept (for concepts, N=12, for level, N=24)

TABLE 11: Mean Frequency of use of each type of inclusion information for Subordinate Level Concepts

<u>Concept</u>	<u>Type of Inclusion Information Provided</u>								
	<u>EXPLICIT</u>			<u>MEMBERSHIP</u>			<u>ANY INCLUSION</u> (Explicit + Membership)		
	<u>Single</u>	<u>Joint</u>	<u>Total</u>	<u>Single</u>	<u>Joint</u>	<u>Total</u>	<u>Single</u>	<u>Joint</u>	<u>Total</u>
Aframe									
Mean (Type) ¹	0	0	0	1.40	1.00	1.60	1.40	1.00	1.60
Mean (Inclusion) ²	0	0	0	1.40	.20	1.60	1.40	.20	1.60
Mean (Concept) ³	0	0	0	.58	.08	.67	.58	.08	.67
Ladle									
Mean (Type)	0	0	0	2.00	1.00	1.50	2.00	1.00	1.50
Mean (Inclusion)	0	0	0	1.00	.50	1.50	1.00	.50	1.50
Mean (Concept)	0	0	0	.17	.08	.25	.17	.08	.25
Locket									
Mean (Type)	0	0	0	1.33	0	1.33	1.33	0	1.33
Mean (Inclusion)	0	0	0	1.33	0	1.33	1.33	0	1.33
Mean (Concept)	0	0	0	.33	0	.33	.33	0	.33
Wrecker									
Mean (Type)	0	0	0	2.00	1.00	2.28	2.00	1.00	2.28
Mean (Inclusion)	0	0	0	2.00	.28	2.28	2.00	.28	2.28
Mean (Concept)	0	0	0	1.17	.17	1.33	1.17	.17	1.33
Subordinate Level Total									
Mean (Type)	0	0	0	6.75	1.00	2.21	6.75	1.00	2.21
Mean (Inclusion)	0	0	0	1.93	.28	2.14	1.93	.28	2.14
Mean (Concept)	0	0	0	1.12	.17	1.29	1.12	.17	1.29

¹ This mean is calculated for the mothers who provide that type of inclusion information (See Table 8 for N)

² This mean is calculated for the mothers who provide inclusion of any kind (See Table 8 for N).

³ This mean is calculated for all mothers who taught that concept (for concepts, N=12, for levels, N=24)

The use of each type of inclusion statement (explicit or membership) expressed as a proportion of all inclusion information provided is presented in Table 12 for superordinate concepts and in Table 13 for subordinate concepts. At both levels, membership statements constituted, on the average, the largest proportion of the inclusion information provided. Membership statements accounted for 74% of the inclusion provided for superordinates and for all of the inclusion for subordinates (see mean inclusion for the level data in Tables 12 and 13).

As was mentioned in the introduction, previous research on this topic (Callanan, 1982, 1985) did not include all forms of membership statements in the analysis of the inclusion data. It was suggested earlier that an accurate reflection of inclusion information provided by mothers for novel concepts must consider all forms of membership statements produced both singly and jointly. The data from the present study can be used to estimate the extent to which maternal use of inclusion was underestimated in the Callanan study. The data indicate that if membership statements are excluded, the use of inclusion for superordinate concepts is underestimated by 74% for the mothers who use inclusion and by 64% for all mothers; for subordinates the projected underestimation is 100% for the mothers who provide inclusion and 58% overall (see Table 14). If joint productions are neglected, inclusion is underestimated for superordinates by 22% for the mothers who use inclusion and 20% overall, for subordinates by 10% for mothers who use inclusion and 6% overall (see Table 15). To determine if the failure to consider membership statements and/or joint productions as instances of inclusion resulted in a significant underestimation of the use of inclusion a series of paired samples *t*-tests was conducted on the inclusion frequency data (see Tables 10 and 11). If membership statements and joint productions are eliminated, significant underestimation occurs at both the superordinate level [t , (23), $p < .002$] and the subordinate level [t , (23), = 5.061, $p < .001$]. Inclusion was significantly underestimated if membership statements were not considered for both superordinates

TABLE 12: Mean Proportions of Inclusion Provided for Superordinate Concepts Broken
Down by Type of Inclusion Information*

<u>Concept</u>	<u>Type of Inclusion Information Provided</u>								
	<u>EXPLICIT</u>			<u>MEMBERSHIP</u>			<u>ANY INCLUSION</u> (Explicit + Membership)		
	<u>Single</u>	<u>Joint</u>	<u>Total</u>	<u>Single</u>	<u>Joint</u>	<u>Total</u>	<u>Single</u>	<u>Joint</u>	<u>Total</u>
Habitat									
Mean (Type) ¹	.517	.517	.850	.697	.570	.681	.804	.523	1.0
Mean (Inclusion) ²	.194	.125	.319	.610	.071	.681	.804	.196	1.0
Mean (Concept) ³	.129	.083	.212	.407	.048	.454	.536	.131	.667
Jewelry									
Mean (Type)	0	0	0	.857	.500	1.0	.857	.500	1.0
Mean (Inclusion)	0	0	0	.750	.250	1.0	.750	.250	1.0
Mean (Concept)	0	0	0	.500	.167	.667	.500	.167	.667
Kitchen									
Mean (Type)	0	0	0	.934	.665	1.0	.934	.665	1.0
Mean (Inclusion)	0	0	0	.778	.222	1.0	.778	.222	1.0
Mean (Concept)	0	0	0	.389	.111	.500	.389	.111	.500
Vehicle									
Mean (Type)	.693	0	.693	.680	.688	.769	.917	.688	1.0
Mean (Inclusion)	.441	0	.441	.309	.250	.559	.750	.250	1.0
Mean (Concept)	.404	0	.404	.283	.229	.512	.688	.229	.917
Superordinate Level Total									
Mean (Type)	.481	.360	.553	.675	.499	.814	.814	.471	1.0
Mean (Inclusion)	.229	.034	.263	.547	.190	.737	.776	.224	1.0
Mean (Concept)	.200	.030	.230	.478	.166	.645	.679	.196	.875

* Values in this table are the proportion of all uses of inclusion that are each type (e.g. Single Explicit/Total Inclusions)

¹ This mean is calculated for the mothers who provide that type of inclusion information (See Table 8 for N)

² This mean is calculated for the mothers who provide inclusion of any kind (See Table 8 for N).

³ This mean is calculated for all mothers who taught that concept (for concepts, N=12, for level, N=24)

**TABLE 13: Mean Proportions of Inclusion Provided for Subordinate Concepts Broken
Down by Type of Inclusion Information***

<u>Concept</u>	<u>Type of Inclusion Information Provided</u>								
	<u>EXPLICIT</u>			<u>MEMBERSHIP</u>			<u>ANY INCLUSION</u> (Explicit + Membership)		
	<u>Single</u>	<u>Joint</u>	<u>Total</u>	<u>Single</u>	<u>Joint</u>	<u>Total</u>	<u>Single</u>	<u>Joint</u>	<u>Total</u>
Aframe									
Mean (Type) ¹	0	0	0	.900	.100	1.0	.900	.100	1.0
Mean (Inclusion) ²	0	0	0	.900	.100	1.0	.900	.100	1.0
Mean (Concept) ³	0	0	0	.375	.042	.417	.375	.042	.417
Ladle									
Mean (Type)	0	0	0	1.0	1.0	1.0	1.0	1.0	1.0
Mean (Inclusion)	0	0	0	.500	.500	1.0	.500	.500	1.0
Mean (Concept)	0	0	0	.083	.083	.167	.083	.083	.167
Locket									
Mean (Type)	0	0	0	1.0	0	1.0	1.0	0	1.0
Mean (Inclusion)	0	0	0	1.0	0	1.0	1.0	0	1.0
Mean (Concept)	0	0	0	.250	0	.250	.250	0	.250
Wrecker									
Mean (Type)	0	0	0	.881	.415	1.0	.881	.415	1.0
Mean (Inclusion)	0	0	0	.881	.119	1.0	.881	.119	1.0
Mean (Concept)	0	0	0	.514	.069	.583	.514	.069	.583
Subordinate Level Total									
Mean (Type)	0	0	0	.903	.097	1.0	.903	.097	1.0
Mean (Inclusion)	0	0	0	.903	.097	1.0	.903	.097	1.0
Mean (Concept)	0	0	0	.527	.057	.583	.527	.057	.583

* Values in this table are the proportion of all uses of inclusion that are each type (e.g. Single Explicit/Total Inclusions)

¹ This mean is calculated for the mothers who provide that type of inclusion information (See Table 8 for N)

² This mean is calculated for the mothers who provide inclusion of any kind (See Table 8 for N).

³ This mean is calculated for all mothers who taught that concept (for concepts, N=12, for level, N=24)

TABLE 14: Projected Percent Underestimation of Inclusion Information Provided if
Membership Statements Are Not Considered as Instances of Inclusion¹

	<u>For the mothers who provided inclusion</u>	<u>For All Mothers</u>
SUPERORDINATE CONCEPTS		
Single.	54.7%	47.8%
Joint	19.0%	16.6%
All Membership	73.7%	64.5%
SUBORDINATE CONCEPTS		
Single	90.3%	52.7%
Joint	9.7%	5.7%
All Membership	100%	58.3%

¹ These projections are based on the mean proportion of inclusion information provided (Mean Type and Mean Concept from Tables 12 and 13)

TABLE 15: Projected Percent Underestimation of Inclusion Information Provided if
Joint Productions Are Not Considered As Instances of Inclusion¹

	<u>For the mothers who provided inclusion</u>	<u>For All Mothers</u>
SUPERORDINATE CONCEPTS		
Explicit	3.6%	3.0%
Membership	19.0%	16.6%
All Inclusion	22.4%	19.6%
SUBORDINATE CONCEPTS		
Explicit ²	0	0
Membership	9.7%	5.7%
All Inclusion	9.7%	5.7%

¹ These projections are based on the mean proportion of inclusion information provided (Mean Type and Mean Concept from Tables 12 and 13)

² No explicit inclusion statements were produced for Subordinate Concepts thus the projected underestimation is 0% for this type of inclusion information for SUBORDINATE CONCEPTS

[t , (23) = 5.127, $p < .001$] and subordinates [t , (23), = 5.061, $p < .001$]. The test of the elimination of joint productions was not significant at either level. Thus, the failure to include membership statements results in a significant underestimation of maternal use of inclusion at both the superordinate and subordinate levels, however, neglecting joint productions does not result in a significant underestimation of inclusion at either level.

The "Kind Of" Construction in Inclusion Statements

It was suggested earlier that the use of a "kind of" construction in inclusion statements should be helpful in the acquisition of novel hierarchically related concepts. Thus, it was of particular interest in the analysis of the inclusion data to determine whether the mothers would make use of the "kind of" construction when providing inclusion information for the novel concepts. This construction was used by 14 of the 24 mothers and accounted for 47 statements in the entire corpus. The frequency of use of the "kind of" construction in inclusion statements is presented in Table 16. Of the 14 mothers who used the "kind of" construction, 12 mothers did so for subordinate concepts, whereas only 3 did so for superordinate concepts; almost all (44 of 47) of the "kind of" constructions were produced for subordinate concepts.

Only 3 of the 47 "kind of" constructions were contained in a membership statement produced by the mother alone. The remaining 44 of the 47 "kind of" constructions were used in attempts by the mother to elicit a label from her child that would result in a jointly produced membership statement; only one of these elicitations was successful. It is interesting to note that mothers used this construction primarily when trying to elicit the novel subordinate level label from the child (e.g., "what kind of truck is this?" for the concept "wrecker"). However, mothers did not attempt to elicit the novel superordinate label (e.g., "A truck is a kind of what?") nor did they attempt to elicit the familiar basic level terms (e.g. "What kind of vehicle is this?" in reference to the dump truck, plane, or boat). Given this result and the finding that mothers did not

TABLE 16: Maternal Use of the "Kind Of" Construction in Inclusion Statements

<u>Concept</u>	<u># Mothers using "kind of" construction</u>	<u>Total # of "kind of" Statements Produced</u>	<u># "kind of" used in unsuccessful attempts to elicit inclusion¹</u>	<u># "kind of" constructions in inclusion stmts.</u>
Aframe	4	9	9	0
Ladle	2	2	2	0
Locket	2	7	7 ²	0
Wrecker	9	26	22	4 ³
Subordinate Level	12	44	40	4
Habitat	1	1	0	1
Jewelry	0	0	0	0
Kitchen	0	0	0	0
Vehicle	2	2	2	0
Superordinate Level	3	3	2	1 ⁴

-
- ¹ Except as noted below, all unsuccessful attempts to elicit inclusion for subordinate concepts employed the basic level label in the "kind of" statement; for superordinates the target label was employed in the "kind of" statement.
- ² These statements all contained the superordinate label "jewelry" in the "kind of" statement.
- ³ One of the 4 statements was a jointly produced membership statement where the mother elicited the target label from the child using a "kind of" construction containing the basic level label. The remaining three statements were membership statements produced by the mother alone.
- ⁴ This statement was a jointly produced membership statement where the mother elicited the basic level label using a "kind of" statement containing the superordinate level label.

themselves spontaneously provide inclusion information using the "kind of" construction, it could be argued that mothers were not using this construction strategically for providing inclusion information.

Compound Nouns in Inclusion Statements

Waxman and Shipley (1987) have suggested that noun-noun compound labels that contain the basic level label may facilitate categorical distinctions at the subordinate level. Callanan (1982) noted that some mothers produced novel compounds when introducing novel subordinates that did not have compound noun labels (e.g., pug dog). While none of the four subordinate concepts employed in this study has a compound noun label that could be considered standard, a few mothers did produce novel compounds for their children. Three of 12 mothers used the compound "aframe-house" for the concept "aframe". For the concept "wrecker", one mother employed the novel compound "wrecker truck"; and for "vehicle" one mother provided the novel basic-superordinate compounds "plane vehicle", "car vehicle" and "truck vehicle" for her child. As Callanan (1982) pointed out, it is possible that the use of a compound comprised of two nouns at different hierarchical levels may help the child to see the inclusion relation that exists between members of hierarchically related categories. However, the occurrence of novel compounds in the present study (only 5 statements) and the proportion of all mothers who used novel compounds (only 5 of the 24 mothers) were too small to suggest that mothers reliably employ this strategy for providing inclusion information when introducing novel superordinate and subordinate concepts to their children.

Labeling and Inclusion

In the earlier analysis of the labeling data it was suggested that mothers could employ a target + basic labeling strategy to provide their children with implicit information regarding the appropriateness of two labels at different hierarchical levels for the same object. Thus, it was of interest in the analysis of the inclusion data to determine whether the mothers who employed the target + basic labeling pattern also

provided their child with inclusion information. Of the 21 mothers who provided some inclusion information, 17 of them (81%) also employed the target + basic labeling pattern for at least one of the superordinate concepts. Of the 14 mothers who provided inclusion information for one or more of the subordinate concepts, 6 mothers (43%) also employed the target + basic labeling pattern. However, if we consider the pattern of use of inclusion and target + basic labeling for each mother for the four concepts we observe that only 4 of 24 mothers (17%) provided their children with the same types of input for concepts at both the superordinate and the subordinate levels; those mothers all provided target + basic labeling and inclusion for concepts at both levels. Thus, it would appear that mothers do not strategically employ a target + basic labeling pattern in conjunction with the use of inclusion statements to provide their children with two different types of information about the appropriateness of two labels for the same referent(s).

Attribute Information

It was suggested earlier that one maternal input strategy that would be useful to the child in the acquisition of novel superordinate or subordinate concepts is one that would help the child to learn the properties (form and/or function attributes) that are relevant for the application of a particular label. For example, mothers could point out one or more properties that result in the application of one subordinate level term rather than another, or that result in the superordinate terms being applied to a variety of different objects.

To examine maternal input concerning concept attributes, four major descriptive analyses were performed on the form and function attribute data: the first analysis addressed the general question of whether the mothers ever provide typical form and function attribute information for their children; the second analysis examined the informativeness of the attribute information and the number of unique informative

attributes provided; the third analysis examined the proximity of the target label to the attribute information provided; and the final analysis examined the manner in which the mother introduced the attribute information and whether the attribute information was provided as a property of an object or as a property of a category.

Maternal Provision of Attribute Information

The first, and most general, question to be addressed in the analysis of the attribute information is whether mothers ever provided typical attribute information when helping their children to learn novel concepts. Only typical function attributes were considered in this analysis as those are the attributes that should be most helpful to the child in determining the attribute properties relevant for membership in the novel categories. The number and proportion of mothers who provided typical attribute information is presented in Table 17 broken down by the number of concepts at each level for which the attribute information was provided. The number of mothers, and the proportion of the mothers who taught a concept who provided typical attribute information for that concept, are presented by concept and level in Table 18.

From an examination of the superordinate and subordinate level data for typical function attribute information in Table 17, it is clear that mothers did provide some typical function information for the novel concepts at both levels. At the superordinate level, all 24 mothers provided typical function attribute information for at least one superordinate concept and 18 of the 24 did so for both superordinates. At the subordinate level, 23 of the 24 mothers provided function information for at least one concept and 13 mothers provided that information for both subordinate concepts. If we examine the concept data in Table 18, we find that all or nearly all of the mothers provided function information for the superordinate concepts "kitchen utensil", "habitat" and "vehicle" whereas only 8 of 12 mothers did so for the concept "jewelry". The differences observed among the superordinate concepts are not surprising. The property "wear" was the only function attribute ever mentioned for the category "jewelry" and

Table 17: Number of Concepts for Which Mothers Provided Typical Attribute Information

		SUPERORDINATES			SUBORDINATES		
		0	1	2	0	1	2
Typical Function	# mothers	0	6	18	1	10	13
	% mothers	0	25	75	4.16	41.07	54.17
Typical Form	# mothers	14	7	3	1	9	14
	% mothers	58.33	29.17	12.5	4.17	37.5	58.33

Table 18: Number and Proportion of Mothers Who Provided Typical Attribute Information

<u>Concept</u>	<u>Typical Function</u>		<u>Typical Form</u>	
	<u># mothers</u>	<u>% mothers</u>	<u># mothers</u>	<u>% mothers</u>
Habitat	11	83.33	5	41.67
Kitchen	12	100	0	0
Jewelry	8	66.67	3	25
Vehicle	11	91.67	5	41.67
Superordinate Level	24	100	10	41.67
Aframe	3	33.33	12	100
Ladle	8	66.67	3	25
Locket	12	100	10	83.33
Wrecker	12	100	12	100
Subordinate Level	23	95.83	23	95.83

while it is clearly important to the concept, knowing that one wears jewelry does not alone serve to distinguish it from the closely related category "clothing". In contrast, the properties "where people or animals live" (for "habitat"), "used in the kitchen to cook food" (for "kitchen utensil"), or "to take people and things from one place to another" (for "vehicle") clearly provide the child with information that may be of greater usefulness for both the extension and the intension of these concepts. This issue of informativeness of attribute information will be addressed in detail later.

At the subordinate level, we also observe variation among the concepts in whether mothers provided function attribute information. An examination of the subordinate concept data in Table 18 reveals that all 12 mothers provided function information for the concepts "wrecker" and "locket", and 8 of 12 did so for "ladle", whereas only 3 mothers provided function information for the concept "aframe". For "aframe", the property "live in", while typical, is only minimally informative; thus, that few mothers provided function information for this concept is not necessarily surprising. It is somewhat surprising, however, that more mothers did not provide function information for the concept "ladle" as one would expect that the salient form properties of the bent handle and large bowl would focus attention on the scooping function afforded by these form properties. Overall, while there is variation among the concepts within a level, most mothers did introduce typical function attribute information for novel concepts at both levels.

Callanan (1990) observed that mothers would often provide both basic level and superordinate level functions in reference to the novel superordinate categories. She observed that mothers often provided this anchoring by introducing a superordinate function (e.g., "Machines do work for us.") together with examples of basic level instantiations of the relevant function (e.g., "lawnmowers do work outside, mixers do work in the kitchen"). To determine whether mothers in the present study anchored

function information at the basic level for the novel superordinates¹, the frequency of higher and lower level functions were compared using a paired-samples t-test. Mothers provided significantly more higher level functions ($M = 10.5$) than lower level functions ($M = .417$) for the novel superordinates [$t(23) = 8.942, p < .001$]. Mothers rarely provided lower level functions for the novel superordinate concepts; thus, mothers in this study clearly were not anchoring function information at the basic level. Further, only one mother was observed to introduce a superordinate function together with basic level instantiations of the function and this mother employed this strategy for only one superordinate concept. The absence of an anchoring effect in this study may have resulted from the restricted range of basic level functions included in this analysis; only those basic level functions that were considered typical with respect to the superordinate category were included in this analysis. It would seem then that when the analysis is restricted to function information that is typical of the novel superordinate, mothers do not anchor the attribute information at the basic level.

Turning to a consideration of the form information provided, the level data in Table 17 show that 10 of 24 mothers (42%) provided typical form information for at least one superordinate concept and only 3 of 24 (12.5%) did so for both superordinate concepts. The superordinate concept data in Table 18 show that 5 of 12, fewer than half, of the mothers teaching the concepts "habitat" and "vehicle" provided typical form information for these concepts. Only 3 of the 12 mothers provided typical form information for the concept "jewelry" and none did so for the concept "kitchen utensil." At the subordinate level we observe somewhat less variability among the concepts in maternal provision of typical form attribute information. Twenty-three of the 24 mothers provided typical form attribute information for at least one of the subordinate

¹ As the present study did not distinguish between basic level and subordinate level functions, it was not possible to examine basic level anchoring of function attribute information for the subordinate concepts.

concepts and 9 of them provided that information for both subordinates (see Table 17). From the subordinate concept data we observe that all of the mothers provided form information for the concepts "aframe" and "wrecker" and 10 of the 12 provided that information for "locket", while only 3 of the 12 mothers did so for the concept "ladle". That fewer mothers provided typical form attribute information for "ladle" than for the other subordinate concepts is a surprising result in that it is the unusual form properties of the bent handle and large bowl that afford the scooping function that are important to the concept and serve to distinguish it from other members of the basic level category "spoon." It is possible that mothers were instead focusing on function information for this concept. An examination of the attribute tallies for each mother who taught the concept "ladle" show that 6 of the 12 mothers provided function information alone, 2 mothers introduced both form and function information, one mother provided only form information and three mothers provided no attribute information of either type. Thus, most mothers who provided function information for the concept "ladle" did not also point out the relevant form attribute information.

As with function attribute information, mothers do not provide form attribute information for all concepts within a level. However, in contrast to the function attribute data we observe a difference in maternal provision of form attribute information as a function of the level of the novel concepts. While most mothers tended to provide function attributes for concepts at both levels, more mothers provided form attribute information for the subordinate level concepts than for the superordinates.

To examine variation in maternal introduction of attribute information as a function of the level of the concepts and of the type of attribute information provided, the amount of form information and function information provided at the two levels was analyzed in a 2 (level) x 2 (attribute type) ANOVA. The test yielded a significant main effect of attribute type [$F(1,47) = 33.06, p < .001$] and a significant level by attribute type interaction [$F(1,47) = 37.25, p < .001$]. Post hoc between-level comparisons

indicated that mothers provided more function information for superordinates than for subordinates and more form information for subordinates than for superordinates. Comparisons of the data within a level indicate that mothers provide more function information than form information for superordinate concepts ($p \leq .001$) but not for subordinates. These results are predictable in that members of a superordinate category are more likely to share function properties than form properties whereas members of subordinate level categories tend to have both form and function attributes in common. That no difference was observed in the amount of form and function information provided for concepts at the subordinate level may result from differences among the subordinate concepts studied in the relative importance of form and function attributes for category membership. For example, aframes differ from other houses on the basis of form but not function properties, whereas lockets may differ from other necklaces more in function than form, and wreckers and ladles differ from other kinds of trucks and spoons respectively both on the basis of function and the form properties that afford the relevant function.

Informativeness of Attribute Information Provided

It has been suggested in preceding analyses of the attribute data that typical concept attributes vary with respect to the amount of useful information that they provide for the extension and intension of a given category. As was discussed in Chapter 3, the typical form and function attributes mentioned by the mothers were further classified on the basis of the informativeness of the attribute with respect to the target concept. The second analysis of the attribute data examined the informative attributes (IA) that mothers introduced for the novel concepts. In the analysis of the informative attribute data it was of interest to determine: 1) how many mothers provided IA information and the number of concepts at each level for which mothers introduced this information; 2) the number of unique informative attributes a mother mentioned for

each of the concepts and; 3) how many mothers introduced each of the informative attributes identified for a concept.

Table 19 presents the number of concepts at each level for which mothers mentioned informative attributes. The data in Table 19 are remarkably similar to those reported for the number of mothers who provided typical function attribute information (see Table 17). All 24 of the mothers provided typical and informative function attribute information for at least one of the novel superordinate concepts. Fifteen of the 18 mothers who provided typical function attribute information for both superordinates provided function attribute information that was considered to be informative. For subordinate concepts, 22 of the 23 mothers who provided typical function attribute information for at least one concept provided function attributes that were considered informative. All of the 13 mothers did who provided typical function information for both subordinate concepts mentioned informative functions. Thus, all or nearly all of the mothers introduced informative function attribute information for at least one concept at both levels. As would be expected given the results of earlier analyses, fewer mothers provided informative form attributes than function attributes for superordinate concepts; the informative form attribute data correspond to the typical form attribute data presented in Table 17. Ten mothers mentioned informative form attributes for at least one superordinate concept and only 3 mothers did so for both concepts. At the subordinate level, 14 of 24 mothers introduced informative form attribute information for at least one of the subordinate concepts and 9 did so for both subordinate concepts.

In addition to the number of mothers who mentioned informative attributes for the novel concepts, it was of interest to determine the number of attributes mentioned and what those attributes were. The number of unique maximally informative function attributes mentioned for each concept and the number and proportion of mothers who introduced the relevant attribute are presented in Table 20. The informative function

TABLE 19: Number of Concepts for Which Mothers Provided Informative Attributes

		Number of Concepts					
		SUPERORDINATE			SUBORDINATE		
		0	1	2	0	1	2
Informative Function Attributes							
	# Mothers	0	9	15	2	9	13
	% Mothers	0	37.5	62.5	8.33	37.5	54.17
Informative Form Attributes							
	# Mothers	14	7	3	1	9	14
	% Mothers	58.33	29.17	12.5	4.17	37.5	58.33

attributes provided for each of the concepts and the number and proportion of mothers teaching the concepts who mentioned the relevant attribute are presented in Table 21 for superordinates and Table 22 for subordinates. It is clear from the data in Table 20 that there is variability both between and within levels in the number of unique informative function attributes mentioned for a concept. With the exception of the concept "vehicle" most mothers did not mention more than one informative function attribute for the novel superordinate concepts. For the subordinate concepts other than "aframe" mothers did tend to introduce more than one informative function attribute. On examining Table 21, the data for the concept "kitchen utensil" stand out. One might expect a much higher frequency of mention of multiple function attributes for this category given that children of this age probably have had a good deal of exposure on a daily basis to kitchen utensils used both in the preparation and consumption of food. It is interesting to note, however, that while only 3 mothers mentioned more than one informative function, all 12 mothers provided their children with the minimally informative property "used in the kitchen". It is possible that mothers were focusing on the locative information "used in the kitchen" to highlight the "kitchen" component of the compound noun label for the novel category.

The number of unique informative form attributes provided is presented in Table 23 and the number of mothers who mentioned each of the informative form attributes is presented in Table 24 for the superordinate concepts and in Table 25 for the subordinate concepts. As would be expected, little informative form information was provided for superordinate concepts (see Table 23). Fewer than half of the mothers provided useful form attribute information and none of the mothers provided more than one form attribute for any of the superordinate concepts. Most mothers provided a useful (maximally informative) form attribute for the subordinate concepts with the exception of "ladle," however, few of the mothers provided more than one useful form attribute for any of the subordinate concepts. An examination of the data in Table 23 suggests that

TABLE 20: Number of Unique Maximally Informative Function Attributes Mentioned

Concept	#unique attributes provided for the concept	# mothers (of 12 possible) who mention at least one	# Mothers	# of Unique Attributes					
				0	1	2	3	4	5
Habitat	3	10	# Mothers	2	5	2	3	-	-
Jewelry	1	8	# Mothers	4	8	-	-	-	-
Kitchen	4	8	# Mothers	4	5	3	0	0	-
Vehicle	5	11	# Mothers	1	3	5	3	0	0
Aframe	1	3	# Mothers	9	3	-	-	-	-
Ladle	3	8	# mothers	4	1	4	3	-	-
Locket	3	12	# Mothers	0	0	8	4	-	-
Wrecker	3	12	# Mothers	0	0	9	3	-	-

Table 21: Informative Function Attributes Provided for Superordinate Concepts

<u>Concept</u>	<u>Attribute</u>	<u># Mothers Provided by</u>	<u>% Mothers Provided by</u>
Habitat	Maximally informative: ¹		
	live in	8	66.67
	people live in	5	41.67
	animals live in	5	41.67
Jewelry	Maximally informative:		
	wear [have on/goes on/put on]	8	75
Kitchen Utensil	Maximally informative:		
	[used to] make food	2	16.67
	[used to] eat food	1	8.33
	[used to] cook food	7	58.33
	[used to] serve food	1	8.33
	Informative:		
	used in the kitchen	12	100
Vehicle	Maximally informative: ²		
	goes + location	6	50
	ride in	3	25
	drive	7	58.33
	take people places	5	41.66
	transport ³	2	16.67

¹ Three mothers mentioned all three maximally informative attributes, 2 mothers indicated that both people and animals live in habitats.

² The attributes "move" and "carry;things were also provided for "vehicle" but were considered too general to be useful.

³ This information took the form of the use of the verb "transports" and the expression "way of transportation"; while the information that a vehicle transports is useful from an adult perspective it may not be particularly useful to a child.

Table 22: Informative Function Attributes Provided for Subordinate Concepts

Concept	Attribute	# Mothers Provided by	% Mothers Provided by
Aframe	Informative live in	3	25
Ladle ¹	Maximally informative: scoop	6	50
	pour	1	8.33
	take [things] out [with it]	4	33.3
	serve [put in bowl with it]	2	16.67
	Informative: eat [negative: don't eat with it]	3	25.0
	cook	2	16.67
	use in the kitchen	2	16.67
Locket	Maximally informative: ² opens	11	91.67
	closes	5	41.67
	put something [in it]	12	100
	Informative: wear	6	50
Wrecker	Maximally informative: ³ picks up [cars]	6	50
	hook on [put on car]	9	75
	take away [broken car]	12	100

1 Eight mothers also provided the lower level specific function for at least one of the exemplars (e.g. a soup ladle is used for soup, gravy ladle for gravy, punch ladle for drinks).

2 A combination of two of the maximally informative attributes (e.g. opens + put something in) was provided by 8 of the mothers and all three attributes were provided by 4 of the mothers.

3 Six mothers mentioned "hook up" as well as "take away", 3 used "pick up" and "take away" and 3 mothers provided all three attributes.

TABLE 23: Number of Unique Maximally Informative Form Attributes Mentioned

Concept	# unique attributes provided for the concept	# mothers (of 12 possible) who mention at least one	# Mothers	0	1	2	3	4	5	6
Habitat	1	5	# Mothers	7	5	-	-	-	-	-
Jewelry	1	3	# Mothers	9	3	-	-	-	-	-
Kitchen	0	0	# Mothers	12	-	-	-	-	-	-
Vehicle	2	5	# Mothers	7	5	0	-	-	-	-
Aframe	6	12	# Mothers	0	9	1	2	0	0	0
Ladle	3	3	# Mothers	9	2	1	3	-	-	-
Locket	3	10	# mothers	2	9	1	0	0	-	-
Wrecker	2	12	# Mothers	0	11	1	-	-	-	-

Table 24: Informative Form Attributes Provided for Superordinate Concepts

<u>Concept</u>	<u>Attribute</u>	<u># Mothers Provided by</u>	<u>% Mothers Provided by</u>
Habitat ¹	Informative: door	5	41.67
Jewelry	Maximally informative: pretty	3	25
Kitchen ²			
Vehicle	Maximally informative: wheels	3	25
	engine	2	16.67

¹ No maximally informative form attributes were identified for "habitat."

² No form information was provided for the concept "kitchen utensil."

Table 25: Informative Form Attributes Provided for Subordinate Concepts

<u>Concept</u>	<u>Attribute</u>	<u># Mothers Provided by</u>	<u>% Mothers Provided by</u>
Aframe	Maximally informative:		
	looks like [shaped like] an A	9	75
	looks like [shaped like] a triangle	2	16.67
	looks like [shaped like] an A and a triangle	3	25.0
	Informative:		
	[roof] goes up and down	2	16.67
	slanty on the sides	1	8.33
Ladle	[roof] goes up in a point	1	8.33
	Maximally informative:		
	bent [handle]	2	16.67
	big at [the] bottom	1	8.33
Locket	bowl [on bottom]	1	8.33
	Maximally informative:		
	door [part that opens]	1	8.33
	chain	2	16.67
	Informative:		
Wrecker	pretty	7	58.33
	Maximally informative:		
	hook	12	100
	Informative:		
	flashing lights	1	8.33

most mothers provided informative form attributes for the concepts "aframe" and "wrecker", both of which have a form attribute that is central to the concept; this is in striking contrast to the concept "ladle" which also has form properties central to the concept.

Method of Introduction of Attribute Information

It was suggested earlier that the manner in which the mothers introduce attribute information may have important consequences for the child's acquisition of novel concepts. A verbal description concurrent with a demonstration of the relevant attribute should be the most useful in helping the child to learn the attributes that are relevant for category membership; this strategy was assumed to be the optimal method of introduction for attribute information. A verbal description alone was considered to be a better strategy than a physical demonstration alone. The optimal method mothers employed to introduce attribute information is presented in Table 26. The results are striking; of the mothers who provided typical function information for the superordinates, only 25% of them provided a physical demonstration of the function attribute as well as a verbal description. For subordinates, 70% of the mothers provided a demonstration in addition to verbal information for function attributes; however, this results almost entirely from information provided for the concepts "locket" (83%) and "wrecker" (75%). The form attribute data indicate that only a verbal description of the relevant attribute information was provided for any of the superordinate concepts. With the exception of the form attributes associated with the concept "aframe", at least 75% of the mothers who provided typical form attribute information for the subordinate concepts did not provide a demonstration of the relevant attribute in addition to a verbal description.

Proximity of Attribute Information to the Target Label

Optimally, attribute information important for category membership should be provided with, or in close proximity to, the target label for the attribute information to

TABLE 26: Optimal Method of Introduction of Typical Attribute Information

Attribute/Concept	N*	Verbal Only		Verbal + Demo.		Demonstration Only	
		#	%	#	%	#	%
FUNCTION							
Aframe	3	3	100	0	0	0	0
Ladle	8	5	62	3	38	0	0
Locket	12	2	17	10	83	0	0
Wrecker	12	4	25	18	75	0	0
Subordinates	23	7	30	16	70	0	0
Habitat	11	11	100	0	0	0	0
Jewelry	8	4	50	4	50	0	0
Kitchen	12	12	100	0	0	0	0
Vehicle	11	7	64	3	27	1	9
Superordinates	24	18	75	6	25	0	0
FORM							
Aframe	12	2	17	10	83	0	0
Ladle	3	3	100	0	0	0	0
Locket	10	10	100	0	0	0	0
Wrecker	12	8	75	4	25	0	0
Subordinates	23	10	43	13	57	0	0
Habitat	5	5	100	0	0	0	0
Jewelry	3	3	100	0	0	0	0
Kitchen	0	0	0	0	0	0	0
Vehicle	5	5	100	0	0	0	0
Superordinates	10	10	100	0	0	0	0

* This is the number of mothers who provided Typical Attribute Information.

be helpful to the child in the appropriate extension of the concept. The proximity of attribute information to the referential use of the target label nearest to the attribute statement is presented in Table 27. Three categories of attribute-label proximities are reported in Table 27: 1) the label was contained in the attribute statement, 2) the label was in the statement adjacent to the statement containing the attribute information, or 3) the label was contained in a statement more than one statement distant from the attribute statement ("Label Distant"). For "Label Distant" statements, the mean distance from the attribute statement to the nearest referential label is reported. If we examine the concept data for the proportion of the mothers who provided typical attribute information with a label in the attribute statement, we observe that variability exists among the concepts within a level; nevertheless, if we consider the level data, the attribute-label proximity patterns are similar at the two levels for function information. More than half of the mothers who provided typical function information for superordinates (62.5%) and for subordinates (52.2%) used a target label in the statement containing the attribute information.

It is unclear whether the attribute information provided with a target label will be more useful to the child than the same information presented with a label in the adjacent statement. In the former case, while the label may be closer to the attribute information, the statement may be of sufficient length or syntactic complexity to make it difficult for the child to parse out the relevant information. Alternatively, while the latter case eliminates the parsing problem it requires that the child be able to correctly identify the anaphoric reference to the target label. Nevertheless, attribute statements containing the label or adjacent to the label are clearly more useful to the child than those statements that are more distant from the label. A fourth category of attribute-label proximity was constructed by collapsing the categories "Label In Attribute Statement" and "Label Adjacent to Attribute Statement" to yield "Label in or Adjacent to Attribute Statement". The data are presented in Table 28. Of the mothers who provided

Table 27: Proximity of Target Label to Typical Attributes

ATTRIBUTE/Concept	Label in Attribute Statement			Label in Adjacent Statement			Label Distant			Mean Distance for
	# mothers	% mothers	# mothers	% mothers	# mothers	% mothers	# mothers	% mothers	Label Distant	
FUNCTION/										
Habitat	11	9	82.0	1	9.0		1	9.0		10.0
Jewelry	8	3	37.5	2	25.0		3	37.5		4.0
Kitchen	12 ²	3	25.0	5	41.67		2	16.67		4.0
Vehicle	11	5	45.4	2	18.2		4	36.4		6.33
Super. Level ³	24	15	62.5	5	20.8		4	16.67		5.75
Aframe	3	0	0	1	33.3		2	66.67		13.67
Ladle	8	3	37.5	4	50.0		1	12.5		3.0
Locket	12	7	58.3	5	41.7		0	0		0
Wrecker	12	6	50.0	4	33.3		2	16.67		2.5
Sub. Level	23	12	52.2	9	39.1		2	8.7		3.5
FORM										
Habitat	5	0	0	3	60.0		2	40.0		3.0
Jewelry	3	0	0	1	33.3		2	66.7		5.0
Kitchen	0	0	0	0	0		0	0		0
Vehicle	5	0	0	1	20.0		4	80.0		11.25
Super. Level	10	0	0	5	50.0		5	50.0		8.4
Aframe	12	4	33.3	6	50.0		2	16.7		9.5
Ladle	3	0	0	2	66.7		1	33.3		2.0
Locket	10	2	20.0	1	10.0		7	70.0		6.86
Wrecker	12	1	8.3	6	50.0		5	41.7		3.6
Sub. Level	23	6	26.1	11	47.8		6	26.0		4.17

¹ This is the number of mothers who provided typical attribute information for that concept.

² Two of these mothers provided typical function attribute information but did not use the label.

³ The level means do not necessarily equal the mean of the four concepts as the level data take into account only the label in closest proximity to the attribute statement.

typical function information, 83% of them did so with or near a referential use of the target label for superordinate concepts and for 91% did so for subordinates.

Turning to the form attribute data, we observe that none of the mothers who provided typical form attribute information for superordinates and 26% of those who did so for subordinates provided the attribute information with a label in the attribute statement. Half of the mothers who provided typical form information used a label in or near the attribute statement for superordinates and 74% did so for subordinates. The greater proportion of mothers who provided form attribute information with or near the label for subordinates than for superordinates probably reflects the greater importance of form attributes for category membership at the subordinate level than at the superordinate level.

Attribute Information as a Property of a Category

Perhaps the most interesting and most informative of the attribute analyses is the final analysis, which addresses the manner in which the mothers specify the range of concept exemplars to which the attribute information pertains. That is, did mothers provide attribute information as a property of the target category or as the property of an object? As can be seen in Table 29, function attribute information was provided as a property of a category by only 15 mothers for superordinates and by only 11 mothers for the subordinates. At the superordinate level, only half or fewer of the mothers provided the information as a category property for three of the four concepts. Most of the mothers (10 of 12) provided function information as a property of the category "habitat". With the exception of the concept "locket", virtually none of the mothers provided function information as a property of subordinate level categories. The data suggest that mothers did not provide function attribute information as a property of a novel category and suggest that there may be differences in the internal structure of categories within a level that may affect maternal input strategies.

Table 28: Target Labels Provided In or Adjacent to Typical Attributes

	<u>N*</u>	<u># Mothers</u>	<u>% Mothers</u>
FUNCTION ATTRIBUTES			
Habitat	10	10	100
Jewelry	8	5	62
Kitchen Utensil	12 ¹	8	75
Vehicle	11	7	64
Superordinate Level	24	20	83
Aframe	4	1	25
Ladle	8	7	88
Locket	12	12	100
Wrecker	23	21	91
Subordinate Level			
FORM ATTRIBUTES			
Habitat	5	3	60
Jewelry	3	1	33
Kitchen Utensil	0	0	0
Vehicle	5	1	20
Superordinate Level	10	5	50
Aframe	12	10	83
Ladle	3	2	67
Locket	10	3	30
Wrecker	12	7	58
Subordinate Level	23	17	74

* This is the number of mothers who provided typical attribute information.

¹ Two of these mothers provided typical attribute information but did not use the concept label.

Table 29: Function Information Provided as a Property of a Category

	Habitat	Jewelry	Kitchen	Vehicle	Superordinate	Aframe	Ladle	Wrecker	Locket	Subordinate
# Function as property of category	10	4	4	6	15	0	2	1	8	11
# Prop. cat. as applied to a group	9	4	2	4	12	0	0	0	1	1
# With target label	7	0	2	2	8	0	1	0	6	7
# With referential target label	5	0	1	2	6	0	1	0	2	3
# With target label in adjacent statement	5	1	0	2	5	0	0	0	4	4
Mean closest distance to referential label	1.5 (n=5)	6.5 (n=4)	10.66 (n=3)	2.75 (n=4)	3.03 (n=12)	0	2 (n=1)	3 (n=1)	2.33 (n=6)	2.38 (n=9)
Property of a category with Verbal information only	10	4	4	5	15	0	2	1	4	7
Property of a category with Verbal Info + Physical Demo.	0	0	0	0	0	0	0	0	4	4
Property of a category with Demonstration Only	0	0	0	1	1	0	0	0	1	1

None of the mothers at either level, ever provided typical form information as a property of the target category; however, three mothers provided that information for atypical form attributes for concepts at the subordinate level. Twenty percent of the mothers who introduce typical function attribute information as a property of a category also did so for atypical function attributes. No more than half of the mothers who introduced function attribute information as a category property provided that information in conjunction with a referential use of the target label or with a demonstration of the relevant function attribute concurrent with a verbal description of the attribute as a property of a category. This analysis suggests that mothers did not take advantage of this type of input strategy for providing their children with optimal information about the form and function attributes that are relevant for category membership.

Summary

General Description

In this study we were interested in six types of information that mothers might provide for their children when introducing novel superordinate and subordinate level concepts. The six types of information were: 1) ostension , 2) inclusion, 3) function, 4) form, 5) form and function attribute correlations, and 6) "other" (non-ostensive) uses of the novel label. Ostension was defined as the provision of an object label in reference to an object or a group of objects where the label is clearly referential and the purpose of the statement is to provide a label for an object or a group of objects. Inclusion statements were those that provided information about the inclusion relation that pertains between members of hierarchically related categories by providing labels at two different levels for the same referent(s). Function attribute statements provided information about the uses of objects (actions that one performs on or with the objects or that the objects themselves can perform) and the locations where objects are used.

Form attribute statements provided information concerning perceptual properties or parts of objects. Form and function statements were single statements or combinations of adjacent statements containing information about a form attribute and the function attribute that pertains to the mentioned form attribute (e.g., "This ladle has a round part on the bottom so that we can use it to scoop with."). Non-ostensive uses of the target label were considered to be "Other" uses of the label.

At both levels, mothers were observed to provide information from all of the coding categories except "Form and Function". Mothers provided similar amounts of ostension and function attribute information for superordinate concepts and they provided more of these types of information than either inclusion or form attribute information. For the subordinate concepts mothers provided similar amounts of ostension and both types of attribute information and provided little inclusion information. The two levels differed only in the relative amount of form information provided; mothers provided more form information for subordinate concepts than for superordinates. Variability among the concepts within a level was observed in both the amount and type of information that mothers provided for their children when introducing the novel superordinate and subordinate level concepts.

The children in this study were observed to spontaneously contribute little of the information content of the concept learning session. However, the children did contribute to the information content by eliciting information from their mothers. While, overall, only a small proportion of maternal productions occurred in response to the child's request for information, child-elicited productions made a significant contribution to both the total number of maternal statements and the number of maternal ostensions at both the superordinate and subordinate levels.

Labeling Practices

The two major analyses of maternal labeling practices yielded similar patterns of results. When mothers used the novel superordinate or subordinate level labels they did

so most often for the purpose of labeling objects (ostension). Mothers also employed the target label to introduce inclusion information at both levels. Again, structural differences in the concepts at the two levels corresponded to observed differences in maternal use of the target label in statements containing attribute information. While the two levels did not differ in the use of the target label in function attribute statements, a greater proportion of all target labels used appeared in form attribute statements for subordinate concepts than for superordinate concepts. Few of the attribute statements at either level contained the novel concept label. However, when the optimal label-attribute proximities were considered, the majority of mothers introduced typical form and function attribute information with or adjacent to a target label.

Mothers provided their children with implicit information that two labels at different levels can be appropriately applied to the same object(s) by using both the basic level label and the target level labels in ostensive statements for the same object referents. This "anchoring" strategy was used by more of the mothers for the novel superordinates than for the subordinates. At the subordinate level mothers employed ostension with the novel subordinate label only. Mothers employed the novel subordinate level label more often in reference to a single object than to a group of objects, but they provided similar amounts of single object and group ostension with the novel superordinate label.

Inclusion

The number of mothers who provided inclusion information for the novel concepts was greater than would be expected by chance for the superordinates but not for the subordinates. Further, mothers provided more inclusion information for the superordinate concepts than for the subordinate concepts. Differences in the use of explicit inclusion statements were observed both between and within levels. Mothers used explicit inclusion statements for only two of the superordinate concepts; mothers

never provided explicit inclusion for subordinates. Membership statements accounted for the largest proportion of the inclusion information provided for the concepts at both levels. It was observed that if membership statements were not considered as instances of inclusion, that the provision of inclusion information was significantly underestimated at both levels. In contrast, failing to consider joint productions as instances of inclusion did not result in underestimation of the amount of inclusion information provided by the mothers.

Maternal use of a "kind of" construction and novel compound nouns for providing inclusion information also were examined. Mothers rarely employed a "kind of" construction for providing inclusion information. When mothers used this construction they most often did so in unsuccessful attempts to elicit the subordinate level label from their children (e.g. "What kind of truck is that?" for the concept "wrecker"); a successful elicitation of this type would have resulted in a jointly produced membership statement. Mothers did not appear to be using the "kind of" construction strategically for providing inclusion information. In contrast to the findings of the Callanan (1985) study, mothers rarely employed a novel compound label for any of the concepts at either level. The low frequency of novel compounds and the small proportion of mothers who produced novel compounds suggest that mothers do not reliably employ this strategy for providing inclusion information when introducing novel superordinate and subordinate concepts for their children.

Attribute Information

Most of the mothers provided typical attribute information for the concepts at both levels. The pattern of maternal input regarding form and function attributes corresponded to structural differences in the categories at the two levels. Mothers provided more function information than form information for the superordinate concepts, but provided both form and function information for the novel subordinates. Mothers introduced form and function attributes that were informative as well as typical

with respect to novel concepts. Mothers tended to introduce informative function attributes for both superordinate and subordinate level concepts, and mothers often mentioned more than one useful function attribute for the novel subordinate level concepts. The useful form attribute data corresponded to the differences between the levels in the relative importance of form attribute information for category membership. Few of the mothers provided useful form attribute information for the novel superordinate concepts. In contrast, most mothers provided useful form attribute information for the novel subordinates. However, few of the mothers mentioned more than one useful form attribute for any of the subordinate concepts. It was noted that there was variability in maternal provision of attribute information among the concepts within a level.

When mothers introduced typical function attribute information for the novel concepts they tended to provide a demonstration in addition to a verbal description of the relevant attribute for the subordinate concepts but not for superordinates. Mothers tended to provide only a verbal description when introducing typical form attributes for superordinates and most of the subordinate concepts; for the concept *aframe* mothers tended to provide a demonstration in addition to the verbal information.

Of particular interest was the finding that mothers did not tend to introduce form or function attribute information in a manner that specified that the relevant attribute was a property of a category. This was true for most of the concepts at both levels, however, this input pattern varied among the concepts within a level. The data suggested that mothers did not take advantage of this type of input strategy for helping their children to identify the properties relevant for membership in the novel categories and that there may be differences in the structure of categories within a level that may affect maternal input strategies.

CHAPTER V

GENERAL DISCUSSION

This study has provided the most complete description to date of the information that mothers provide when helping their children to learn novel superordinate and subordinate level concepts. In contrast to an earlier study on the topic (Callanan, 1985), mothers in this study were asked to help their children learn both superordinate and subordinate concepts. Thus, the design of this study allowed for direct comparisons of patterns of input as a function of the level of the novel concept. The findings suggest that maternal input strategies may vary not only with the level of the novel concept but between concepts within a level. Additionally, this study highlights several methodological considerations that are important for studies examining the acquisition of hierarchically-related concepts and suggests the need for a number of studies.

Children appear to acquire basic level terms easily; however, young children appear to have difficulty acquiring terms at either the subordinate (Mervis & Crisafi, 1982) or the superordinate levels (Horton & Markman, 1980; Mervis & Crisafi, 1982). Both the structure of basic level categories (Rosch & Mervis, 1975; Rosch et al., 1976) and the early linguistic input that children receive (Shipley, Kuhn & Madden, 1983; Wales, Coleman & Pattison, 1983; Ninio, 1980) may contribute to the primacy of the basic level with respect to order of acquisition. Given that there is relatively little structural information about category membership at the subordinate and superordinate levels, adult input is likely to play a crucial role in the acquisition of categories at these levels.

Let us consider the tasks facing the child in the acquisition of a novel superordinate or subordinate category label. First, the child must determine that the novel label is appropriate for an object; if the child already knows a basic level label for the object, the child must learn that the new label is also appropriate for the same object referent. Second, the child must identify the hierarchical level of the novel category label; and third, the child must identify those attribute properties that are relevant to membership in the novel category. Parental input may be important for each of these aspects of the acquisition process. First, adult input can help the child understand that two labels at different hierarchical levels are appropriate for the same object. Second, input that specifies the hierarchical inclusion relationship that pertains between members of hierarchically related categories can help the child identify the hierarchical level of the novel category label. Finally, because the relevant form and function attribute correlations are more difficult to detect at the superordinate and subordinate levels, adult input is likely to play a crucial role in helping the child determine the attribute properties relevant for category membership.

What, in fact, is the nature of the input pertaining to novel hierarchically-related concepts that mothers provide for their children? A general description of the type of information that mothers in this study provided for their children regarding the novel subordinate and superordinate concepts is presented in the following section. In the remaining sections each of the types of input strategies suggested in the earlier will be considered separately. Additionally, a number of methodological concerns raised in the present study will be discussed. Finally, the need for additional studies examining the acquisition of superordinate and subordinate concepts will be addressed.

General Description of the Maternal Input Provided in This Study

At both levels, mothers were observed to provide ostension, inclusion, form attribute information and function attribute information for the novel concepts.

Callanan (1985) suggested that mothers provide anchoring at the basic level for superordinates but that they rely on ostension when introducing novel subordinates. In this respect, the results of the present study mothers were consistent with Callanan's finding; mothers appear to provide both ostension with the target label and inclusion information for novel superordinates but provided only ostension for novel subordinates. Maternal input regarding the form and function attributes relevant for category membership corresponded to structural differences in the categories at the two levels. Mothers provided more function information than form information for the superordinate concepts, but provided both form and function information for the novel subordinates. Variability among the concepts within a level was observed in both the amount and type of information that mothers provided for their children when introducing the novel superordinate and subordinate level concepts.

Maternal Input Regarding the Appropriateness of Two Labels for the Same Referents

Mothers can provide their children with both implicit and explicit information about the appropriateness of two labels for the same referent(s) in at least two ways. One way is to point out explicitly that an object can have more than one label. Only two instances of type of explicit information were observed in this study (two mothers each produced one of these statements for the concept "kitchen utensil"). For example, one mother labeled the group of objects as kitchen utensils and then said "Forks and knives and all those things are called that too. They all have one name and then they all have another name.". While this type of explicit statement clearly indicates that two labels are appropriate, mothers appear to rely more on implicit means of providing this information for their children. Mothers in this study were observed to provide their children with this implicit information by using both the target level label and a basic level label that was familiar to the child for the same referent; however, they employ this strategy more often for superordinate concepts than for subordinates. Thus, it can

be said that mothers are more likely to provide their children with implicit information that two levels are appropriate for novel superordinates than for subordinates.

Information Regarding the Hierarchical Level of the Novel Label

While the use of two labels at different hierarchical levels provides the child with information that the novel label is appropriate for an object, it does little to specify the hierarchical level of the novel label. Consider the difficulty that the young child, who already possesses a basic level label for an object, encounters when faced with another label for the same object (as is often the case when a child first hears a novel superordinate or subordinate label). For example, a child who already knows the label "dog" must determine whether the novel label "Pekinese" refers to a specific subcategory of dogs, to canines, quadrupeds, mammals, animals (if the superordinate term is unfamiliar to the child), or to animate creatures. While the child may be biased to interpret the novel label taxonomically (Markman and Hutchinson, 1984), it remains unclear how the child decides which level in a hierarchy is specified by the novel term. It is possible that children rely on adult input to specify the level of a novel label.

Callanan (1989) suggested that the use of a novel superordinate label in reference to a group of objects helped 3- to 5-year olds correctly interpret novel superordinate labels. In the present study, mothers used this "multiple referent" strategy for concepts at both levels. This strategy may help the child to correctly interpret the novel superordinate label as the label was simultaneously applied to exemplars from three different basic level categories that were familiar to the child. For the subordinate concepts, however, the label was used in reference to three exemplars from the same basic level category; thus there is no information available to help the child determine that the novel label is not merely a synonym for the familiar basic level term. While a "multiple referent" strategy may help the child to interpret

the level of a novel superordinate label, additional information is required to correctly interpret novel subordinate labels.

Mothers can provide information about the hierarchical level of a novel label by providing specific information regarding the inclusion relationship that exists between the novel superordinate or subordinate label and the familiar basic level term. Inclusion statements can take two general forms: 1) explicit inclusion statements of the canonical form "An X is a Y"; and 2) membership statements. Membership statements in turn can take several general forms (e.g., "This is an X. It's a Y.", "This is an X and a Y." and "An X is a kind of Y"). The present study considered explicit inclusion statements and all forms of membership statements, including cases where one of the labels in a membership statement was provided by the child, as instances of inclusion. Mothers in this study provided more inclusion information for superordinate concepts than for subordinate concepts and appeared to employ an inclusion strategy when introducing novel superordinate concepts but not for subordinates. Thus, mothers are providing their children with information regarding the level of the novel superordinate labels but they appear less sensitive to the child's need for this additional information for the novel subordinates.

The findings of the present study pertaining to the type of inclusion input that mothers provide for novel hierarchically related concepts raise both methodological and theoretical concerns. It was suggested that all forms of membership statements must be considered as instances of inclusion if we are to accurately assess the inclusion input that the child receives. It was found that failure to consider membership statements as instances of inclusion results in extreme underestimation of the amount of inclusion information provided at both levels. This is particularly apparent at the subordinate level where membership statements accounted for all of the inclusion input that the mothers provided for the concepts at this level.

It can be argued further that the form of the inclusion statement may affect the child's ability to make use of the inclusion input. Only membership statements that employ a "kind of" construction (e.g. "A car is a kind of vehicle") express the asymmetry of the inclusion relation. While the young child's ability to make use of the type of information remains unclear, this form of inclusion statement has been shown to provide sufficient information for older children to correctly interpret the class-inclusion relationships in a novel hierarchy (Horton & Markman, 1980). Mervis (1987) suggested that the use of a "kind of" construction may be particularly useful to the child in making distinctions among categories at the subordinate level, and Callanan (1989) demonstrated that inclusion statements of this form can result in a level-appropriate interpretation of a novel superordinate term when paired with a familiar basic level term. Mothers, however, do not appear sensitive to this distinction in the type of information conveyed by the form of the inclusion statement. In fact, mothers in this study rarely employed a "kind of" construction to provide inclusion information for their children although many of the mothers did employ this construction when attempting to elicit the novel subordinate level label from their children (e.g. "What kind of truck is this?").

Parental input regarding the inclusion relationship that exists for category terms within a hierarchy may, therefore, contribute to the difficulty that children experience acquiring terms at levels of abstraction other than the basic level. If children require adult input to determine the hierarchical level of a novel label, the necessary maternal input is only available for novel superordinate concepts. Further, if the "kind of" form of inclusion information is necessary for the child to appreciate the inclusion relationship, then the relevant input is not available for concepts at either the superordinate or subordinate levels. These suggestions, while only speculative, provide a potential explanation for the difficulty that children have in acquiring superordinate and subordinate level terms that should be tested in future studies of this nature.

Maternal Input Regarding the Attribute Properties Relevant to Category Membership

Every theory of concept development addresses the importance of form and/or function attribute information for the acquisition of concepts and categories. The second general type of input strategy examined in this study is one that helps the child to learn the attribute properties that are relevant to membership in a particular category and result in appropriate application of a category label. All eight of the concepts included in this study have form and/or function properties that are important to the concept. While those attributes are not considered defining properties in the sense of a classical concept, there are certain form or function properties associated with each of the concepts that one would expect to find in a definition provided for the concept label, and which many people would provide if asked to define the concepts. Because the attribute information relevant to category membership at the superordinate and subordinate levels is less obvious than for basic level categories, adult input is likely to play a crucial role in helping the child to determine the attribute properties relevant for category membership at these levels.

Mothers do appear to provide their children with information about the form and/or function properties that are relevant to category membership for novel superordinate and subordinate level concepts. However, the type of information provided differs as a function of the level of the concept being introduced. Mothers provide their children with function information but not form information for superordinate categories; whereas they provide both types of attribute information for novel subordinates. The pattern of maternal input regarding the two types of attributes is consistent with the relative importance of the attribute information for membership in categories at the two levels: members of superordinate categories are more likely to share function properties than form properties, whereas members of subordinate categories tend to have both form and function attributes in common.

It also was noted that the type of attribute information that mothers provide varies not only between the two hierarchical levels but for concepts within a level. For example, only three mothers provided typical function attribute information for the concept "aframe" whereas all or most of the mothers provided this type of information for the remaining three subordinate level concepts. This result can be easily explained in that the only function attribute relevant to "aframe" is the property "live in", which is only minimally informative for this concept as it does not serve to distinguish aframes from other types of houses. The variability among concepts within a level observed in maternal provision of attribute information suggests that studies that attempt to address the relationship between hierarchical level and attribute information relevant for category membership at those levels should attempt to consider the variation that appears to exist between categories within a hierarchical level.

Mothers can introduce attribute information relevant to category membership in three ways. First, they can simply provide a verbal description of the relevant information; second, they can provide a demonstration of the property. Finally, they can combine a physical demonstration concurrent with the verbal description of the relevant attribute property. Mervis (1988) suggested that the method of introduction of attribute information may affect the child's ability to make use of the attribute information in the acquisition of novel categories; specifically, she suggested that a verbal description combined with a demonstration of the relevant attribute information should be most useful to the child. Banigan and Mervis (1988) demonstrated that this verbal description + demonstration strategy when provided with an object label was successful in inducing 2- year olds to learn new adult-appropriate labels for objects previously included in a child-basic category . Mothers in the present study were provided with actual objects (in contrast to pictures of objects) for the category exemplars to use while helping their children to learn the novel concepts. Actual objects were used to allow the mother and child to manipulate the objects. This allowed

for the examination of the method(s) mothers employ to introduce attribute information. While the present study demonstrates that mothers do provide their children with information about the attributes that are important for superordinate and subordinate category membership, mothers do not provide that verbal information with a demonstration of the relevant attribute property. If children require more than a verbal description or physical demonstration of the attribute properties relevant for category membership, the lack of this type of information in the input that the child receives about the novel categories may be a factor in the difficulty that children have in acquiring terms at the superordinate and subordinate levels.

It is also possible that children may require explicit information that certain attribute properties are relevant to category membership. Mothers can provide this information by specifying for the child that the attribute is a property of a category of objects and not simply a property of an individual object. For example, the attribute information "used to scoop with" can be introduced as a property of a single object as in "You use that to scoop with" (in reference to a single ladle) or as a property of the category of ladles as in "A ladle is used to scoop with". Mothers in this study rarely provided attribute information as a property of a category. Additionally, while many mothers introduced some attribute information in close proximity to the novel label, the proportion of the total statements that contained attribute information and a referential use of the target label was minimal (less than 5% for any of the concepts). While mothers do provide their children with information about the form and/or function properties that are relevant for membership in superordinate or subordinate categories, mothers do not provide that information in ways that should be most useful to the young child for the acquisition of novel superordinate and subordinate level concepts. They do not demonstrate the attribute property as they provide the verbal description. They do not specify that the relevant attribute is a property of a category rather than a property of an object. These factors may play a role in the child's difficulty acquiring

hierarchically organized concepts if any or all of these types of information are necessary for that process or if they facilitate the process.

Additional Methodological Concerns

Several methodological concerns for studies examining the acquisition of novel hierarchically-related concepts have been raised in the preceding sections. Four additional methodological concerns will be presented in this section.

First, the possible effect that the instructions to the mothers may have had on the content of the information that the mother then provided for her child merits discussion. Mothers in this study were not specifically instructed to "teach" or "help their children learn" categories, rather they were asked to help their children to learn new words. It was assumed in this study, as in previous studies, that in this situation the mother would provide information relevant to the concept (category) as well as the concept label (the word). While this is probably a reasonable assumption, we cannot overlook the possible impact of the instructions on the content of the information that the mother provided for her child. In fact, while mothers did provide a variety of information for the novel concepts, the majority of their productions were in some way concerned with the concept label. The majority of maternal productions at both levels were ostensions. Further, some mothers seemed to focus on getting their child to produce or imitate the novel label to the virtual exclusion of any other type of information. It is possible that if mothers were given a concept- or category-oriented instruction rather than a word learning instruction, a different pattern of input would result. The effect the type of instructions given to the mother in a task of this type may have on maternal input to the child should be tested empirically. Alternatively, data gained in naturalistic observation of the mother and child at home may provide the only accurate description of the information that mothers provide about these concepts.

Second, it was initially proposed that the failure to consider the input that the child provides in the concept learning session was a serious failing of the Callanan (1982) study. While in the present study the child spontaneously contributed little to the information provided for the novel concepts, the child did make a substantial contribution by eliciting information from the mother. Future studies should take the child's input as well as that provided by the mother into consideration when attempting to assess the input that the child receives regarding novel concepts.

Third, this study highlights the importance of a pretest to determine which concepts are, in fact, unfamiliar for an individual child. In the present study we chose concept labels that children of this age were unlikely to know, however, this proved not to be a sufficient measure to ensure that the labels were, in fact, unfamiliar to the child. In this study 11 children knew a sufficient number of concepts to be untestable and many more children knew at least some of the labels. It is impossible to assess how the inclusion of children who knew the concepts would have affected the maternal input provided in this study. However, it is clear that mothers are unlikely to provide the same information for a concept that she knows is already familiar to her child than she would provide for one that is clearly unfamiliar.

Finally, it was noted repeatedly that variability in maternal input was observed not only between the two levels but among the concepts within a level as well. This variability suggests that future studies should make every effort to employ the same set of concepts for all of the subjects who participate; this design would allow differences among the concepts to be controlled to the extent possible and their effects to be tested directly.

Future Considerations

This study has provided the most complete description to date of the information that mothers provide when helping their children to learn novel superordinate and

subordinate level concepts. Additionally, this study has highlighted some important methodological and theoretical considerations for studies of this kind and has demonstrated the need for a variety of additional such studies. Specifically we must determine what information is, in fact, necessary and what is sufficient for the acquisition process. Can children learn subordinate level labels if provided with inclusion statements that employ the "kind of" construction? Can they learn superordinates if relevant attributes are demonstrated as well as explained and/or if that information is provided as a property of the novel category? To what extent do these factors interact in the process of acquisition and how does the structure of categories both within and between hierarchical levels affect the acquisition process? These questions remain to be answered before we can fully assess the importance of adult input for the child's acquisition of hierarchically related concepts.

APPENDIX A

CODING MANUAL

I. Coding System Overview

A. Purpose of the Coding System

The following coding system was designed to classify the information relevant to the acquisition of a novel concept label that was conveyed during an experimental session in which a mother was asked to help her child to learn a novel subordinate or superordinate label. The mother was provided with the concept label typewritten on an index card and three objects which were exemplars of the concept in question. The verbal interaction between mother and child was audiotaped and transcribed; the transcript also contains commentary on the relevant nonverbal aspects of the interaction.

B. Organization of the Coding System

The coding system is designed hierarchically. At the most general level, the coding system can be considered to consist of six categories of information into which the content of the interaction between mother and child can be classified. Under each of the general category headings are listed the column codes that pertain to that general category of information. The six information categories and the column codes relevant to each category are listed below in outline form.

1. Person or persons who produced the statement being coded

COL 1 Person(s) making statement

2. Type of Statement: Spontaneous/Elicited/Imitated

COL 2 Spontaneous/Elicited/Imitated
COL. 3 Person eliciting information
COL. 4-5 Form of elicitation
COL 6 Response to elicitation

3. Form/Type (E, R, r, C) of the statement

COL 7 Type of statement: E, R, r, C
COL 8 Form of statement

4. Reference in statement

COL 9 Level of label used in statement
COL. 10 Presence of referent of statement and/or label
COL. 11 Label in statement
COLS. 12 -14 Distance from statement to nearest referential use of the target label
COL. 12 Distance 1: Nearest label is:
a) in the statement
b) before the statement
c) after the statement
d) anaphoric reference
e) in the elicitation

COLS. 13-14 Distance 2: Number of utterances from present statement to nearest referential use of label

5. Informational Content of the statement

COL. 15 Content Category Codes

COLS. 16-27 Content Category Description Codes

6. Response to the statement

COL. 28 Presence of a response to the statement

COL. 29 Intent of the response to the statement

COL. 30 Content of the response to the statement

COL. 31 Label in response to the statement

COL. 32 Level of new label introduced in the response

COL. 33 Response to the new label

C. CONTENT CATEGORIES

The following content categories were designed to classify the contents of the verbal and nonverbal interaction between mother and child:

1) OSTENSION

Ostensive statements are deictic statements of the general form "That is an X" (where X is a label) or deictic phrases of the general form "X" or "[determiner/quantifier] X" where the X label is provided for a single object or for a group of objects. The yes/no question form of the deictic statement (i.e., the deictic statement with subject-verb inversion and marked with a question mark) will be considered as a case of OSTENSION provided that the question was responded to (for a complete description of how the response to the elicitation is determined see STEP B: Secondary selection of codable statements). Deictic statements or phrases that are produced with a question intonation are considered as instances of OSTENSION. (NOTE: Statements or phrases produced with a question intonation are declarative statement that are marked with a question mark to indicate the rising intonation, but that are not interrogative because there is no subject-verb inversion.) Tag questions that are the interrogative form of deictic statements or phrases are also considered instances of ostension (e.g., "That's an X, isn't it?")

NOTE: Deictic statements or phrases containing a negative (e.g., "That's not an X") are included as instances of OSTENSION and can occur in the form of a declarative statement, a statement with a question intonation, or a tag question. (These utterances will be assigned an OSTENSION DESCRIPTION CODE of "NEGATIVE OSTENSION", Col. 17 = 2.)

With the exception of compound nouns (e.g., gravy ladle), the deictic utterance or phrase cannot contain an adjective or noun that modifies the label (e.g., This is a big ladle). Utterances or phrases that contain an adjective modifier and label are coded in the content category FORM.

Examples of deictic statements:

This is a car. (referent: car)
That's a wrecker. (referent: wrecker)
This is called a ladle. (referent: ladle)
These are all called jewelry. (referent: necklace, bracelet, ring)
It's an airplane. (referent: airplane)

Examples of statements that are not considered deictic statements:

These are shiny ladles. (referent: gravy ladle, soup ladle)
This is a small house. (referent: aframe)
Pretty jewelry. (referent: ring)
This ladle is metal. (referent: soup ladle)

Examples of deictic phrases:

A truck. (referent: dumptruck)
Wreckers. (referent: three wreckers)
Some jewelry. (referent: necklace, ring)
Locket. (referent: three lockets)

Examples of phrases that are not considered deictic phrases:

Tiny houses. (referent: three aframes)
Funny trucks. (referent: three wreckers)
Fancy spoons. (referent: ladle)

Examples of deictic statements in the form of a yes/no question that are considered as instances of OSTENSION

- a) M: Is that a car? (referent: car)
C nods head in agreement.
- b) M: Are those wreckers? (referent: car)
C: No.
(NOTE: This would be assigned a description code of "NEGATIVE OSTENSION")
- c) M: Is that a kitchen utensil?
C: Yeah.

Examples of tag questions considered as OSTENSION

That's a ladle, isn't it?
It's a vehicle, right?
Locket, right?

Examples of deictic statements/phrases that are statements with a question intonation

That's not a magnet. (referent: locket)
(declarative)

That's not a truck, is it? (referent: car)
(interrogative)
Those aren't toys? (referent: bowl, spoon, pot)
(declarative with question intonation)

2) INCLUSION

Inclusion statements are statements that provide labels at two different hierarchical levels for the same referent(s).

Inclusion statements take two forms:

- 1) Explicit Inclusion Statements of the general form "An X is a Y." (e.g., "A car is a vehicle." or "Cars are vehicles.")
- 2) Membership statements are those that provide implicit information pertaining to the hierarchical relationship between the members. Membership statements consist of a single utterance or a combination of consecutive utterances that provide labels at two different hierarchical levels for the same referent(s). These statements can take the following general forms:
 - a) This is an X. It's a Y.
 - b) It's an X and a Y.

NOTE: Where more than one X label precedes the Y label and the Y label refers to the referent of all of the X labels, X applies to all X labels that occur before Y. (e.g., This is a car, a truck, and a plane. They're all called vehicles.)

(NOTE: Negative ostensions at two different hierarchical levels are not considered to constitute a membership statement. e.g., "That's not a car and not a vehicle.", referent: ladle)

3) FUNCTION

Function includes uses of objects (actions that one performs on or with the objects, or that the objects themselves can perform) and locations where objects are used. The mentioned function can be typical, atypical, or idiosyncratic with respect to the object for which the function information was provided.

Function statement can be in the form of a declarative statement (e.g., "We use that to pour soup.", referent: ladle), a declarative statement with a question intonation (e.g., "We use that to pour soup?", referent: ladle), a tag question (e.g., "We use that to pour soup, don't we?", referent: ladle), or in the form of a yes/no question ("Do we use that to pour soup?", referent: ladle). (NOTE: Only yes/no questions that have both the form and the pragmatics of yes/no questions and that are responded to will be coded as statements relevant to the FUNCTION category. See "Step B: Secondary selection of codable statements" for a complete description of how yes/no questions are identified as codable statements.)

Utterances that contain a negation of the mentioned function (e.g., "We don't use that to dig with", referent: ladle) are considered function statements; these

utterances will be assigned a FUNCTION DESCRIPTION CODE of "NEGATION OF FUNCTION" (COL. 22=2).

Examples of functions:

- 1) This is used for scooping up soup. (referent: soup ladle)
- 2) I use this for pouring water on my plants. (referent: ladle)
- 3) I wear this on my head. (referent: bowl)
- 4) Mommy uses these in the kitchen sometimes. (referent: three ladles)
- 5) Mommy uses this for soup. (referent: soup ladle)
- 6) We keep all these things in the kitchen at home. (referents: bowl, pot, spoon)

Examples of negation of function:

- 1) We don't use these for digging. (referent: ladle)
- 2) You don't wear that on your head. (referent: bowl)

4) FORM

Form includes perceptual properties of the objects and parts of the objects.

The utterance containing the form information can occur as [be in the form of] a declarative statement (e.g., "The ladle has a big round bowl on the bottom.", referent: ladle), a declarative statement with a question intonation (e.g., "The ladle has a big round bowl on the bottom?", referent: ladle), a tag question (e.g., "The ladle has a big round bowl on the bottom, doesn't it?", referent: ladle), or in the form of a yes/no question ("Does that have a big round bowl on the bottom?", referent: ladle). (NOTE: Only yes/no questions that have the form and the pragmatics of yes/no questions and that are responded to will be coded as statements relevant to the FORM category. See "Step B: Secondary selection of codable statements" for a complete description of how yes/no questions are identified as codable statements.)

Utterances that contain a negation of the mentioned form information (e.g., "The ladle doesn't have a flat part at the bottom", referent: ladle) are considered form statements; these utterances will be assigned a FORM DESCRIPTION CODE of "NEGATION OF FORM" (COL. 20=2).

Examples of form statements:

- 1) This ladle has a big round part on the bottom. (referent: ladle)
- 2) Locketts are shiny. (referent: three lockets)
- 3) This part is shaped like an A. (referent: aframe)
- 4) Wreckers have a hook on the back. (referent: three wreckers)

Examples of negation of form statements:

- 1) That doesn't have a flat part at the bottom like a knife (referent: ladle)
- 2) That's not straight at the sides. (referent: aframe)
- 3) Regular spoons aren't bent like these are. (referent: three ladles)

5) FORM AND FUNCTION

FORM AND FUNCTION statements are single statements or a combination of adjacent statements containing information about form attributes and the function attribute that pertains to the mentioned form attribute. (Generally the form attribute will be the property of the object that affords the function that is mentioned.) The relationship between the mentioned form attribute and the function attribute must be specified in the statement (see examples below).

The utterance(s) containing the form and function information can be in the form of a declarative statement (e.g., "The ladle has a big round bowl on the bottom so that we can scoop up soup." referent: ladle), a declarative statement with a question intonation (e.g., "The ladle has a big round bowl on the bottom so that we can scoop up soup?", referent: ladle), a tag question (e.g., "The ladle has a big round bowl on the bottom so that we can scoop up soup, doesn't it?", referent: ladle), or in the form of a yes/no question ("Does that have a big round bowl on the bottom so that we can scoop up soup?", referent: ladle). (NOTE: Only yes/no questions that have the form and the pragmatics of yes/no questions and that are responded to will be coded as statements relevant to the FORM AND FUNCTION category. See "Step B: Secondary selection of codable statements" for a complete description of how yes/no questions are identified as codable statements.)

Utterances that contain a negation of the mentioned form information (e.g., "The ladle doesn't have a flat part at the bottom so we can use it to scoop up soup", referent: ladle), the function information (e.g., "The ladle has a big round bowl on the bottom so that we can't use it to cut things with.", referent: ladle), or of both the form and function information (e.g., "The ladle doesn't have a flat part at the bottom so that we can't use it to cut things with", referent: ladle) are considered form and function statements; these utterances will be assigned A DESCRIPTION CODE indicating that the statements contain "NEGATION OF FUNCTION" and/or "NEGATION OF FORM." In most cases of negation of form and/or function information, the form, or function, or form and function information will be considered idiosyncratic information (e.g., The form and function information provided in the utterance "The ladle doesn't have a flat part at the bottom so that we can't use it to cut things with." would be considered idiosyncratic form and function information.)**

Examples of utterances in which the relationship between the form information and the function information is specified

- 1) The ladle has a big rounded bowl so that you can scoop things and pour them out.

In this statement, the form information "has a big rounded bowl" is specifically related to the function information "you can scoop things and pour them out" by the phrase "so that".

- 2) The wreckers have a hook on the back so that they can pick up cars and pull them away.

The form attribute (hook) and the function (pull [cars] away) that the form attribute affords are specifically related by the phrase "so that".

Examples of utterances in which the relationship between the form information and the function information is not specified

- 1) The ladle has a big rounded bowl and I use it to scoop things and pour them out.

In this case the form information is not related to the function information although both types of information are present within a single utterance.

- 2) Wreckers have a hook on the back and they hook onto cars and pull them away.

Again, even though both the form (hook) and function (hook onto cars and pull them away) are present in a single utterance, the relationship between the form attribute that affords the mentioned function is not specified in the utterance.

6) OTHER USES OF LABEL OR REQUESTS FOR LABELS

Statements containing one of the following uses of a label:

a) NONOSTENSIVE USE OF LABEL

A label is provided for which there is a specified or clearly identifiable referent, but the statement label is not provided in the form of a deictic utterance (e.g., See this ladle I have in my hand?).

b) ATTEMPT TO ELICIT PRODUCTION OR IMITATION

One person (generally M) attempts to elicit a nonreferential production or imitation of the label. The attempt to elicit production can be in the form of an explicit request that the other person produce the word or in the form of a prompt where the prompt is a production of a part of the word. The attempt to elicit an imitation can be in the form of an explicit request that the other person imitate the word or in the form of a prompt where the word to be imitated is used as a prompt to imitate.

Examples of an attempt to elicit a nonreferential production:

- 1) M: Can you tell me the new word?

(M is attempting to elicit a nonreferential production. Contrast this with the example of an attempt to elicit a referential production)

- 2) M: LI-(M pauses for C to produce the word.)
C: Ladle.

Example of an attempt to elicit a referential production (This category code does not apply)

- 1) M: What is that? (referent: necklace)
C: Jewelry.

(In this case, M is attempting to elicit a referential production of the word, therefore the "jewelry" would be coded as OSTENSION.)

Examples of an attempt to elicit an imitation:

- 1) M: Can you say jewelry?
(M is attempting to elicit an imitation)

- 2) M: Ladle.
(M pauses for C to produce the word.)

c) NONREFERENTIAL USE OF LABEL

Statements containing the use of the target label (The label being taught), or a label that is superordinate or subordinate to the target label (not assigned to "b" above) for which there is not a specified or clearly identifiable referent (e.g., "I like wreckers.").

D. GENERAL INFORMATION

- 1) Yes/No questions must have both the form and the pragmatics (actually requesting a yes/no response rather than a request for another type of information) to be considered as yes/no questions. Questions that have the form, but not the pragmatics of a yes/no question, are considered as NOT yes/no questions.

Examples:

- a) M: Do you know what these are?

This has the form of a yes/no question, but is an implicit request for the other person to label the objects, not simply to indicate whether or not s/he knows what the objects are. Thus, this has the form but not the pragmatics of a yes/no question.

- b) M: Is that a wrecker?
or
M: Do we use this to scoop up soup? (referent: ladle)

These have both the form and the pragmatics of a yes/no question.

- 2) Nonspecific requests for information (e.g., "How do you know?", "Why?") are not considered elicitation.
- 3) If the commentary on the nonverbal aspects of the interaction is redundant with the verbal information contained in the utterance to which the

commentary pertains, then the commentary and the utterance (or portion thereof) will be considered as a unit to constitute a codable statement.

Example

M: We scoop with the ladle. (as M pretends to scoop with ladle)

- 4) Commentary on the nonverbal aspects of the interaction will not be considered a codable statement, unless there is some verbal information that draws attention to the nonverbal behavior being performed. (e.g., The commentary "M pushes car back and forth along floor" will only be identified as relevant to the content category FUNCTION as a demonstration of a function, if M had verbally drawn attention to the performed action (e.g., by saying something like "Watch this.", "See this.", or "Look.").
- 5) "Thing", "stuff" and "one" are not considered labels except where "thing" occurs in an idiosyncratic or invented label (e.g., "gravity thing" as a label for the gravity ladle).

II. Selection of codable statements in transcripts

Before any codes can be assigned, it is necessary to select, out of the entire corpus, those statement that are to be coded. The selection of codable statement is a multi-step decision process. For coding purposes, a codable statement is defined as any utterance, part of an utterance, or combination of adjacent utterances that is relevant to one of the content coding categories as described above.

The selection of codable statements involves two general procedures: 1) the identification of potential codable statements and 2) the selection from all possible potential codable statements (PCS) those statements that are to be coded. The selection process has six general steps (A through F). These steps are introduced below and are described in detail in the subsequent section.

NOTE: Statements produced by M or C that are directed to E are to be ignored when examining the utterances in the corpus during the process of selection of PCS. The only exception to this rule is when either M or C, in response to a request by the other person to do so, directs a statement to E that is relevant to one or more of the content coding categories.

Overview of the six general steps in the process of identification of codable statements in transcripts.

STEP A: Preliminary selection of potential codable statements.

During this step, utterances in the corpus are highlighted to identify them as potential codable statements. At this stage the following general types of utterances are identified as PCSs:

- 1) Utterances that attempt to elicit information relevant to one (or more) of the content coding categories. PCSs of this type are referred to as ELICITATIONS (E).

2) Utterances that contain information relevant to one (or more) of the content categories. These utterances are termed CONTENT CATEGORY STATEMENTS (C).

3) Any series of utterances that constitutes the response to a C. These utterances are termed RESPONSE (R).

STEP B: Secondary selection of potential codable statements.

Utterances that are produced in response to an E are highlighted to identify them as PCSs. These utterances are termed RESPONSE TO ELICITATION (r).

STEP C: Preliminary assignment of PCS to content coding categories.

All PCSs identified as Cs will be assigned a code that identifies the content coding category or categories that are applicable to the PCS. Any single PCS may be assigned more than one content category code. The code(s) assigned during this step may be changed during a later step.

STEP D: Combining utterances Phase I: INCLUSION

All pairs of adjacent PCS in which both of the PCSs were identified as O (ostension), L (other use of label), or some combination of L and O, in STEP C will be examined to determine if the PCSs should be combined to form a single codable statement relevant to the content category INCLUSION. (NOTE: In STEP C, a single utterance may be parsed into smaller units that are identified as PCSs. Thus, pairs of adjacent PCSs identified as O or L in STEP C may be contained within a single utterance.)

STEP E: Combining utterances Phase II: FORM AND FUNCTION

All adjacent PCSs assigned a combination of FO (form) and F (function) in STEP C will be examined to determine which pairs of adjacent utterances should be considered as a unit that is a codable statement relevant to the content category FORM AND FUNCTION. (NOTE: In STEP C, a single utterance may be parsed into smaller units that are identified as PCSs. Thus, pairs of adjacent PCSs that were assigned some combination of FO and F in STEP C may be contained within a single utterance.)

STEP F: Assignment of statement numbers to codable statements

Upon completion of steps A-E, each codable statement identified (including the commentary on the nonverbal behavior were appropriate) should be assigned a number.

Detailed descriptions of the seven general steps in the process of identification of codable statements in transcripts.

NOTE: Any single utterance may be assigned more than one code (e.g., E, C, R, r) during this process.

STEP A: Preliminary selection of codable statements

There are three steps involved in the preliminary selection of codable statements. The steps are to be executed in a linear order (i.e., Step 1 followed by Step 2 followed by Step 3).

Step 1:

Go through the transcript and highlight every utterance that explicitly or implicitly attempts to elicit (is a request that the other person provide) information relevant to one or more of the content categories. Explicit elicitions take the form of a question (requesting that the other person provide some information or perform some activity) or an imperative utterance directing the other person to perform some action (see Example 1). Implicit attempts to elicit information generally occur in the form of a "fill in the blank" statement, or as an utterance that prompts the other person to provide some information without explicitly requesting such information (see Example 2). (The particular content category to which the information pertains is irrelevant in this step of the statement identification process.) For each utterance highlighted during this step, place an "E" in the margin to the left of the utterance.

General Information concerning the identification of elicitions:

- 1) Tag questions are not considered elicitions.
- 2) Every attempt to elicit information relevant to a content category should be identified as an E; this includes yes/no questions that may themselves be considered as codable statements relevant to the content categories (see descriptions of content categories above). Note, however, that yes/no elicitions are not identified as content category statements until STEP B-Step 2.
- 3) In the event that one person produces a request for information that contains an anaphoric pronouns and in the immediately following utterance the same person provides an object label that specifies the referent of the anaphoric pronoun, the two utterances are to be combined and the combination of the two utterances should be considered a single elicitation. To indicate that the two utterances are to be combined, a bracket connecting the two utterances should be placed in the margin to the left of the utterances.

Example:

- [M: Which one's the round one?
[The round locket.

The "locket" in the second utterance, specifies the referent of the anaphoric pronoun "one" used in the preceding utterance. The bracket connecting the two utterances indicates that they are to be considered together as a single elicitation.

- 4) Except in cases where a word (in whole or in part) is used as a prompt to elicit an imitation or production of the word (See Example 2b), prompts (e.g., huh?, hm?, Can you try?) are not considered to be elicitation.

Examples of elicitation:

- 1) a) What is this called? (requests OSTENSION)
b) What do we do with this? (requests FUNCTION)
c) Can you open this? (requests demonstration of a FUNCTION)
- 2) a) This is called a - (M pauses waiting for C to respond.)
(requests OSTENSION)
b) Kit- (M pauses for C to respond) (word is kitchen utensil)
(requests OTHER USE ORF LABEL)

Step 2:

Highlighted every utterance (with the exception of Es identified in Step A-Step 1) that contains information that can be classified in one or more of the content categories (described previously). Note that the commentary on the nonverbal aspects of the interaction must also be examined to identify those portions of the commentary that describe nonverbal behaviors that can be considered as codable statements relevant to a content category (most often this will occur as a nonverbal demonstration of some functional property of one of the objects, e.g., "M hooks one wrecker to the back of another" or "C opens/closes locket", "M pretends to scoop and then pour with ladle"). At this stage of the statement identification process, it does not matter which of the six content categories the information is relevant to, simply that the utterance contains information relevant to at least one of the content categories.

Place a C in the margin to the left of any utterance highlighted during this step.

Examples

- i) utterance: "This is a vehicle." (referent: car)
Classification: The entire utterance can be classified in the content category OSTENSION.
- ii) utterance: "This has a big round bowl on the bottom so that it can be used for scooping up soup." (referent: ladle)
classification: This utterance contains the information "has a big round bowl on the bottom" that can be classified in the FORM category, and the information "it can be used for scooping up soup" that can be classified in the FUNCTION category. (NOTE: This information would also be considered relevant to the FORM AND FUNCTION category, but in this initial step of the statement selection process, the actual assignment is irrelevant.)
- iii) utterance: "This is pretty jewelry." (referent: ring, necklace, bracelet) classification: FORM

- iv) utterance: "This is a special kind of truck called a wrecker."
(referent: wrecker) classification: This utterance contains the two deictic frames "This is a special kind of truck" and "[this is] called a wrecker". Each of these deictic frames can be classified as OSTENSION, and the entire utterance "This is a special kind of truck called a wrecker" which provides two labels at different hierarchical levels for the same referent can be classified in the INCLUSION category. (NOTE: Again, the assignment of the statement to OSTENSION or INCLUSION is irrelevant at this point.)

Step 3:

Highlight any utterance that is made in response to a C. (Again, the particular content category to which the information pertains is irrelevant at this point.) For any codable statement, the consecutive utterances (up to 5) produced by the other member of the dyad that intervene between the statement and the next utterance produced by the person who produced the statement in question AND that are on topic (contain information that is relevant to a content category) are considered to constitute the response. (NOTE: The first utterance following the C should be identified as part of the response if it contains some form of "yes" or "no" even if it does not contain any information that is relevant to a content category.)

NOTE: In counting utterances produced by person X to be identified as R, prompts by person X are excluded (prompts include the following kinds of expressions: "Huh?", "Hm?", "Can you try?"). However, a prompt by person Y (the person who produced the codable statement that is being responded to) is counted as an utterance by that person and terminates the response to the statement (see example g).

Examples of identification of consecutive utterances that constitute the response (where all utterances are on topic):

In the following examples, X indicates a single utterance produced by X (a subscript p is used to indicate that the utterance was a prompt); Y indicates a single utterance produced by Y. The utterance inside the brackets [] is the utterance that is identified as a codable statement. The underlined utterances are those utterances that constitute the response to the statement. Note that in the following examples, all X utterances are on topic.

- a) [Y] XXXXXXY

In this case, the five utterances produced by X intervening between the statement and Y's next utterance constitute the response.

- b) [Y] XXXXXXXXXXY

In this case, nine utterances by X intervene between the statement and Y's next utterance. However, five is the maximum number of utterances that can be identified as the response to a statement. Thus,

only the first five utterances produced by X are considered to be the response.

c) [Y] XXXYXXX

In this case there are three intervening utterances by X. Although X produces three additional utterances after Y's next utterance, only the three utterances by X that intervene between Y's statement and Y's next utterance are considered as the response to the statement.

d) [Y] Y

In this case, there are no utterances by X that intervene between the statement and Y's next utterance. This statement is considered to have no response.

e) [Y] XXX_pX_pXXX_pXY

In this case, although person X produces eight consecutive utterances that intervene between the statement and Y's next utterance, three of X's utterances are prompts (indicated by the subscript p). Excluding the prompts, X has five utterances that are identified as the response.

f) [Y] X_pXXX_pY

In this case, after the prompts are excluded, person X produces two utterances that intervene between the statement and person Y's next utterance; these two utterances are identified as the response to the statement.

g) [Y] XXX_pXY_pXXY

In this case, after the prompts by person X are excluded, person X appears to have five utterances that could be identified as the response; however, person Y produces a prompt that terminates the response after X's third utterances (excluding prompts by person X).

Examples of identification of consecutive utterances that constitute the response (where some utterances are not on topic):

In the following examples, X indicates a single on topic utterance produced by X (a subscript p is used to indicate that the utterance was a prompt); X with a subscript n (X_n) indicates a single utterance not on topic produced by X; Y indicates a single utterance produced by Y. The utterance inside the brackets [] is the utterance that is identified as a codable statement. The underlined utterances are those utterances that constitute the response to the statement. Note that the response to the statement terminates when a not on topic utterance is encountered.

a) [Y] ~~XXXXX~~ X_n X X Y

In this case, X produces four on topic utterances that constitute the response, X's fifth utterance is not on topic and therefore the response terminates with X's fourth utterance.

b) [Y] ~~X~~ X_n X X X X Y

In this case, X produces only one on topic utterance that is considered as the response to the statement.

c) [Y] X_n X X X Y

In this case, the first utterance that X produces following the statements is not on topic, as a result there are no utterances by X that are considered the response to the statement. (NOTE: In this case a "no response" will be coded for all codes relevant to the response to the statement.)

d) [Y] ~~XX~~ X_p X_p X X X_n Y

Note that in this case, X produces two consecutive on topic utterances that are identified as part of the response to the statement; they are followed by two prompts (that are not included in the count of utterances to be included in the response); X then produces two more on topic utterances that are part of the response, before a not on topic utterance is encountered that terminates the response to the statement.

In many cases, portions of the response may have been highlighted during a previous step as an utterance that is relevant to one or more of the content categories. In the event that an utterance identified as part of the response was highlighted in an earlier step, simply place an R in the margin to the left of that utterance.

NOTE: Those utterances that are identified R only (they are not identified as PCSs in any other step) are not considered codable statements and will only be used to code the "CONTENT OF THE RESPONSE TO THE STATEMENT", COL. 30).

In the following examples those utterances that are underlined were highlighted in step 1 or 2. An open bracket { is used to indicate those utterances that are identified as the response to the statement.

i) C: Truck. (referent: wrecker)
{ M: No.
{ I told you what that's called
(prompt) Do you remember?
{ What's that called?
(prompt) Can you tell Mommy?
C: Wrecker

- ii) M: That's a vehicle. (referent: car)
 - { C: No it's not Mom.
 - { It's a car.
 - M: It's a vehicle too.

STEP B: Secondary selection of potential codable statements in transcripts

During this stage of the process of identification of codable statements, all elicitations highlighted in STEP A (Step 1), the utterances that follow the elicitation, and the commentary on the nonverbal interaction relevant to the elicitation are examined to identify the response to elicitation (r).

General information concerning the identification of the response to an elicitation:

NOTE: One person can ask and answer his/her own elicitation.

- 1) In general, where the elicitation is followed by a pause allowing the other person an opportunity to respond, the first utterance produced by the other person (or the relevant nonverbal behavior) is considered to constitute the response to the elicitation. In cases where the first utterance contains information that is relevant (correct or incorrect, but not irrelevant) to the elicitation, subsequent consecutive utterances are examined to identify those utterances that should also be considered part of the response to the elicitation (see complete description under Step 1-Condition 2-Condition A, page X).
- 2) The commentary on the nonverbal aspects of the mother-child interaction should be examined to determine if there was a nonverbal response to the elicitation where such a response would be appropriate.

Examples:

- a) C: Open that one (referent: heart locket)
M opens the locket and hands it to C.

Although M does not say anything, she responds to C's request by performing the requested action.

- b) M: Which one is the biggest locket?
C points to the blue locket.
- c) C: What's this for Mommy? (as C touches the hook on wrecker)
M: It goes like this. (as M hooks the hook onto the front of another wrecker)

- 3) Where consecutive elicitations produced by the same person occur,
 - a) the second elicitation is not coded as a response to the first E, only as an E itself.

Example:

E M: What is that?
E What do we do with that?

- b) If both Es request the same information (relevant to the same content category), then the second E is not considered an E, it is considered a prompt only and is not considered a codable statement (the E placed next to it in Step A-Step 1 should be deleted).

Example:

E M: What is this?
E What do we call this?

- 4) Where an elicitation by one person is followed by an elicitation produced by the other person, the following guidelines should be used to determine if the second elicitation should be considered: 1) an elicitation, 2) a response to the first elicitation, or 3) both an elicitation and a response to the preceding elicitation:
- a) If the second elicitation requests the same information that was requested in the first elicitation, then the second elicitation should be considered as a response to the first elicitation and not as a separate elicitation. In this case, the E to the left of the second elicitation should be deleted. An r should be placed in the margin to the left of the second elicitation to indicate that it is to be considered as the response to the first elicitation.

Example:

E M: What's that?
E C: What is it, Mom?

In this case, the elicitation produced by the child is a request for the same information requested in the elicitation produced by M, thus, the child's elicitation is considered as a response to M's elicitation and not as a separate elicitation. The E in the margin to the left of C's utterance is deleted and an r is placed in the margin to the left of C's utterance

Example:

E M: What's that?
r E C: What is it, Mom?

- b) If the second elicitation is simply "What?" and it is not clear what information is being requested, the second elicitation should be considered as a response to the first elicitation and should not be considered as a separate elicitation. In this case, the E to the left of the second elicitation should be deleted and an r should be placed in the margin to the left of the second elicitation.

Examples:

1) E M: What do we do with this?
r E C: What?

2) E M: What's that called?
r E C: What?

- c) If the second elicitation requests information that is different from the information requested in the first elicitation, then the second elicitation should be considered the response to the first elicitation and also should be considered a separate elicitation. An r should be placed in the margin to the left of the second elicitation.

Example:

1) E M: What's that?
r E C: What does this do Mom?

M's elicitation requests OSTENSION, C's elicitation requests FUNCTION, so C's elicitation is considered as a separate elicitation as well as the response to M's elicitation.

- d) In the event that the second elicitation is considered as a separate elicitation, it automatically will be coded as an implicit "No response" (RESPONSE TO ELICITATION, COL. 6=2) as a response to the first elicitation. If an utterance is production by the other person after the second elicitation that is appropriate as a response to the first elicitation, that utterance should not be considered as a response to the first elicitation. It will always be considered the response to the second elicitation.

Example:

M: LII
C: What is that Mom?
M: Locket.

In this case, M attempts to elicit a nonreferential production of the label. C then attempts to elicit a referential production of the label. Since C is requesting information that is different from the information requested by M, C's utterance constitutes a separate elicitation as well as the response to M's elicitation (a response that is later coded as an implicit "No response" under RESPONSE TO ELICITATION, COL. 28.) In this case, M's statement "Locket." is a response to C's request, and should not be considered as a response to her own request even though it would be considered appropriate as a response to her request. The codes in the left margin should be as follows (the E and its accompanying response are connected with brackets):

Example:

[E M: LII -
[rE] C: What is that Mom?
r] M: Locket.

Steps in the process of secondary selection of potential codable statements in transcripts

Step 1:

For each elicitation identified in Step 1 of Part A, it is necessary to determine which one of the two following conditions applies to the statement and then to determine which of the relevant conditions under that heading also applies.

Condition 1

The attempt to elicit information was not followed by a pause to allow the other person an opportunity to respond to the elicitation.

In this case, determine which of the following conditions applies:

Condition A

The person who produced the elicitation responds appropriately (i.e., with information that addresses the content of the E) to the E in the utterance (s) immediately following the E.

Where condition A applies, place an r in the margin to the left of the response to elicitation.

Condition B

The person who produced the elicitation does not respond to the elicitation or produces an utterance that is irrelevant to the E (i.e., does not pertain to a content category, or is relevant to a content category other than that requested by the E).

Where condition B applies, place an NOR in the margin to the left of the E to indicate that the elicitation did not provide the other person an opportunity to respond to the request for information.

Condition 2

The elicitation is followed by a pause allowing the other person an opportunity to respond.

NOTE: In the following descriptions, "irrelevant" information is information that is relevant to a content coding category other than the category that pertains to the type of information requested in the elicitation or that is not relevant to any content category.

Condition A

The other responds with "What?".

Where Condition A applies, mark the "What?" with an r in the left margin.

Condition B

The other person responds to the elicitation with any utterance other than "What?".

The following process should be used to identify the utterances/nonverbal behavior to be considered the response to elicitation:

- 1) Place an r in the margin to the left of the first utterance (and/or nonverbal behavior following the elicitation) produced by the other person immediately following the elicitation; the first utterance is always considered as the response to the elicitation regardless of the content of the utterance.
- 2) If correct or incorrect (but not irrelevant) information is provided in the first utterance, examine the next consecutive utterance produced by the same person. If that utterance contains information relevant to the request, consider that utterance as part of the response to elicitation.

NOTE: Utterances such as "Um", "Uh", "Hm", "Ah", are not considered irrelevant when examining utterances identifying the response of the response to elicitation.

- 3) Repeat Step 2 until either a) a total of five consecutive utterances have been identified as the response to elicitation, or b) less than five consecutive utterances have been included but an utterance containing irrelevant information has been encountered (in this case the response to elicitation terminates with the utterance prior to the utterance that contains information that is irrelevant with respect to the elicitation).

NOTE: Utterances such as "Um", "Uh", "Hm", "Ah", are not considered irrelevant when examining utterances for the purpose of identifying the response to elicitation; these utterances are included in the count of utterances to be included as the response to elicitation.

NOTE: All utterances identified as r must be consecutive (i.e., no utterances by the other person may intervene between two utterances marked r).

Examples:

- a) E M: What does that do? (referent: ladle)
r C: We scoop stuff with this. (as C picks up ladle and pretends to scoop)

- r I can scoop soup with this.
This is shiny, Mom. (referent: ladle)

In this case, C's first utterance (and the relevant commentary on the nonverbal behavior) following the elicitation is automatically identified as the r. Since C's first utterance following the elicitation contains information that is relevant to the elicitation, the second utterance is examined. The second utterance is determined to contain relevant information and is identified as part of the response to the elicitation; as a result, C's third utterance is also examined. The third utterance contains form information rather than function information and therefore is considered irrelevant with response to the elicitation. thus the response to the elicitation terminates after the second utterance.

- b)E M: What's that called? (referent: locket)
r C: I like that Mom.
C: This is a necklace.

In this case, C's first utterance is identified as part of the r. The first utterance contains information that is irrelevant with respect to the elicitation, thus the response terminates after the first utterance even though C's next consecutive utterance contains information that is relevant to the elicitation.

- c)E M: What's that called? (referent: wrecker)
C: Um.
r A truck.
M: Yeah, a truck.

In this case, the first utterance "Um" is identified as part of the r and the next consecutive utterance is examined. The second utterance contains relevant information and is marked with an r. M produces the next utterance, terminating C's response to the elicitation.

Where Condition B applies, mark the relevant utterances with a lower case r in the left margin.

Condition C

The other person does not respond (or responds with "What?") AND the person who originally produced the elicitation provides the requested information in the utterance(s) following the pause that allowed the other person the opportunity to respond. (NOTE: All consecutive utterances, up to five, that are still in response to the elicitation should be considered as part of the response to elicitation.)

Where Condition C applies, mark the relevant utterance(s) with a lower case r in the left margin.

Condition D

Neither person responded to the elicitation. This occurs when the transcript indicates that the E was followed by a pause but that the other person did not respond (e.g., "M pauses but C does not respond") **AND** the net utterance is irrelevant (i.e., the person who produced the elicitation does not provide information in the utterance following the E that is relevant to the content of the E).

Where Condition D applies, place an NR in the margin to the left of the E to indicate that there was an explicit no response to the E.

STEP 2: Selection of codable statements from E-r pairs

All utterances identified as E that were responded to (i.e., not coded as NOR in Step B-Step 1), and the associated r, should be examined to determine whether a) the E should be considered a codable statement independent of the response, b) the E-r pair should be considered a PCS, or c) the E should not be considered a codable statement and should be used only to assign an elicited code to the r (see codes for COL. 2).

DECISION PROCESS: Decide which of the following applies to the E:

- a) If the E is not a yes/no question and the answer is appropriate to the question (i.e., the answer is relevant to the question) and the answer is not a form of "I don't know.",

then the E will not be coded and will be used only to assign an elicited code to the r (see COL. 2 codes).

- b) If the E is not a yes/no question and the answer is not appropriate or is a form of "I don't know.",

then the E is a codable statement. Place a C in the margin to identify the E as a codable statement. (In STEP C, assign a content category code based on the type of information requested in the E.)

- c) If the E is a yes/no question and is 1) answered appropriately, 2) there is "No response", or 3) the r is irrelevant to the E,

then the E is coded as a separate codable statement. Place a C in the margin to identify the E as a codable statement. (NOTE: When the E is relevant to the category OSTENSION, FORM, FUNCTION, or FORM AND FUNCTION, then the r is used to determine whether the statement is assigned a positive or negative description code.)

STEP C: Preliminary assignment of PCS to Content Categories

During this step, each utterance and/or commentary identified as relevant to one or more of the content coding categories in the preceding steps will be assigned a code for each of the content categories that applies to the utterance.

Content category codes assigned in this step will be subjected to further examination in subsequent steps before the final content category code assignment is made.

A letter symbol indicating the content category assignments(s) should be placed in the margin to the left of the PCS. The following abbreviations should be used:

O = Ostension

I = Inclusion

F= Function

FO = Form

FOF = Form and Function

L = Other use of label

It sometimes will be necessary to parse a single utterance into more than one potential codable statement. This occurs when information relevant to more than one content category is expressed within a single utterance or when multiple occurrences of information relevant to a single content category occur within a single utterance.

It is sometimes the case that a single utterance will appear to be relevant to one of the content categories and that it is also possible to parse the utterance into smaller units, each of which is relevant to one or more of the content categories. (NOTE: Each mention of a form or function attribute is considered a unit relevant to a content category. See examples of parsing form/function attributes below.)

When a single utterance contains smaller units relevant to more than one content category, each of the smaller units should be identified as a PCS and should be assigned to a single content category in the order specified PRECEDENCE HIERARCHY that follows. When more than one of the units is relevant to the same content category, each such unit will be considered a separate statement (see Example 1).

PRECEDENCE HIERARCHY

1) INCLUSION, FORM AND FUNCTION

2) INCLUSION, FORM, FUNCTION

3) OSTENSION

4) OTHER USE OF LABEL

Assignment to any one category takes precedence over all other categories lower in the hierarchy.

Note that INCUSION appears at the same level (1) as FORM AND FUNCTION and at the same level (2) with FORM, and FUNCTION. Statements containing INCLUSION information and FORM, FUNCTION, or FORM AND FUNCTION should be assigned all applicable content category codes. The FORM category and the FUNCTION category are at the same level, but the category FORM AND FUNCTION is superordinate to the categories FORM and FUNCTION. Where FORM information and FUNCTION information are present in the same utterance, or combination of adjacent utterances, and the two types of

information are specifically related in the utterance(s) as specified in the description of the FORM AND FUNCTION category, that utterance or combination of utterances would be assigned to the FORM AND FUNCTION category. All other utterances that contain both FORM and FUNCTION information should be parsed into a statement relevant to the FORM category and a statement relevant to the FUNCTION category.

When a single utterance is parsed into smaller units that are to be considered as separate codable statements, the relevant portions of the utterance should be surrounded with curved brackets to indicate that the utterance contains more than one codable statement. The content category codes assigned to the utterance also should be surrounded by brackets to indicate that the code is associated with only a portion of the utterance and not the entire utterance.

Examples

- 1) M: This is a car and a truck and a plane. (M touches each object as she labels it).

In this case, there are three occurrences of ostension within a single utterance. The utterance would be parsed into three separate statements as follows:

{This is a car} {and [this is] a truck} {and [this is] a plane.}

Each of the above statements (a statement is contained within curved brackets { }) would be assigned to the category OSTENSION.

- 2) C: This is a car and a vehicle. (referent: car)

This utterance contains two OSTENSION statements, "this is a car" and "and [this is] a vehicle". Should this utterance be parsed into two OSTENSION statements? No. The PRECEDENCE HIERARCHY specifies that assignment of statements to the INCLUSION category takes precedence over assignment to all other content categories. Therefore, the above utterance remains intact and is considered a codable statement that is relevant to the content category INSLUSION.

- 3) M: This ladle has a big round part at the bottom so that we can scoop up things with it.

In this case there are three pieces of information in the utterance, each of which appears to be relevant to a different content category: 1) this is a ladle (OSTENSION), 2) [it] has a big round part at the bottom (FORM), 3) we can scoop things up with it (FUNCTION). The decision process for the parsing/assignment of this statement is as follows:

- a) Both FORM and FUNCTION take precedence over OSTENSION.
- b) Assign to FORM, FUNCTION or FORM AND FUNCTION? In this case, the FORM attribute (big round part at the bottom) and the FUNCTION attribute (we can scoop things up with it) are specifically related by the phrase "so that" which specifies that the FORM attribute mentioned

affords the FUNCTION mentioned, as such the precedence hierarchy specifies that the statement should be assigned to the FORM AND FUNCTION category. The statement is not parsed into smaller units; the entire statement intact is assigned to the FORM AND FUNCTION category.

Example of parsing form/function attribute statements

M: We use this to make food and eat food.

This utterance is parsed into two statements each containing one of the function attributes are mentioned in this utterance; {"we use this to make food"} and {"[we use this to] eat food."}

Example of content category assignment for statements containing INCLUSION and FORM or FUNCTION Information

M: This truck that picks up broken cars and takes them away is called a wrecker.

This utterance contains the INCLUSION information "This truck is called a wrecker."; this portion of the utterance should be assigned a content category code of I (INCLUSION). However, this statement also contains the FUNCTION information "picks up cars"; this portion of the utterance should be assigned a content category code F. (FUNCTION)

STEP D: Combining utterances phase I: INCLUSION

For every two or more adjacent PCSs that were all marked O (for Ostension), L (for Other Use of Label), or some combination of O and L, in Step C, examine the PCSs to determine if a combination of the PCSs constitutes a membership statement relevant to the content category inclusion.

Inclusion statements are statements that provide labels at two different hierarchical levels for a single object or a group of objects. There are two types of inclusion statements: explicit inclusion statements and membership statements. Explicit inclusion statements specify the hierarchical relationship between members of the categories denoted by the labels and are of the general form "An X is a Y" (e.g., A car is a vehicle). Membership statements are a type of inclusion statement that provide implicit information pertaining to the hierarchical relationship between the members. Membership statements consist of a single utterance or two or more consecutive utterances that provide labels at two different hierarchical levels for the same referent(s). These statements can take the following general forms:

- a) This is an X. It's a Y.
- b) It's an X and a Y.

NOTE: More than one X label can precede the Y label, provided that the Y label can be applied to each of the referents of each of the X labels (e.g., This is a car, a truck, and a plane. They're all called vehicles.).

(NOTE: Negative ostensions, or use of a label, at two different hierarchical levels are not considered to constitute a membership statement. e.g., "That's not a car and not a vehicle.", referent: ladle)

Note that, by definition, membership statements consist of the provision of two labels for a single referent (or group of referents). Thus, the individual statements would be assigned to the category OSTENSION or OTHER USE OF LABEL, while the combination of utterances considered as a unit would be assigned to the category INCLUSION. When a combination of two or more adjacent O, L or O and L statements constitute a membership statement, the assignment of the combination of the utterances to the INCLUSION category takes precedence over assignment of the individual utterances to the category OSTENSION or OTHER USE OF LABEL. (NOTE: The adjacent utterances can be produced by two different people as in Example 2 below.)

For any combination of adjacent utterances that qualifies as a membership statement, 1) join the utterances with a bracket in the left margin to indicate that the combination of utterances is to be considered a single codable statement, 2) delete the O (for OSTENSION) or L (for OTHER USE OF LABEL) next to each of the statements, 3) place an I (for INCLUSION) in the margin to the left of the bracket.

Examples

- 1) [O M: This is a car and a truck and a plane.
 I [
 [O They're all called vehicles.

These utterances considered together are relevant to the content category inclusion.

- 2) [O C: This is a car. (referent: car)
 I [
 [O M: It's also called a vehicle.

In this case, M and C's statements, when considered as a unit, are applicable to the content category INCLUSION: Membership Statement (COL. 15 = 2 and COL. 16 = 2).

NOTE: C's statement and M's statement each considered separately would be relevant to the category "OSTENSION"; however, the PRECEDENCE RULES for assignment of statements to content categories state that INCLUSION takes precedence over OSTENSION.

- 3) [O C: This is a necklace. (referent: necklace)
 I [M: What is the other word you're learning?
 [L C: Jewelry.

Step E: Combining utterances phase II: FORM AND FUNCTION

For any pair of adjacent PCSs where one PCS was assigned an F (FUNCTION) in Step C and the other PCS was assigned an FO (FORM) in Step C, examine the pair of PCSs to determine if the PCSs should be combined to form a single statement relevant to the content category FORM AND FUNCTION.

FORM AND FUNCTION statements are statements containing information about one or more form attributes and the function attribute that pertains AND specifically relating the two types of information in the statement.

Example of adjacent PCSs that should be combined to form a single PCS relevant to the FORM AND FUNCTION category:

After Step C:

{FO}, {F}	{The ladle has a big rounded bowl }	{So that you can scoop
FOF	things and pour them out.}	

Decision process in this step:

In this statement the form information "has a big rounded bowl" is specifically related to the function information "you can scoop things and pour them out" by the phrase "so that". The brackets and the FO, F codes should be deleted and the entire utterance should be identified as relevant to the category FORM AND FUNCTION by placing FOF in the left margin as indicated below.

After this step:

FOF	{The ladle has a big rounded bowl so that you can scoop things and pour them out}
-----	---

Example of adjacent PCSs that should not be combined to form a single statement relevant to FORM AND FUNCTION

FO	The ladle has a big rounded bowl.
F	And I use it to scoop things and pour them out.

In this case the form information is not related to the function information although both types of information are present in the adjacent utterances. Thus the adjacent PCSs should not be assigned a FORM AND FUNCTION code.

NOTE: The utterances contained in any combination of utterances that could be assigned to the FORM AND FUNCTION category could also, as individual utterances, be assigned to the FORM and FUNCTION categories. However, the assignment of a combination of utterances to the FORM AND FUNCTION category will take precedence over the assignment of the individual utterances to the FORM and FUNCTION categories.

STEP F: Assignment of statement numbers to codable statements

Upon completion of STEPS A-E, each codable statement should be assigned a statement number. Simply begin with the first codable statement in the corpus and proceed through the transcript assigning the statements numbers in numerical order from 1 to the total number of codable statements in the transcript (NOTE: Portions of the commentary that were identified as codable statements should also be numbered.) The number will be used only to identify the statement during the assignment of the column.

III. DESCRIPTIONS OF COLUMN CODES

NOTE: In the examples that are provided in the following sections an asterisk is used to indicate the statement to which the code pertains.

COL. 1: Person(s) who produced the utterance

This code enables us to distinguish those statements that were produced by a single member of the dyad and those that were produced by both members jointly.

CODES:

- 1 = M only
- 2 = C only
- 3 = Joint, M first then C
- 4 = Joint, C first then M

DESCRIPTIONS OF TERMS:

JOINT codes are assigned to codable statements that were produced by both members jointly. Joint productions can occur in one of two ways:

- 1) Each member of the dyad produces a codable statement and the statements are combined in Step D (INCLUSION) or Step E (FORM AND FUNCTION) to produce a single codable statement.

or

- 2) One member of the dyad produces adjacent statements that are combined in Step D (INCLUSION) or Step E (FORM AND FUNCTION) to produce a single codable statement AND at least one of the adjacent statements was imitated. (NOTE: Imitations are statements in which one person repeats all or a part of an utterance produced by the other person in reference to the same object during the preceding three utterances produced by either or both people. For a further description of "imitation" see description of COL. 2: Spontaneous/Elicited/Imitated.) (See example 4 below)

or

- 3) The statement being coded is an E-r pair.

Examples:

- 1) *M: That's a wrecker. (referent: wrecker)
C: Yeah

CODE = 1 (M only)

C's statement is a response to M's statement.

- 2) * C: That's a house. (referent: aframe)
M: That's right.

CODE = 2 (C only)

M's statement in this case is a response to C's statement.

- 3) [M: That's vehicle. (referent: car)
* [C: It's a car too.

CODE = 3 (JOINT, M first then C)

- 4) C: That's got a hook. (referent: wrecker)
* M: It's got a hook so that it can pick up and pull broken cars to be fixed.

CODE = 4 (JOINT, C first then M)

In this case C's utterance is a single statement relevant to the category FORM. M's statement is comprised of a FORM statement "It's got a hook" and two FUNCTION statements "it can pick up [broken cars]" and "and pull broken cars to be fixed" and the form information is related to the function information by the phrase "so that", resulting in a statement relevant to the category FORM AND FUNCTION. The portion of M's statement that is relevant to FORM is an imitation of C's preceding utterance. Thus, M's statement is assigned a JOINT code.

COL. 2: Spontaneous/Elicited/Imitated

CODES:

- 1 = Spontaneous Nonimitation
- 2 = Elicited Nonimitation
- 3 = Spontaneous Imitation
- 4 = Elicited imitation
- 5 = Spontaneous Imitation + Spontaneous Nonimitation
- 6 = Elicited Imitation + Spontaneous Nonimitation
- 7 = Elicited Nonimitation + Spontaneous Nonimitation
- 8 = Spontaneous Imitation + Elicited Nonimitation

DECISION PROCESS TO ASSIGN CODE

Step 1: Decide whether the statement is an imitation or a nonimitation, or a combination of imitation and nonimitation.

Imitations are statements in which one person repeats all or a part of an utterance produced by the other person in reference to the same object during the preceding three utterances produced by either or both people.

NOTE THE FOLLOWING EXCEPTIONS TO THE PRECEDING RULE:

- 1) All productions in a series of repetitions of the same utterance by the person who originally produced the utterance in question are considered to be nonimitations even though the subsequent productions are a repetition of an

utterance produced by the other person within the preceding three utterances. For example, consider the following series of utterances:

M: Locket.
C: Locket.
M: Locket.
C: Locket.
M: Locket.

M is the first person to produce the word "loket". C then imitates "loket" in the next consecutive utterance. M then produces "loket" again; this production is not considered an imitation of C's production of the word "loket" since M originally produced the word that C imitated.

2) An imitation of a label will be coded as a nonimitation, provided that the statement containing the imitation is relevant to a content category other than that relevant to the statement containing the imitated label. Consider the following series of utterances:

C: A car, Mom.
M: Yeah, you're right.
* The car takes you places.

In this case, the statement contains a repetition of label "car; however, C's use of label is relevant to the category OSTENSION, while M's use of the label is relevant to the category FUNCTION.

Nonimitations are statement which are not imitations.

Imitation + Nonimitations are statements that are comprised of both an imitation and a nonimitation.

Step 2: Decide if the statement is elicited or spontaneous.

Elicited statements are those that are in response to an elicitation (a request for information) typically in the form of a question (e.g., "What's that?", "What does this do?").

Spontaneous statements are those that are not elicited.

Step 3: Use the decisions of steps 1 and 2 to select the COL. 2 code based on the descriptions of the CODES below.

NOTE: The choice of elicited or spontaneous is relevant only to the imitated portion of the statement when assigning a code of "5" or "6".

DESCRIPTION OF CODES

1) Spontaneous Nonimitations are utterances which are not elicited and are not imitated.

Examples:

- a) * M: This is a place for animals to live. (referent: barn)
- b) * C: I wear this on my finger. (referent: ring)

- 2) Elicited Nonimitations are utterances that are in response to an elicitation (a request for information) even if the utterances are not appropriate as a response to the elicitation.

Examples:

- a) M: What's that? (referent: ladle)
 - * C: Spoon.
- b) M: Where do we use this? (referent: bowl)
 - * C: In the kitchen.

- 3) Spontaneous Imitations are imitations that are not elicited.

Example:

- M: This is a kind of truck that pulls broken cars. (referent: wrecker)
- * C: Pulls broken cars.

- 4) Elicited Imitations are imitations that are in response to a request to imitate a phrase. Note: Productions of a label, or a part of a label in response to a prompt with part of the word (e.g., LLL for "ladle") are considered elicited imitations.

Examples:

- a) M: Can you say jewelry?
 - * C: Jewelry.
- b) M: Say habitat.
 - * C: Habatat (sic).

- 5) Spontaneous Imitation + Spontaneous Nonimitation

Those statements produced by one person that are relevant to either INCLUSION or FORM AND FUNCTION that are comprised of an imitation of all or part of the other person's production plus additional information that is not imitated.

Example:

- C: Truck. (referent: wrecker)
- * M: Yes, that's a truck called a wrecker.

M's statement is comprised of two OSTENSIVE utterances "that's a truck" and "[that's] called a wrecker" that were combined in STEP D to result in a single codable statement relevant to the category INCLUSION. Since the

"truck" portion of the statement is an imitation of the label contained in C's statement and "called a wrecker" is a nonimitation, M's statement is assigned a code of "5" (Spontaneous Imitation + Nonimitation). NOTE: The choice of elicited or spontaneous is relevant only to the imitated portion of the statement when assigning a code of "5" or "6".

6) Elicited Imitation + Spontaneous Nonimitation

Those statements relevant to either INCLUSION or FORM AND FUNCTION that are comprised of an elicited imitation plus a spontaneous nonimitation.

Example:

- M: Can you say "a locket"? (referent: none)
* C: A locket and a necklace too.

C's statement is comprised of two statements relevant to the category OTHER USE OF LABEL ("A locket" and "a necklace too") that were combined in STEP D to form a single codable statement relevant to the category INCLUSION. The "locket" portion of C's statement is an elicited imitation and the "and a necklace too" is a spontaneous nonimitation, thus the statement is assigned a code of "6" (Elicited Imitation + Spontaneous Nonimitation).

6) Elicited Nonimitation + Spontaneous Nonimitation

Those statements relevant to either INCLUSION or FORM AND FUNCTION that are comprised of an elicited nonimitation plus a spontaneous nonimitation.

Example:

- C: What is that (referent: ladle)
* M: A spoon and it's a ladle too.

M's statement is comprised of two statements relevant to the category OSTENSION ("A spoon" and "it's a ladle too") that were combined in STEP D to form a single codable statement relevant to the category INCLUSION. The "spoon" portion of M's statement is an elicited nonimitation and the "it's a ladle too" is a spontaneous nonimitation, thus the statement is assigned a code of "7" (Elicited Nonimitation + Spontaneous Nonimitation).

8) Spontaneous Imitation + Elicited Nonimitation

Those statements that are comprised of as spontaneous imitation plus an elicited nonimitation.

Example:

- M: What do we do with this ladle? (referent: ladle)
* C: Ladle for soup.

In this case the child's statement is a single codable statement relevant to the content category FUNCTION. The "ladle" contained in C's statement is a spontaneous imitation of the label in M's elicitation, the "for soup" is an elicited nonimitation.

COL. 3: Person eliciting information

For statements that are elicited (COL. 2 = 1, 3, or 5), this code indicates which member of the dyad produced the request for information. It is important to note that the statement may be produced and elicited by the same person; this will occur when one person attempts to elicit information, pauses to allow the other person an opportunity to respond, the other person does not respond, and the person who originally requested the information provides the information requested (see Example 2 below).

CODES:

0 = statement not elicited (COL. 2 = 1, 3 or 5)

1 = elicited by M

2 = elicited by C

Examples:

- 1) a) M: What's that? (referent: car)
C: Car.

CODE = 1

- b) C: Does this open Mom? (referent: locket)
M: Yes, I think it does.

CODE = 2

- 2) M: What's this called? (referent: ladle)
M pauses, but C does not respond
M: It's a ladle.

CODE = 1

COLS. 4-5: Form of elicitation

For elicited statements (COL. 2 = 4 or 6), this code describes the form of the request for information.

CODES:

00 = not applicable, statement is not elicited (COL. 2 = 1, 3 or 5)

01 = Question (Yes/NO), using "kind of" construction

02 = Question (not Yes/No), using "kind of" construction

03 = Question (Yes/NO), other than "kind of" construction

04 = Question (not Yes/No), other than "kind of" construction

05 = Statement, using "kind of" construction

- 06 = Statement, other than "kind of" construction
- 07 = Fill in the blank, using "kind of" construction
- 08 = Fill in the blank, other than "kind of" construction
- 09 = Imperative, using "kind of" construction
- 10 = Imperative, other than "kind of" construction
- 11 = Repetition, using "kind of" construction
- 12 = Repetition, using other than "kind of" construction

Definitions of terms used in COLS. 4-5:

Question: utterance is interrogative

Two kinds of questions will be coded:

- 1) Yes/No questions: Questions for which a simple yes or no is the only response that is required.
- 2) Not Yes/No questions: questions which request more than a simple yes/or no response.

NOTE: Yes/No questions must have both the form and the pragmatics of a yes/No question. That is, the question must actually request a yes/no response as opposed to another types of information. Questions that have the form, but not the pragmatics of a Yes/No question, are considered as Not Yes/No questions. (See Section D: General Information for examples.)

Statement: utterance is declarative.

Fill in the blank: Statement in which one person provides partial information relevant to one of the content categories and a pause serves as a cue that the person wishes the other member of the dyad to provide additional information to complete the thought.

Repetition: An imperative statement or a statement followed by a pause, indicating that the person wishes for the other member of the dyad to repeat (imitate) the content of the statement.

Examples:

- 1) Say jewelry.
- 2) Habitat?
(M pauses, but C does not respond)

Kind of construction: any statement containing the phrase "kind of" where it is used to mean "a particular type of" as opposed to the colloquial usage meaning "something similar to" as in the expression "kind of like".

Imperative: an imperative statement is used to request that the other person perform some action on or with one or more of the objects (e.g., "Open this" in reference to the locket). NOTE: Imperatives requesting that the other person imitate a word or phrase are coded as REPETITION, not as IMPERATIVE.

Examples of elicitations with COL. 5 codes:

- 1) Do we use this kind of spoon for soup? (referent: ladle)
CODE = 01
- 2) What do we use this kind of spoon for? (referent: ladle)
CODE = 02
- 3) Does this truck pull broken cars? (referent: wrecker)
CODE = 3
- 4) Where do we use these? (referent: pan, bowl, spoon)
CODE = 04
- 5) This kind of truck is for picking up broken cars. (referent: wrecker)
CODE = 5
- 6) We use these things to make food. (referent: pan, bowl, spoon)
CODE = 6
- 7) This is a special kind of necklace called a LO- (M pauses for C to respond)
(referent: locket)
CODE = 7
- 8) This is a la- (M pauses for C to respond) (referent: ladle)
CODE = 8
- 9) Show me what we do with this kind of spoon. (referent: ladle)
CODE = 9
- 10) Open this. (referent: locket)
CODE = 10
- 11) Say "this kind of necklace is a locket". (referent: locket)
CODE = 11
- 12) Say 'kitchen utensil'. (referent: none)
CODE = 12

COL. 6 Response to Elicitation

These codes are used in conjunction with the "ELICITED" codes in COL. 2 to describe the response to the elicitation. In the description of the codes below, Person 1 refers to the person who produced the elicitation (the statement that was an attempt to elicit information in response). Person 2 refers to the person of whom Person 1 was attempting to elicit the information. This column describes Person 2's response to the request for information.

COLUMN 6 CODES:

- 0 = Not applicable (statement not elicited)
- 1 = Explicit No Response

- 2 = Implicit No Response
- 3 = Don't Know
- 4 = Response Irrelevant, relevant to a Coding Category
- 5 = Response Irrelevant, not relevant to a Coding Category
- 6 = Correct Response
- 7 = Attempt at Correct Response
- 8 = Incorrect Response
- 9 = Response Unintelligible

Terms used in COL 6

Not Applicable

Statement is not elicited.

No Response

An explicit NO RESPONSE occurs when the person who produced the E paused, allowing the other person an opportunity to respond, and there was no response by the other person. An explicit NO RESPONSE will be noted in the transcript as "X pauses, but Y does not respond".

Examples:

- 1) M: What is that? (referent: wrecker)
M pauses, but C does not respond.

Implicit No Response

An implicit NO RESPONSE is coded when one of the following occurs:

- 1) Person 2 responds to the E with "What?".

Example:

M: What do we do with this?
C: What, Mom?

- 2) Person 2 responds with an elicitation that requests the same information that was requested in the original elicitation.

Example:

M: What is that called?
C: What's that, Mom?

Don't Know

Person 2 responds with some form of "I don't know."

Correct Response

Person 2 provides information that is correct as a response to Person 1's request. Person 2's response can be either verbal (see Example 1 below) or nonverbal (see Example 2 below). Where the elicitation is a request for an imitation or a production of the concept label, attempts at producing the entire label that result in incorrect but identifiable pronunciations of the word are considered correct responses (see Example 3 below). In addition, any word that can be correctly applied to the referent, regardless of the level of the label, is considered a correct response (this includes idiosyncratic labels when it is clear that both M and C agree that this idiosyncratic term substitutes for the label in question) (see Examples 4 and 5 below).

Example 1:

- a) M: What is that? (M is pointing to necklace)
C: Necklace.
- b) M: What does Mommy do with this? (referent: saucepan)
C: Make soup.
- c) M: What did Mommy say these things were called?
C: A car and a truck and a plane.

Example 2:

- a) C: Open this, Mom. (as C holds locket out to M)
M: M opens locket.
- b) M: Where is the aframe?
C touches one aframe.
- c) M: What do we do with this? (referent: ladle)
C pretends to scoop and then pour with the ladle.

Example 3:

- a) M: What did Mommy tell you that these things are called?
(referents: ring, bracelet, and necklace)
C: Jew-le-ry. (=jewelry)
- b) M: Can you say the word?
C: Kitchen sil. (=utensil)
- c) M: What's another name for the car? (referent: car)
C: Veekickle. (=vehicle).

Example 4:

- a) M: What is this? (referent: ladle)
C: Spoon.

- b) M: What is this? (referent: wrecker)
C: Truck
- c) M: What are all these things called? (referents: car, truck, plane)
C: Car, truck and a plane.

Example 5:

- M: What's this? (referent: necklace)
- C: Boolah-boolah.
- M: Right. That's a necklace, but we call it a boolah-boolah, huh?

Attempt at Correct Response

Person 2 provides only part of the information requested by Person 1 and the information that Person 2 provides is correct. This will occur most often when Person 2 produces part of a word in response to a request to imitate or produce the word. Note that this category does not include incorrect pronunciations (many 2-3 year old children cannot correctly pronounce words such as jewelry or kitchen utensil).

Examples:

- 1) M: Can you say the word? (the word is kitchen utensil)
C: Kitchen.
- 2) M: Can you say that word? (the word is kitchen utensil)
C: 'tensil. (=utensil)
- 3) M: What did Mommy say the new word was? (the word is locket)
C: LII-
- 4) M: What is this called? (referent: locket)
C: Lock-
- 5) M: What's this? (referent: house, label is habitat)
C: Hab.

Incorrect Response

Person 2 provides information that is incorrect as a response to the request (note that "incorrect" does not include information that is irrelevant as a response (i.e., does not pertain to the same content category as the type of information that is requested in the elicitation). As above, the response can be verbal or nonverbal in nature (see Examples 1 and 2 respectively).

Example 1:

- M: What is this? (referent: bowl)
- C: A hat.

Example 2:

a) M: Can you show me Mommy's ring?
C points to necklace around M's neck.

b) C: Can you open this Mom? (referent: locket)
M takes locket from C and puts it around her own neck.

In this case, the E requests a demonstration of a specific function (namely the opening of the locket). The response provides a demonstration of a function (namely that one wears a locket around the neck) and is therefore relevant to the same content category as that requested in the elicitation. However, the function demonstrated in the response is not the function requested. Thus, the response is incorrect as a response to the elicitation.

Response Irrelevant. Relevant to a Content Category

This code is assigned to those responses that contain information that is irrelevant with respect to the elicitation (i.e., information that is relevant to a content category other than that relevant to the type of information requested in the elicitation) and that is relevant to a content category.

Examples:

M: What's that called? (referent: ladle)
C: We use that to scoop soup.

In this case, the elicitation requests an OSTENSION, and the response does not contain an OSTENSIVE UTTERANCE, but does contain information that is relevant to the category FUNCTION.

Response Irrelevant. Not relevant to a content category

This code is assigned to those responses that are not relevant to the content category that pertains to the information requested in the elicitation, nor is the information relevant to any of the other content categories.

Example:

M: What is that called?
C: I like that Mom.

Response Unintelligible

This code will be assigned to any utterance identified as r that contains only a "V" (the transcription notation for an unintelligible production).

Example:

M: Can you tell Mommy what that is?
C: V.

COL. 7: Type of statement: E, R, r, C, E-r pair

CODES:

- 1 = E
- 2 = r
- 3 = E-r pair
- 4 = C
- 5 = R

DESCRIPTION OF TERMS:

E: The statement was identified as an E during Step A-Step 1 and it is not a part of an E-r pair identified as a statement relevant to the content category INCLUSION (Step D) or FORM AND FUNCTION (Step E).

r: The statement was identified as an r during Step B, and is not part of an E-r pair identified as relevant to the category INCLUSION (Step D) or FORM AND FUNCTION (Step E).

E-r pair: The statement is either 1) comprised of a combination of adjacent utterances relevant to the category INCLUSION or FORM AND FUNCTION, and the relevant utterances were identified as E and r (in Steps A-Step 1 and Step B respectively), or 2) a YES/NO question that was responded to appropriately.

R: There is an R in the margin to the left of the utterance.

C: There is a C in the margin to the left of the statement and none of the preceding codes appears in the margin as well.

COL. 8: Form of Statement

CODES:

- 1 = "Kind of" construction
- 2 = Definition
- 3 = Different/same construction
- 4 = Justification (this is called X because it has Y property)
- 5 = Canonical ostension (this is an X)
- 6 = Canonical inclusion (an X is a Y)
- 7 = Other (none of the above)

DESCRIPTIONS OF TERMS:

- 1) "Kind of" construction: the statements contain the phrase "kind of" where it is used to mean "a particular type of" as opposed to the colloquial usage meaning "something similar to" as in the expression "kind of like".

Examples:

- a) Cars and trucks are two kinds of vehicles.

b) A locket is a special kind of necklace.

c) Show me the kind of kitchen utensil that we use for cooking soup.

- 2) Definitions: statements that specify one or more properties relevant to the concept in an attempt to "define" a concept term (note: the mentioned property must be typical of the concept in question and should be a property that would be provided in a typical definition of the concept label). Definitions are of the general forms "An X is a Y" or "A Y is called an X" where X is the concept label and Y is a phrase containing the "defining" property. (Statement that provide a definition of the general form "Called X because it has Y property" are coded as JUSTIFICATIONS, see description below).

Examples:

a) Habitats are places where people or animals live.

b) Things that we use in the kitchen to make food are called kitchen utensils.

c) Locket is necklaces that open so that we can put something inside.

d) A-frames are houses that are shaped like an A.

- 3) Different/same constructions: statements specifying that a group of objects are different but that they can all be called by the same name (label).

Examples:

a) These things are all different but they're all called kitchen utensils.

b) These all look different but they're all ladles.

- 4) Justifications: statements that specify that an object (or group of objects) is referred to by a particular label because it possesses a particular property. Justifications are of the general form "Called X because it has Y property" where X is the concept label and Y is a property of members of that concept.

Examples:

a) A house is a habitat because people live there.

b) This is a ladle because it is bent at the bottom.

c) This is a locket because we can open it.

- 5) Canonical ostensions: statement relevant to the content category ostension that are of the general form "This is [called] an X," "it is X" or "an X."

Examples:

a) This is a locket.

b) These are kitchen utensils.

c) These things are all called vehicles.

6) Canonical Inclusion. An X is a Y.

7) Other: all statements that do not fall into one of the above categories.

COL. 9: Level of label used in statement

Code the level of the label used, if any.

NOTE: When COL. 15 = 2 (INCLUSION), Col. 9 is used to code the level of the X (lower level) label.

CODES:

- 0 = subsubordinate
- 1 = subordinate
- 2 = basic
- 3 = intermediate
- 4 = superordinate
- 5 = no label
- 6 = not possible to identify level of label (i.e., part or property is used as a label)
- 7 = made up label
- 8 = part of word
- 9 = supersuperordinate

COL. 10: Presence of referent

Code the presence or absence of referent(s) for the statement.

CODES:

- 0 = no (no referent)
- 1 = yes (referent present)

COL. 11: Label in statement:

Assign a code to identify which of the following describes the label that is contained in the statement:

CODES:

- 0 = not applicable, no label in statement
- 1 = label is target word
- 2 = label is not the target, but is superordinate or subordinate to it
- 3 = label is novel (invented) or idiosyncratic
- 4 = a part or property of the object (typical of the target concept) is used as a label
- 5 = two + labels, 1 target, 1 superordinate or subordinate to target
- 6 = label not target and not superordinate or subordinate to target
- 7 = partial production of target label
- 8 = part or property (not typical of target concept) used as label

COLS. 12-14: Distance from statement to the nearest referential use of a label:

These two columns provide a measure of the distance from the present statement to the nearest referential use of the label being taught, or to the target label that is the referent of an anaphoric pronoun contained in the statement.

COL. 12: Distance 1:

Indicates the relationship between the nearest referential use of the target label and the utterance being coded.

CODES:

- 0 = label in statement
- 1 = label before
- 2 = label after
- 3 = statement contains anaphoric reference to the target label
- 4 = no label (label never used)
- 5 = label is in elicitation

COL. 13-14: Distance 2:

NOTE: Only "one" is considered an anaphoric pronoun.

Indicates the number of utterances that intervene between the present statement and the nearest utterance by either member of the dyad containing a referential use of the label. Utterances made by both M and C that intervene between the two uses of the label are included in the count of intervening utterances. (NOTE: When COL. 12 = 3 (statement contains anaphoric reference to a label), COLS. 13-14 are used to indicate the number of utterances prior to the statement that intervene between the anaphoric reference and the label; in this case, the label need not be referential.)

CODES:

Number of utterances up to 8

9 = more than 8 utterances intervene

0 = not applicable (use when COL. 12 = 0 or 4 or 5)

COL. 15: CONTENT CATEGORY CODES

CODES:

- 1 = Ostension
- 2 = Inclusion
- 3 = Function
- 4 = Form
- 5 = Form and Function
- 6 = Other use of label

CONTENT CATEGORY DESCRIPTION CODES

COLUMNS 16-27 codes will vary depending on the content category code assigned in COL. 15, as described under the Content Category headings below:

OSTENSION

COL. 16: Single/Group

Indicates whether the referent of the ostensive label is a single object or a group of objects.

CODES:

- 1 = single object
e.g., This is a ladle. (referent: one ladle)
- 2 = group of objects
e.g., These are all ladles. (referent: three ladles).

COL. 17: POSITIVE/NEGATIVE OSTENSION

This code indicates whether the ostension was positive (e.g., That's an X) or negative (e.g., That's not an X).

CODES:

- 1 = positive
- 2 = negative

COLS. 18-27 are BLANK

INCLUSION

COL. 16: Type of Inclusion Statement

Indicates the type of inclusion statement.

1 = EXPLICIT INCLUSION

Statements of the general form "An X is a Y." (e.g., "A car is a vehicle." or "Cars are vehicles.").

2 = MEMBERSHIP

Statements that provide implicit information pertaining to the hierarchical relationship between the members. Membership statements consist of a single utterance or two consecutive utterances that provide ostension at two different hierarchical levels. These statement can take the following general forms:

- a) This is an X. It's a Y.
- b) It's an X and a Y.

NOTE: X applies to all X labels that occur before Y. (e.g., This is a car, a truck, and a plane. They're all called vehicles.)

3 = JOINT MEMBERSHIP

In consecutive statements, each member of the dyad provides a label for the object; each label is a different hierarchical level.

Example:

C: That's a car.

M: It's also a vehicle.

NOTE: A "joint inclusion" code is assigned to statements identified as inclusion when one or both of the labels contained in the membership statement is provided in response to an elicitation.

Example:

M: What is that?

C: Necklace.

M: What else do we call it?

C: Jewelry.

COL. 17: Number of X labels preceding or following Y

The code is assigned based on the number of X (lower level) labels that precede or follow the Y (higher level) label.

CODES:

Number of labels up to 8

9 = more than 8 labels

Example:

M: Car. Truck. Plane. Vehicle.

COL. 16 = 3

COL. 18: Referent of X (lower level) label

CODES:

1 = single referent, single label

e.g., This is a car. It's also a vehicle (referent: is a car)

2 = multiple referents, single label

e.g., These are a special kind of spoon called ladles. (M is indicating all three ladles)

3 = multiple referents, each with a unique label (A.B.C.Y)

e.g., This is a car. This is a truck. This is a plane. They're all vehicles.

- 4 = multiple referents all with the same label (A.A.A.Y)
e.g., This is a ladle, and this is a ladle, and this is a ladle (as M indicates each of the three ladles one at a time). They're special kinds of spoons.

COL. 19: Level of Y (higher level) Label

CODES:

- 0 = subsubordinate
- 1 = subordinate
- 2 = basic
- 3 = intermediate
- 4 = superordinate

COLS. 20-27 are BLANK

FUNCTION

For each statement identified as F (FUNCTION), the following description codes should be assigned.

COL. 16: Level to which the function pertains

This code indicates the hierarchical level(s) to which the function pertains.

CODES:

- 1 = Higher level
- 2 = Lower level

DESCRIPTION OF TERMS:

HIGHER level functions are those that are true of most members of at least one of the intermediate level categories contained within the relevant superordinate, or that are true of most members of the relevant superordinate category.

Examples:

- i) "People or animals live in habitats" is a higher level function for the category HABITAT; it is a function relevant to all members of the superordinate category HABITAT.
- ii) "We use this to eat food" is a function relevant to most members of the intermediate level category of DISHWARE or TABLEWARE. "Used to eat food" is true of most members of the intermediate level category, although it is not generally true of most members of the superordinate KITCHEN UTENSIL.

LOWER level functions are those functions that are generally relevant to members of basic level or lower level categories, and that are

not generally true of most members of categories higher than the basic level.

Example:

"You use this to scoop up soup." is a lower level function for the concept LADLE; it is specifically relevant to soup ladles, but can be true of any ladle (any type of ladle can be used for scooping up soup). However, it is true of only some members of a few categories at higher levels. For example, only some members of the intermediate category DISHWARE, and of the superordinate category KITCHEN UTENSIL are used to scoop up soup.

COL. 17: Type of function attribute

This code describes the type of function attribute. In general, function includes uses of objects (actions that one performs on or with the objects, or that the objects themselves can perform) and locations where objects are used. There are eight mutually exclusive categories of function attributes.

CODES:

- 1 = General use
- 2 = Specific use
- 3 = General locative
- 4 = Specific locative
- 5 = General use + General locative
- 6 = General use + Specific locative
- 7 = Specific use + General locative
- 8 = Specific use + Specific locative

DESCRIPTION OF TERMS:

GENERAL USE This category includes statements that indicate that one uses the object, but do not indicate the way in which one uses the object or the purpose for which one uses the object.

Example:

"Mommy uses those sometimes, doesn't she?"
(referent: pot, bowl, spoon)

The way one uses the object, or the purpose for which one uses the object is not specified. Thus, this statement is coded in the category GENERAL USE rather than SPECIFIC USE.

SPECIFIC USE This category includes statements that provide information about an action that one performs on or with the object (or that the object itself performs).

Examples:

"We use these things to make food." (referents: pot, bowl, spoon)

Note that this statement indicates how one uses the objects in question, namely to make food. Thus it is coded as SPECIFIC USE rather than GENERAL USE.

"These are all places where people or animals live." (referents: house, barn, cage)

"You wear these to make you pretty." (referents: ring, bracelet, necklace)

"These trucks take cars that are broken to the garage so that they can be fixed." (referent: three wreckers)

SPECIFIC LOCATIVE: Includes statements that indicate a location where one would generally find/keep/use members of the category, and the location is more specific than "at home", "inside", or "outside".

Examples:

"We keep these things in the kitchen." (referent: pot, spoon, bowl)

"You see these kind of trucks at accidents." (referent: three wreckers)

GENERAL LOCATIVE: Includes statements that indicate that one would find/keep/use members of the category "at home", "inside", or "outside", "somewhere" or "someplace".

Examples

"We have some of these at home." (referents: pot, bowl, spoon)

"You see wreckers outside." (referent: three wreckers)

GENERAL USE + GENERAL LOCATIVE: This category includes statements that indicate that one uses the object, but that do not indicate the way in which one uses the object or the purpose for which one uses the object and that indicate that one would use members of the category "at home", "inside", or "outside", "somewhere" or "someplace".

Example:

"Mommy uses these at home." (referents: pot, bowl, spoon)

GENERAL USE + SPECIFIC LOCATIVE: This category includes statements that provide information about an action that one performs on or with the object (or that the object itself performs) and that also contain information that indicates a location where one would generally use

members of the category, and the location is more specific than "at home", "inside", "outside", "somewhere", or "someplace".

Example:

"Mommy uses these things in the kitchen." (referents: pot, bowl, spoon)

SPECIFIC USE + GENERAL LOCATIVE: This category includes statements that provide information about an action that one performs on or with the object (or that the object itself performs) and that also contain information indicating that one would use members of the category "at home", "inside", or "outside", "somewhere", or "someplace".

Example:

"Mommy uses these things at home to make food." (referents: pot, bowl, spoon)

SPECIFIC USE + SPECIFIC LOCATIVE: This category includes statements that provide information about an action that one performs on or with the object (or that the object itself performs) and that indicate a location where one would generally find/keep/use members of the category, and the location is more specific than "at home", "inside", or "outside", "somewhere", or "someplace".

Example:

"Mommy uses these things in the kitchen to make food."
(referents: pot, bowl, spoon)

COL. 18: Typicality of function information

This code indicates whether the mentioned function attribute is typical, atypical, or idiosyncratic with respect to the concept that is being taught.

CODES:

- 1 = typical
- 2 = atypical
- 3 = idiosyncratic

DESCRIPTION OF TERMS:

Typical function attributes are those that are true of most but not necessarily all members of the concept in question.

Example:

"We use these to make food or eat food". At least one of the two function attributes mentioned "we use these to make food" and "[we use these to] eat food" is true of most (if not all) members of the category "kitchen utensil."

Atypical function attributes are those that are true of some, but not most, members of the concept in question.

Example:

M: We use this to eat cereal. (referent: spoon)

(NOTE: typicality is defined with respect to the concept being taught, thus "use to eat cereal" is identified as atypical for the category "kitchen utensil".)

Idiosyncratic function attributes are those that are not generally true of members of the concept in question, but that can be applied to the concept or to a specific member of the category.

Example:

"I wear this on my head." (referent: bowl)

COL 19: Specification of the range of concept exemplars to which the function attribute applies

This code describes the manner in which the range of concept exemplars to which the attribute can be applied was specified in the statement.

CODES:

- 1 = Property of an object/single referent
- 2 = Property of an object/multiple referents
- 3 = Property of category/single referent
- 4 = Property of category/multiple referents

DESCRIPTION OF TERMS:

PROPERTY OF OBJECT: The function attribute was provided as a property of a specific object.

Examples:

This ladle is used for scooping up soup. (referent: soup ladle)

This wrecker would pick up a broken school bus. (referent: largest of the three wreckers)

People live in a house. (referent: house)

PROPERTY OF CATEGORY/SINGLE REFERENT: The function attribute was provided as a property that pertains to a category of objects of which the single object referent of the statement is a member.

Examples:

A house is a habitat that people live in. (referent: house)

We use a ladle to scoop up soup. (referent: soup ladle)

PROPERTY OF CATEGORY/MULTIPLE REFERENTS: The function attribute was provided as a property of a category of objects applied to multiple exemplars of that category (one function attribute is mentioned relevant to more than one exemplar of the category to which the attribute pertains), or the object referents are not specified but it is clear that the attribute applies to more than one object (see the third example below).

Examples:

These are all places where people or animals live. (referents: house, barn, cage)

These are used for scooping up liquids. (referents: three ladles)

Vehicles are things that take us places. (referent: none)

COL. 20: Level of category to which the attribute was applied

When COL. 19 = 3 or 4 (property of category), the COL. 20 code is used to identify the level of the category to which the function attribute was applied.

CODES:

- 0 = not applicable, COL. 19 = 1 or 2
- 1 = subordinate
- 2 = basic
- 3 = intermediate
- 4 = superordinate

COL. 21: Method of introduction

This code describes how the relevant Function information was provided.

CODES:

- 1 = verbal only
- 2 = verbal + demonstration
- 3 = demonstration only

DESCRIPTION OF TERMS

Verbal only: A verbal description of the relevant form and/or function attribute(s) is provided. No demonstration of the relevant form or function is provided.

Example:

It's got a hook on the back to pull cars with. (referent: wrecker)

Verbal + demonstration: A verbal description and a physical demonstration are provided for the relevant attribute(s).

Example:

It's got a hook on the back to pull cars with (referent: wrecker)

(as M hooks a car onto the wrecker and pulls the wrecker).

Demonstration only: A demonstration is provided for the relevant form/function attribute(s). No verbal information is provided for the relevant form and/or function information.

Example:

Watch this. (as M pretends to scoop and pour with ladle).

COL. 22: POSITIVE/NEGATION FUNCTION:

CODES:

1 = Positive

2 = Negative

DESCRIPTION OF TERMS:

POSITIVE FUNCTION STATEMENT: The function attribute is provided as a property that can be applied to the concept exemplar that is the referent of the statement.

Example:

We use that for scooping up soup. (referent: ladle)

NEGATION OF FUNCTION: The function attribute is provided as a property that is not applicable to the concept exemplar that is the referent of the statement.

Example:

We don't use that for scooping up cheese. (referent: ladle)

COLS. 23-27 are BLANK

GENERAL NOTE CONCERNING STATEMENTS CONTAINING FUNCTION INFORMATION

In addition to the above codes, notes will be made on every occurrence of the following:

- 1) Function information is provided by contrasting a function relevant to the concept in question with a function relevant to a member of a related but contrastive category at the same hierarchical level.

Example:

We don't use a fork to scoop with; we use a special spoon. (concept = ladle)

- 2) Successive statements in which the same function attribute is applied to each of two or more different exemplars of the concept in question.

Example:

This ladle is used for scooping up soup. (referent: soup ladle)

This ladle is used for scooping up gravy. (referent: gravy ladle)

This ladle is used for scooping up punch. (referent: punch ladle)

or...

Houses are habitats for people.

Barns are habitats for animals.

FORM DESCRIPTION CODES

For each statement identified as FO (FORM), the following description codes should be assigned.

COL. 16-17: Type of form attribute

Assign a code based on the type of form attribute mentioned.

CODES:

- 1 = size
- 2 = color
- 3 = shape
- 4 = part as part
- 5 = part as location
- 6 = function of part
- 7 = material
- 8 = general appearance
- 9 = other descriptor
- 10 = by analogy

DESCRIPTION OF TERMS:

- 1) Size: Any form statement that contains information pertaining to the size of an object or objects.

Examples:

- a) This is a little ladle. (referent: gravy ladle)
- b) The bigger aframe. (referent: brown aframe)

- 2) Color: Any form statement that contains information pertaining to the color(s) of an object or objects.

Examples:

- a) This wrecker is red. (referent: red wrecker)
- b) I like the gold locket. (referent: round locket)

- 3) Shape: Any form statement that contains information pertaining to the shape of an object or objects.

Examples:

- a) This house is shaped like a triangle. (referent: aframe)
- b) This ladle is bent. (referent: soup ladle)

NOTE: When the concept being taught is locket, statements containing the term "heart" are coded as a shape form attribute and not as a label (e.g., the heart one, the heart locket, this is a heart).

- 4) Part as part: Any form statement that contains information pertaining to a part (or parts) of an object or objects. The purpose of the statement must be to label and/or identify the part. Statements containing a part label where the part is 1) used as a location or 2) mentioned in the context of the provision of functional information concerning the part, are not coded in this category, but are coded in categories 5 and 6 respectively.

Examples:

- a) Most vehicles have wheels. (referent: none)
- b) See it has two windows. (referent: aframe)

- 5) Part as location: Any form statement that contains a reference to a part of an object, where the mentioned part is used to identify/describe a location on the object.

Examples:

- a) The window is on this side. (referent: aframe)

In this case, the "side" of the aframe is mentioned as a location. Contrast this use with the mention of "side" in the following sentence where "side" is clearly a part of an object: This house has four sides.

- b) This one opens on the top. (referent: locket)

In this case, the "top" is mentioned as a means of specifying where the locket opens.

- 6) Function of a part: Any statement that contains information that pertains to a function of a part of an object.

Examples:

- a) The door opens on this one. (referent: door on aframe)

- b) The wings open. (referent: wings on airplane, concept: vehicle)

- 7) Material: Any form statement that contains information pertaining to a material or materials that an object, or group of objects, is made of.

Examples:

- a) This is a plastic ladle. (referent: punch ladle)

- b) This house is made of wood. (referent: aframe)

- 8) General appearance: Any form statement that comments that an object or group of objects is "the same" or "different".

Examples:

- a) These are all the same. (referent: three ladles)

- b) These are all different things. (referents: ring, bracelet, necklace)

- 9) Other descriptor: Any form statement that contains an adjective modifier that does not apply to one of the above categories.

Examples:

- a) Jewelry is pretty. (referent: none)

- b) Vehicles are funny. (referent: car, truck, airplane)

- c) These are fancy things. (referent: ring, bracelet, necklace)

COL. 18: "Criteriality" of form attribute

Assign a code based on the "criteriality" of the form attribute mentioned (NOTE: The code should be assigned based on the applicability of the form attribute to the concept being taught.).

CODES:

- 1 = "criterial"
- 2 = other relevant
- 3 = idiosyncratic

DESCRIPTION OF TERMS:

- 1) "criterial": Includes those attributes which are true of most, but not necessarily all, members of the concept being taught, and which are important to the concept.
- 2) other relevant: Includes attributes which are true of some, but not necessarily all, members of the concept being taught, and are not important to the concept in question. (e.g., COLOR)

NOTE: When COL. 16 = 1, 2 or 6, COL. 17 = 2.

- 3) idiosyncratic: Those attributes which are not generally applicable to the concept in question, or are specific to a particular person, situation, or object. (e.g., the attribute "square" for the concept "necklace" would be considered idiosyncratic)

NOTE: When COL. 16 = 7 or 8, COL. 17 = 3.

COL. 19: Range of concept exemplars to which the form attribute is/can be applied.

CODES:

- 1 = property of an object
- 2 = property of a category

COL. 20: Positive/Negation of Form

CODES:

- 1 = positive
- 2 = negation

DESCRIPTION OF TERMS:

- 1) Positive form statement: The form attribute is a property that can be applied to the concept exemplar that is the referent of the statement.

Examples:

- a) This ladle is bent.
- b) This aframe has a slanted roof.

- 2) Negation of form statement: the form attribute is not applicable to the concept exemplar that is the referent of the statement.

Examples:

- a) This ladle isn't plastic. (referent: metal soup ladle)
- b) This habitat isn't blue. (referent: house that is painted yellow)

COL. 21: Method of Introduction

This code describes how the relevant Form information was provided.

CODES:

- 1 = verbal only
- 2 = verbal + demonstration
- 3 = demonstration only

DESCRIPTION OF TERMS:

Verbal only: A verbal description of the relevant form attribute(s) is provided. No demonstration of the relevant form is provided.

Example:

It's got a hook on the back. M does not point out the hook to C)
(referent: wrecker)

Verbal + demonstration: A verbal description and a physical demonstration are provided for the relevant attribute(s).

Example:

It's got a hook on the back. (as M hooks a car onto the wrecker)
(referent: wrecker)

Demonstration only: A demonstration is provided for the relevant form attribute(s). No verbal information is provided for the relevant form and/or function information.

Example:

Look at this. (as M traces A outline on the front of one aframe)
(referent: brick aframe)

COLS. 21-27 are BLANK

FORM AND FUNCTION DESCRIPTION CODES:

COLS. 16-22 are used to code the FUNCTION information contained in the statement.

COL. 16: Level to which the function pertains

This code indicates the hierarchical level(s) to which the function pertains.

CODES:

- 1 = Higher level
- 2 = Lower level

COL. 17: Type of function attribute

This code describes the type of function attribute. In general, function includes uses of objects (actions that one performs on or with the objects, or that the objects themselves can perform) and locations where objects are used. There are eight mutually exclusive categories of types of function attributes.

CODES:

- 1 = General use
- 2 = Specific use
- 3 = General locative
- 4 = Specific locative
- 5 = General use + General locative
- 6 = General use + Specific locative
- 7 = Specific use + General locative
- 8 = Specific use + Specific locative

COL. 18: Typicality of function information

This code indicates whether the mentioned function attribute is typical, atypical or idiosyncratic with respect to the concept that is being taught.

CODES:

- 1 = Typical
- 2 = Atypical
- 3 = Idiosyncratic

COL. 19: Specification of the range of concept exemplars to which the function attribute applies

This code describes the manner in which the range of concept exemplars to which the attribute can be applied was specified in the statement.

CODES:

- 1 = Property of an object/single referent
- 2 = Property of an object/multiple referents
- 3 = Property of category/single referent
- 4 = Property of category/multiple referents

COL. 20: Level of category to which the attribute was applied

When COL. 19 = 3 or 4 (property of category), the COL. 20 code is used to identify the level of the category to which the function attribute was applied.

CODES:

- 0 = not applicable, COL. 19 = 1 or 2
- 1 = subordinate
- 2 = basic
- 3 = intermediate
- 4 = superordinate

COL. 20: Method of introduction

This code describes how the relevant Function information was provided.

CODES:

- 1 = verbal only
- 2 = verbal + demonstration
- 3 = demonstration only

COL. 21: POSITIVE/NEGATION FUNCTION:

CODES:

- 1 = Positive
- 2 = Negation

COLS. 23-27 are used to code the FORM information contained in the statement.

COL. 23: Type of form attribute

Assign a code based on the type of form attribute mentioned.

CODES:

- 1 = size
- 2 = color
- 3 = shape
- 4 = part as part
- 5 = part as location
- 6 = function of part

- 7 = material
- 8 = general appearance
- 9 = other description
- 0 = by analogy

COL. 24: "Criteriality" of form attribute

Assign a code based on the "criteriality" of the form attribute mentioned (NOTE: The code should be assigned based on the applicability of the form attribute to the concept being taught.).

CODES:

- 1 = "criterial"
- 2 = other relevant
- 3 = idiosyncratic

NOTE: When COL. 22 = 1 or 2, COL. 23 = 2.
When COL. 22 = 7 or 8, COL. 23 = 3.

COL. 25: Range of concept exemplars to which the form attribute is/can be applied.

CODES:

- 1 = property of an object
- 2 = property of a category

COL. 26: Positive/Negation of Form

CODES:

- 1 = positive
- 2 = negation

COL. 27: Method of Introduction

This code describes how the relevant Form information was provided.

CODES:

- 1 = verbal only
- 2 = verbal + demonstration
- 3 = demonstration only

OTHER USE OF LABEL

COL. 16: Use of label

CODES:

- 1 = nonostensive use of label
- 2 = attempt to elicit production

- 3 = attempt to elicit imitation
- 4 = nonreferential use of label
- 5 = elicited imitation
- 6 = sounding out pronunciation in part

DESCRIPTION OF TERMS:

1) NONOSTENSIVE USE OF LABEL

A label is provided for which there is a specified or clearly identifiable referent, but the statement label is not provided in the form of a deictic utterance (e.g., See this ladle I have in my hand?).

2) ATTEMPT TO ELICIT PRODUCTION

One person (generally M) attempts to elicit a nonreferential production the label. The attempt to elicit production can be in the form of an explicit request that the other person produce the word or in the form of a prompt where the prompt is a production of a part of the word.

Examples of an attempt to elicit a nonreferential production:

a) M: Can you tell me the new word?

(M is attempting to elicit a nonreferential production. Contrast this with the example of an attempt to elicit a referential production)

b) M: LII- (M pauses for C to produce the word.)
C: Ladle.

3) ATTEMPT TO ELICIT IMITATION

One person (generally M) attempts to elicit an imitation of the label. The attempt to elicit the label can be in the form of an explicit request that the other person imitate the word or in the form of a prompt where the word to be imitated is used as a prompt to imitate.

Examples:

a) Can you say jewelry?

b) Say habitat.

4) NONREFERENTIAL USE OF LABEL

Statement containing the use of the target label (the label being taught), or a label that is superordinate or subordinate to the target label (not assigned to "b" above) for which there is not a

specified or clearly identifiable referent (e.g., "I like wreckers.").

5) ELICITED IMITATION

The statement is an elicited imitation (see description of COL. 2 codes).

COL. 28: Presence/Absence of response to the statement

This code describes whether an opportunity for a response to the statement existed and whether there was a series of utterances identified as a response to the statement.

CODES:

- 0 = no opportunity for response
- 1 = no response
- 2 = response

DECISION PROCESS TO ASSIGN CODES:

For every codable statement,

- 1) Determine if the statement was followed by a pause, allowing the other person an opportunity to respond to the statement.
 - a) If the statement was not followed by a pause, then assign a code of "1" (no opportunity for response).
 - b) If the statement was followed by a pause, then proceed to step 2.
- 2) Determine whether there is an utterance or series of utterances immediately following the statement that were identified as the response to the statement (an R appears in the margin to the left of utterances identified as part of the response).
 - a) If there are no utterances immediately following the statement that were identified as R, then assign a code of "2" (no response).
 - b) If there are utterances immediately following the statement that were identified as R, then assign a code of "3" (response).

COL. 29: Intent of Response to Statement

These codes are used to describe the response of one member of the dyad to a statement produced by the other member of the dyad, or by the two parties jointly. A response code will be assigned to every statement identified only as C (or C and R) statement in the corpus (except the last codable statement).

For every codable statement, examine those utterances (and the portions of the commentary) following the codable statement that were identified as R. Assign a code on the basis of the overall intent of the response as described below.

CODES:

- 0 = not applicable (no response or no opportunity for response, COL. =)
- 1 = AGREE
- 2 = DISAGREE
- 3 = AGREE TO DISAGREE
- 4 = DISAGREE TO AGREE
- 5 = HEDGE
- 6 = Response does not address content of the statement
- 7 = Response unintelligible (v.)
- 8 = maybe
- 9 = response neutral

DESCRIPTION OF TERMS:

- 1) AGREE includes all cases in which the intent of the response, as expressed implicitly or explicitly, is to agree with the content of the statement being responded to.

EXPLICIT AGREE: responses which contain a word or phrase such as yes, yeah, uh huh, okay, right, good boy/girl, very good, etc. which convey agreement AND which do not contain any information which is contradictory to information contained in the statement being responded to.

NOTE: Provision of a new label that is superordinate or subordinate to a label contained in the statement being responded to is not considered contradictory information and is coded as EXPLICIT AGREE. (See example b below.) However, provision of a new label for the same referent that is at the same level as the label contained in the statement being responded to is considered contradictory and is coded as IMPLICIT DISAGREE (it will be coded EXPLICIT DISAGREE if the response also contains a word or phrase that explicitly indicates disagreement).

EXAMPLES:

- a) statement: That's a car. (referent: car)
response: Yes, that's a car.
- b) statement: This is a truck. (referent: wrecker)
response: Uh huh, it's a wrecker.
- c) statement: We use this for soup. (referent: ladle)
response: Yeah, we do.

IMPLICIT AGREE: responses which do not contain a word or phrase which conveys agreement, still it is clear that the intent of the

response is to convey agreement as expressed by the repetition of the information in the statement (except as noted under IMPLICIT DISAGREE below) or by some reference to the content of the statement (typically this is accomplished by an anaphoric reference to information contained in the statement). (NOTE: Responses of the general form "I think that's an X" are coded as IMPLICIT AGREE provided that the X is the response is not contradictory to the X in the statement.)

EXAMPLES:

- a) statement: Necklace. (referent: necklace)
response: Necklace.
- b) statement: This is a truck. (referent: dumptruck)
response: That's a truck.
- c) statement: For soup. (referent: ladle)
response: We use that for soup.

- 2) DISAGREE includes all cases in which the intent of the response as expressed implicitly or explicitly is to disagree with the content of the statement being responded to.

EXPLICIT DISAGREE: responses which contain a word or phrase such as no, that's not right, etc. which explicitly convey disagreement with the statement.

EXAMPLES:

- a) statement: Car. (referent: wrecker)
response: No, that's a wrecker.
- b) statement: Necklace. (referent: locket)
response: No, I told you what that's called.
- c) statement: A fork, Mom. (referent: spoon)
response: That's not right.

IMPLICIT DISAGREE: responses which do not contain a word or phrase which explicitly conveys disagreement, but which contains information that is contradictory to the information contained in the statement or which repeats information expressed in the statement with an intonation that indicates surprise. The following expressions also are coded as IMPLICIT DISAGREE:

- 1) Do you really think X.
- 2) It only looks like an X.
- 3) It just looks like an X.

EXAMPLES:

a) statement: Necklace. (referent: locket)
response: Locket.

b) statement: Truck. (referent: car)
response: Do you really think that's a car?

- 3) AGREE TO DISAGREE: responses that initially indicate agreement then change to a disagreement.

EXAMPLE:

statement: A box. (referent: aframe)
response: A box. Do you really think that's a box.

In this example, the initial "A box" in the response constitutes an agreement to the statement but it is followed by "Do you really think that's a box?" which is coded as a disagreement so the code assigned is AGREE TO DISAGREE

- 4) DISAGREE TO AGREE: responses that initially indicate disagreement then change to an agreement.

EXAMPLE:

statement: Triangle. (referent: aframe)
response: No, that's not a triangle, Well yes, the shape is a triangle.

In this example, the initial statement in the response constitutes a disagreement to the statement "Triangle" but it is followed by "Well, yes, the shape is a triangle." which is coded as an agreement so the code assigned is DISAGREE TO AGREE

- 5) HEDGE: responses that indicate neither agreement nor disagreement. The following statements also are coded as HEDGE:

1) Do you think X?

NOTE: "I think that's an X: is coded as IMPLICIT AGREE and not as a HEDGE unless the statement also contains a word that implicitly indicates disagreement.

2) That looks like an X.

EXAMPLES:

a) statement: C: A car. (referent: wrecker)
response: M: Do you think that's a car?

NOTE: In the event that M's response had used the expression "Do you really think...?", the response would have been classified as IMPLICIT DISAGREE.

- b) statement: C: A teepee. (referent: aframe)
response: M: It looks like an X.

NOTE: In the event that M's response had used the phrase "It only looks like...", or "It just looks like...", the response would have been classified as IMPLICIT DISAGREE.

- c) statement: C: I could use this for sand. (referent: ladle)
response: M: Well, maybe.

- 6) RESPONSE DOES NOT ADDRESS THE CONTENT OF THE STATEMENT:
responses that do not address the content of the statement coded.

EXAMPLE:

statement: We call this a wrecker.
response: I like to ride my bike.

- 7) RESPONSE UNINTELLIGIBLE: those instances where the only statement identified as a response are indicated as unintelligible with a "V" on the transcript.
- 8) MAYBE: those response contains only the single utterance "maybe".
- 9) RESPONSE NEUTRAL: those cases where the response contains only the terms "Uh", "Ah", "Um", "Oh" or another term that cannot be classified into one of the above categories.

COL. 30: Content of Response to Statement

This code describes the information that the response conveys relevant to the content of the statement being responded to.

CODES:

- 0 = not applicable (COL. 28 = 0 or 1)
1 = agree only
2 = disagree only
3 = hedge only
4 = repeats information
5 = repeats plus expands
6 = expands only
7 = response does not address the content of the statement (COL. 29 = 6)

DESCRIPTION OF TERMS

1) NOT APPLICABLE

This code is assigned when there is no response made to the statement.

2) AGREE ONLY

This code is assigned to responses that contain only a term or phrases that indicate agreement and that contain no other information relevant to the content of the statement.

Example:

statement: C: That's a house. (referent: aframe)
response: M: Yes, that's right.

3) DISAGREE ONLY

This code is assigned to responses that contain only a term or phrase that indicates disagreement and that contain no other information relevant to the content of the statement.

Example:

statement: C: That's a house. (referent: aframe)
response: M: No, that's not what I told you.

4) HEDGE ONLY

This code is assigned to those cases that contain only a phrase that indicates vacillation and contains no other information relevant to the content of the statement.

Examples:

a) statement: C: This is a car. (referent: wrecker)
response: M: Do you really think so?

b) statement: C: This is a car. (referent: wrecker)
response: M: Maybe it looks a little like one.

NOTE: If M had repeated the word "car" rather than using the pronoun "one", then her response would have been coded "5" (REPEATS INFORMATION) because her response contained a repetition of the information in the statement (i.e., the label).

5) REPEATS INFORMATION

This code is used when the response contains a repetition of all or part of the information contained in the statement that is being responded

to, without the provision of any new information that is relevant to one of the content categories.

Examples:

a) statement: C: This is a truck. (referent: dumptruck)
response: M: Yes, it's a truck.

b) statement: C: Look, a car. (referent: wrecker)
response: M: No, that's not a car.

6) REPEATS PLUS EXPANDS

This code is used when the response contains a repetition of all or part of the information that was conveyed in the statement and provides additional information that is related to and elaborates upon the information contained in the statement. (NOTE: In order to have been identified as R (response), the new information must be relevant to one of the content categories.

Examples:

a) statement: C: I like this necklace.
response: M: That necklace opens.

In this case, M's response contains a repetition of the information contained in the statement (i.e., the label "necklace") and provides the additional information "[the necklace] opens" (relevant to the content category FUNCTION).

b) statement: C: It has a hook. (referent: hook on wrecker)
response: M: It has a hook to pick up broken cars with.

In this case, the response contains a repetition of the information contained in the statement ("hook") and provides the additional information "to pick up broken cars with" (relevant to the content category FUNCTION).

7) EXPANDS ONLY

This code is assigned to responses that are relevant to a content category, but that do not contain a repetition of any of the information contained in the statement that is being responded to.

Examples:

a) statement: C: This is a car, Mom. (referent: car)
response: M: We use that when we go to the store.

b) statement: M: This is used for scooping soup. (referent: ladle)
response: C: That's a ladle.

- c) statement: C: I like jewelry. (referent: none)
response: M: We wear these things to make us pretty.

COL. 31: Label in response to statement

Assign codes as a function of any labels contained in the statement that are repeated in the response and/or any labels unique to the response that can substitute for a label contained in the statement or that can serve as an appropriate label for the referent of the statement.

CODES:

- 0 = not applicable, no response or no opportunity for response
(COL. 28 = 0 or 1)
1 = no label
2 = repeats label
3 = repeats label + new label
4 = new label only

Description of terms:

No label: Use this code when the response does not contain a label at all.

Examples:

- 1) statement: This is a ladle, Mom.
response: Yes, that's right.
- 2) statement: A truck
response: What do we use that for?

Repeats Label: The response contains a repetition of a label contained in the statement and does not contain any new labels for the referent of the label in the statement. The repetition need not be exact with respect to the correct adult pronunciation of the word (see Example 2 below), or with respect to the usage of an accepted idiosyncratic label (see Example 3 below).

Examples:

- 1) statement: That's a wrecker.
response: Yes, that's a wrecker.
- 2) statement: This is a kitchen utensil.
response: kitchen uktensil. (=kitchen utensil)
- 3) statement: This is a necklace.
response: Boolah-boolah. (C's idiosyncratic word for necklace)

Repeats label + New label: The response contains a repetition of a label contained in the statement and also contains a new label for the

referent of the label in the statement. The repetition of the original label need not be exact as described above.

Examples:

- 1) statement: This is a truck.
response: It's a truck called a wrecker.
- 2) statement: Boolah-boolah.
response: Yeah, it's a necklace and it's jewelry too.

New label only: The statement does not contain a repetition of a label contained in the statement, but a new label for the referent of a label contained in the statement (or of the statement itself) is provided in the response. NOTE: This code will also be assigned to cases in which the statement does not contain a label but the response does provide a label and the referent of the label is the same as the referent of the statement (see Examples 3 and 4 below).

- 1) statement: Look, a truck.
response: Yeah, a wrecker. (referent: wrecker)
- 2) statement: It's a locket.
response: It's a necklace that opens. (referent: locket)
- 3) statement: We use this for soup.
response: Yes, it's a ladle for soup. (referent: soup ladle)
- 4) statement: This is pretty.
response: Yes, the jewelry's pretty. (referent: ring)

COL. 32: NEW LABEL (for the same referent) IN RESPONSE

Assign the code on the basis of the level of the new label (if any) in the response.

NOTE: If more than one new label is contained in the response, code the level of the first new label. Keep a written record of every occurrence of a response containing more than one new label.

CODES:

- 0 = subsubordinate
- 1 = subordinate
- 2 = basic
- 3 = intermediate
- 4 = superordinate
- 5 = no new label
- 6 = not applicable, no response to the statement or no opportunity for response (COL.28 = 0 or 1)

COL 33: RESPONSE TO NEW LABEL

In those cases in which a new label is introduced in the response to a statement (COL 31 = 4 or 5), this code describes the response to the label that has been introduced (the response by the person other than the one who produced the novel label). Assign a code according to the occurrence of an imitation or a spontaneous production of the novel label within the first three utterances that are produced by the person who responds to the novel label following the introduction of the novel label.

CODES:

- 0 = Not applicable: no new label in response to statement (COL 32 = 5)
- 1 = Label not imitated or produced
- 2 = Imitation: label imitated
- 3 = Production: label produced spontaneously
- 4 = Label comprehended
- 5 = Elicited imitation

APPENDIX B

ATTRIBUTE RATINGS

<u>Concept</u>	<u>Attribute</u>	<u>Level</u>	<u>Typicality</u>	<u>Type</u>	<u>IA Rating</u>
HABITAT					
<u>Function</u>	live in	higher	typical	spec. use + spec loc.	MI
	people live in	higher	typical	spec. use + spec. loc.	MI
	animals live in	higher	typical	spec. use + spec. loc	MI
	for animals	lower	typical	general use	NLA
	for people	lower	typical	general use	NLA
	window (house)	lower	atypical	part as part	NLA
	door (house)	lower	atypical	part as part	NLA
	doorknob (house)	lower	atypical	part as part	NLA
	garage (house)	lower	atypical	part as part	NLA
	side	higher	typical	part as location	IG
<u>Form</u>	door opens, closes	lower	atypical	function of part	NLA
	car fits in garage	lower	atypical	function of part	NLA
	cage looks like pen	lower	atypical	desc. by analogy	NLA
	cage like at zoo	lower	atypical	desc. by analogy	NLA
	cage looks like a basket	lower	idiosyncratic	desc. by analogy	NLA
JEWELRY					
<u>Function</u>	wear				
	(have on, put on, got on, goes on)*	higher	typical	specific use	MI
	goes on + location	higher	typical	spec. use + spec. loc.	MI
<u>Form</u>	jewel (in ring)	lower	typical	part as part	NLA
	snap (necklace)	lower	typical	part as part	NLA
	red, pink	lower	atypical	color	NLA
	pretty				
	(beautiful, fancy)*	higher	typical	other descriptor	IG
	different from				
	clothes	higher	typical	by analogy	IG
	all the same	higher	typical	same/different	IG
KITCHEN UTENSIL					
<u>Function</u>	use in the kitchen	higher	typical	gen. use + spec. loc.	IR
	[use] to make food				
	(eat,serve,cook)*	higher	typical	specific use	MI
	[use] in the kitchen to make food				
	(eat, cook)*	higher	typical	spec. use + spec loc.	MI
	use [spoon,				
	pot,utensils]	higher	typical	general use	IG
	use [pan] for bacon	lower	atypical	specific use	NLA
	use bowl for chocolate chip cookies	lower	atypical	specific use	NLA
	use the kitchen				
	utensil for food	higher	typical	general use	IG

<u>Concept</u>	<u>Attribute</u>	<u>Level</u>	<u>Typicality</u>	<u>Type</u>	<u>IA Rating</u>
KITCHEN					
UTENSIL (cont'd)					
	we have pans at home	lower	idiosyncratic	general location	IRR
	cook in the [bowl, pan, with spoon]	lower	atypical	general use	NLA
	we use the frying pan at home too	lower	atypical	gen. use + gen loc.	NLA
	serve food in bowl [belong] in the kitchen	lower	typical	specific use	NLA
	put soup in bowl	higher	typical	specific location	IR
	stir soup with spoon	lower	atypical	specific use	NLA
	stir cookies with spoon too	lower	atypical	specific use	NLA
	make pancakes with the bowl	lower	atypical	specific use	NLA
	eat cereal in bowl	lower	atypical	specific use	NLA
	pan is for milk	lower	atypical	specific use	NLA
VEHICLE					
<u>Function</u>					
	ride in	higher	typical	specific use	MI
	take you places (goes someplace)*	higher	typical	spec. use + gen loc.	MI
	drive	higher	typical	specific use	MI
	transport	higher	typical	specific use	MI
	carry things	higher	typical	specific use	IG
	moves	higher	typical	general use	IG
	goes + gen. location	higher	typical	gen. use + gen. loc.	IG
	fly (airplane)	higher	typical	specific use	IR
	fly in sky (plane)	higher	typical	spec. use + spec. loc.	IR
	cars and planes roll	higher	typical	specific use	IG
	put dirt and rocks in the back (truck)	lower	atypical	spec. use + spec. loc.	NLA
	dumps (dumptruck)	lower	atypical	specific use	NLA
<u>Form</u>					
	wheels	higher	typical	part as part	MI
	engine	higher	typical	part as part	MI
	hood	lower	typical	part as part	NLA
	trunk	lower	typical	part as part	NLA
	big	higher	atypical	size	IRR
	back doesn't open (car)	lower	atypical	function of part	NLA
	front opens (car)	lower	atypical	function of part	NLA
	wings open (plane)	lower	atypical	function of part	NLA
	door opens (car)	lower	atypical	function of part	NLA

<u>Concept</u>	<u>Attribute</u>	<u>Level</u>	<u>Typicality</u>	<u>Type</u>	<u>IA Rating</u>
VEHICLE (cont'd)					
	put groceries in (car trunk)	lower	atypical	function of part	NLA
	close door[hood] (on car)	lower	atypical	function of part	NLA
AFRAME					
<u>Function</u>	live in	higher	typical	spec. use + spec. loc.	MI
<u>Form</u>	shaped like an A	lower	typical	shape	MI
	shaped like triangle	lower	typical	shape	MI
	[roof] goes up and down	lower	typical	shape	IR
	slanty on the sides	lower	typical	shape	IR
	[roof] goes up in a point	lower	typical	shape	IR
	door	lower	typical	part as part	IG
	window	lower	typical	part as part	IG
	back, side	lower	typical	part as location	IG
	little, big	lower	atypical	size	IRR
	green	lower	atypical	color	IRR
	wood	lower	atypical	material	IRR
	brick	lower	atypical	material	IRR
	straw	lower	atypical	material	IRR
	don't look like our house	lower	typical	desc. by analogy	IG
	poor houses	lower	idiosyncratic	other descriptor	IRR
	funny houses	lower	idiosyncratic	other descriptor	IRR
	looks like summer	lower	idiosyncratic	desc. by analogy	IRR
	open door	lower	atypical	function of part	IRR
	door is locked	lower	atypical	function of part	IRR
LADLE					
<u>Function</u>	scoop	lower	typical	specific use	MI
	pick up, take out pour	lower	typical	specific use	MI
	(put in bowl)	lower	typical	specific use	MI
	cook with	higher	typical	specific use	NLA
	use for soup	higher	typical	specific use	NLA
	don't eat with	higher	typical	specific use	IR
	cook	higher	typical	specific use	IR
	use in the kitchen	higher	typical	gen. use + spec. loc.	IR
	serve	higher	typical	specific use	MI
<u>Form</u>	[handle] bent	lower	typical	shape	MI
	big (at bottom)	lower	typical	shape	MI
	bowl (on bottom)	lower	typical	part as part	MI

<u>Concept</u>	<u>Attribute</u>	<u>Level</u>	<u>Typicality</u>	<u>Type</u>	<u>IA Rating</u>
LOCKET					
<u>Function</u>	opens	lower	typical	specific use	MI
	closes				
	(lock, snap it)	lower	typical	specific use	MI
	put things in it	lower	typical	spec. use + spec. loc.	MI
	wear	higher	typical	specific use	IG
<u>Form</u>	big	lower	atypical	size	IRR
	little	lower	atypical	size	IRR
	cold	lower	idiosyncratic	other descriptor	IRR
	pretty	lower	typical	other descriptor	IG
	blue	lower	atypical	color	IRR
	chain	lower	typical	part as part	MI
	pull that (clasp)	lower	atypical	function of part	IRR
WRECKER					
<u>Function</u>	pick up (cars)	lower	typical	specific use	MI
	hook on (put on)				
	car	lower	typical	specific use	MI
	take away/carry (broken car)	lower	typical	spec. use + gen. loc.	MI
<u>Form</u>	hook	lower	typical	part as part	MI
	flashing lights	lower	typical	part as part	MI

APPENDIX C

CODING RELIABILITY SCORES

I. Overall Coding Reliability (All Eight Concepts Combined)

<u>Description of Code (Col. #)</u>	<u>% Reliability</u>
Person(s) making statement (1)	100
Spontaneous/Elicited/Imitated (2)	99
Person eliciting information (3)	100
Form of elicitation (4-5)	97
Response to elicitation (6)	96
Type of statement: E, R, r, C (7)	96
Form of statement (8)	94
Level of label used in statement (9)	100
Presence of referent of statement and/or label (10)	100
Label in statement (11)	99
Distance 1 (12)	98
Distance 2 (13-14)	95
Content Category Codes (15)	99
Content Category Description Code (16)	97
Content Category Description Code (17)	95
Content Category Description Code (18)	96
Content Category Description Code (19)	93
Content Category Description Code (20)	94
Content Category Description Code (21)	97
Content Category Description Code (22)	96
Content Category Description Code (23)	100
Content Category Description Code (24)	100
Content Category Description Code (25)	100
Content Category Description Code (26)	100
Content Category Description Code (27)	100
Presence of a response to the statement (28)	94
Intent of the response to the statement (29)	92
Content of the response to the statement (30)	93
Label in response to the statement (31)	98
Response to the new label (33)	97

II. Coding Reliability for Superordinate Level Concepts

Description of Code (Col. #)	% Reliability				
	Habitat	Jewelry	Kitchen	Vehicle	Level
Person(s) making statement (1)	100	100	100	100	100
Spontaneous/Elicited/Imitated (2)	98	99	100	99	99
Person eliciting information (3)	100	100	100	100	100
Form of elicitation (4-5)	96	98	97	99	98
Response to elicitation (6)	94	96	98	97	96
Type of statement: E, R, r, C (7)	95	98	96	97	96
Form of statement (8)	94	92	95	94	94
Level of label used in statement (9)	100	100	100	100	100
Presence of referent of statement and/or label (10)	100	100	100	100	100
Label in statement (11)	98	97	99	100	98
Distance 1 (12)	97	98	99	96	98
Distance 2 (13-14)	94	95	96	93	94
Content Category Codes (15)	98	99	100	99	99
Content Category Description Code (16)	96	95	97	96	96
Content Category Description Code (17)	94	93	97	95	95
Content Category Description Code (18)	94	96	94	97	95
Content Category Description Code (19)	93	92	91	95	93
Content Category Description Code (20)	93	94	96	93	94
Content Category Description Code (21)	96	96	97	98	97
Content Category Description Code (22)	97	96	97	96	96
Content Category Description Code (23)	100	100	100	100	100
Content Category Description Code (24)	100	100	100	100	100
Content Category Description Code (25)	100	100	100	100	100
Content Category Description Code (26)	100	100	100	100	100
Content Category Description Code (27)	100	100	100	100	100
Presence of a response to the statement (28)	93	95	94	92	94
Intent of the response to the statement (29)	92	91	93	90	92
Content of the response to the statement (30)	94	93	92	94	93
Label in response to the statement (31)	98	97	98	99	98
Response to the new label (33)	96	97	98	99	98

III. Coding Reliability for Subordinate Level Concepts

Description of Code (Col. #)	% Reliability				
	Aframe	Ladle	Locket	Wrecker	Level
Person(s) making statement (1)	100	100	100	100	100
Spontaneous/Elicited/Imitated (2)	100	98	100	100	19
Person eliciting information (3)	100	100	100	100	100
Form of elicitation (4-5)	97	98	96	99	97
Response to elicitation (6)	97	96	98	96	97
Type of statement: E, R, r, C (7)	96	97	94	97	96
Form of statement (8)	96	95	93	96	95
Level of label used in statement (9)	100	100	100	100	100
Presence of referent of statement and/or label (10)	100	100	100	100	100
Label in statement (11)	99	100	99	98	99
Distance 1 (12)	98	98	99	99	98
Distance 2 (13-14)	96	97	94	95	94
Content Category Codes (15)	99	99	100	98	99
Content Category Description Code (16)	99	96	97	98	97
Content Category Description Code (17)	95	96	96	97	96
Content Category Description Code (18)	97	96	97	98	97
Content Category Description Code (19)	91	94	93	96	94
Content Category Description Code (20)	95	95	96	93	95
Content Category Description Code (21)	96	97	98	98	97
Content Category Description Code (22)	96	97	97	96	96
Content Category Description Code (23)	100	100	100	100	100
Content Category Description Code (24)	100	100	100	100	100
Content Category Description Code (25)	100	100	100	100	100
Content Category Description Code (26)	100	100	100	100	100
Content Category Description Code (27)	100	100	100	100	100
Presence of a response to the statement (28)	92	94	96	96	94
Intent of the response to the statement (29)	92	94	93	92	93
Content of the response to the statement (30)	92	93	92	96	93
Label in response to the statement (31)	99	99	98	99	99
Response to the new label (33)	97	97	98	96	97

* Entries in parentheses were considered variations on the previously listed attribute statement.

REFERENCES

- Anglin, J.M. (1977). *Word, object, and conceptual development*. New York: W. W. Norton & Co, Inc.
- Banigan, R. L. & Mervis, C. B. (1988). Role of adult input in young children's category evolution: II an experimental study. *Journal of Child Language*, 15, 493-504.
- Blewitt, P. (1983). "Dog" vs. "collie": Vocabulary in speech to young children. *Developmental Psychology*, 19, 602-609.
- Brown, R. (1985). *Words and things*. New York: Free Press of Glencoe.
- Callanan, M. A. (1990). Parents' descriptions of objects: potential data for children's inferences about category principles. *Cognitive Development*, 5, 101-122.
- Callanan, M. A. (1989). Development of object categories and inclusion relations: preschoolers' hypotheses about word meanings. *Developmental Psychology*, 25(2), 207-216.
- Callanan, M. A. (1985). How parents label objects for young children: The role of input in the acquisition of category hierarchies. *Child Development*, 56, 508-523.
- Clark, R. (1982). Theory and method in child-language research: Are we assuming too much? In S. Kuczaj (Ed.), *Language Development Volume I: Syntax and Semantics*. Hillsdale, N.J.: Lawrence Erlbaum Associates.
- Clark, H. (1974). What's new? Acquiring new information as a process in comprehension. *Journal of Verbal Learning and Verbal Behavior*, 13, 512-521.
- Horton, M. S. & Markman, E. M. (1980). Developmental differences in the acquisition of basic and superordinate categories. *Child Development*, 51, 708-719.
- Mervis, C. B. (1988a). Early conceptual development of children with down syndrome. In D. Cicchetti, M. Beeghly (eds.), *Down syndrome: The developmental perspective*. New York: Cambridge University Press.
- Mervis, C. B. (1988b). Child-basic categories and early lexical development. In U. Neisser (Ed.), *Concepts reconsidered: The ecological and intellectual bases of categorization*. Cambridge: Cambridge University Press.
- Mervis, C. B. & Crisafi, M. A. (1982). Order of acquisition of subordinate, basic, and superordinate level categories. *Child Development*, 53, 258-266.
- Ninio, A. (1980). Ostensive definition in vocabulary teaching. *Journal of Child Language*, 7, 565-573.
- Rosch, E. & Mervis, C. B. (1975). Family resemblances: Studies in the internal structure of categories. *Cognitive Psychology*, 7, 573-605.
- Rosch, E., Mervis, C. B., Gray, W., Johnson, D., & Boyes-Braem, P. (1976). Basic objects in natural categories. *Cognitive Psychology*, 3, 382-439.

- Shipley, E. F., Huhn, I. F., & Madden, E. C. (1983). Mother's use of superordinate category terms. *Journal of Child Language*, 10, 571-588.
- Smith, E. E., & Medin, D. L. (1981). *Categories and concepts*. Cambridge, Mass.: Harvard University Press.
- Tulving, E. (1972). Episodic and semantic memory. In E. Tulving & W. Donaldson (Eds.), *Organization and memory*. New York: Academic Press.
- Wales, R., Colman, M., & Pattison, P. (1983). How a thing is called--A study of mothers' and children's naming. *Journal of Experimental Child Psychology*, 36, 1-17.
- Waxman, S. R., & Shipley, E. F. (1987, April). Interactions between existing knowledge and language in subordinate classification. Paper presented at the biennial meeting of the Society for Research in Child Development, Baltimore.

