THE UNDERSTANDING OF ENGLISH MORPHOLOGY BY CERTAIN PRESCHOOL CHILDREN

Thesis for the Degree of M. A.
MICHIGAN STATE UNIVERSITY

Roberta Ann Henry

1967

ABSTRACT

THE UNDERSTANDING OF ENGLISH MORPHOLOGY BY CERTAIN PRESCHOOL CHILDREN

by Roberta Ann Henry

This study replicated selected aspects of Jean Berko's study of the child's learning of English morphology. From her findings she suggested that "every child is in contact with a sufficiently varied sample of spoken English in order for him to be exposed at an early age to the basic morphological processes." (Berko, 1958, 57)

The purposes of the present study were to investigate the relationship between the understanding of morphological rules and environment, and the relationship between the learning of morphology and intelligence.

The two major hypotheses were:

I. Children in the Laboratory Preschool Group will achieve higher scores on the Berko test for morphological rules than will children in the Community Play Group.

II. There is a positive correlation between the acquisition of English morphology, as measured by the Berko test, and intelligence, as measured by the Peabody test.

The results of these hypotheses yielded a third hypothesis: There is a difference in the performance of the two groups on the Berko test when the effect of I.Q.

is controlled.

The sample consisted of 30 children from the Michigan State University nursery schools ranging in age from 4 years old to 5 years 2 months old. Half of the children were from the upper middle class (Laboratory Preschool Group), and the remainder of the children were representative of lower class families (Community Play Group). To ascertain a child's I.Q. score, the Peabody Picture Vocabulary Test was administered to the child. The child's understanding of the morphological rules was measured by his responses to picture cards designed by Berko.

The results supported Hypotheses I and II; however, Hypothesis III was not supported. The study found that there was a difference in the mean scores on the Berko test between the two groups of children. There was also a relationship between the acquisition of morphology and intelligence. When the effect of I.Q. was controlled, the difference in the mean scores on the Berko between the groups was not significant. This may have been due to the fact that the acquisition of morphology is developmental and depends on the maturational level of the child. The children in this study were just beginning the developmental sequence of understanding the rules of morphology.

Berko, Jean. "The Child's Learning of English Morphology." Unpublished doctoral dissertation, Radcliffe College, 1958.

THE UNDERSTANDING OF ENGLISH MORPHOLOGY BY CERTAIN PRESCHOOL CHILDREN

By

Roberta Ann Henry

A THESIS

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

MASTER OF ARTS

Department of Home Management and Child Development

1967

ACKNOWLEDGMENTS

The author wishes to express her gratitude to Dr. Martha E. Dale and Miss Phyllis Lueck for their guidance and direction in planning and conducting the study.

Special appreciation is due to Dr. Sarah Hervey and Mr. Tanniru R. Rao for their statistical direction and generous donation of time and assistance during the course of the study.

The author also wishes to thank the head teachers of the Michigan State University nursery schools for their assistance. Appreciation is expressed to the children who participated in the study.

It is impossible to adequately express my gratitude to Dr. Jean Berko Gleason for the consent to replicate her study and the use of the picture cards which she developed.

And finally to my friends and colleagues who gave advice and encouragement when it was most necessary, thank you.

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I

INTRODUCTION

Many aspects of childhood development have been subjects of study. One of the more important aspects centers on the acquisition of language by the young child. Language is of concern for the following reasons: the positive relationship between language development and intelligence; the establishment of norms measuring development, to be used as a basis for comparison; recognition of difficulties in language learning; and location of factors that influence development both positively and negatively. On the average, children rapidly acquire a basic understanding of the spoken language during the preschool years. In the opinion of McCarthy, if a child's language development is seriously delayed for any reason he will labor under an almost insurmountable handicap in his social and academic relationships. (1946, 477) Because of the severity of insufficient verbal skills researchers have attempted to locate the causes of delayed language development. The early records of this learning process were biographical in nature and centered mainly on precocious or retarded children.

In more recent years the research has become more standardized and experimental in its approach. Large samples

of children have been studied for purposes of comparison and the establishment of norms. Research has also turned from the broad measurements of language such as vocabulary size, sentence length and sentence complexity, to the more specific skills of linguistic learning such as phonological, morphological and syntactic rules. Since little comparative research has been done on these more specific skills, the purpose of this study was to examine the performance of two groups of children from different socio-economic classes on one of these linguistic skills--morphology.

Jean Berko (now Gleason) observed a group of preschool children to determine if they possessed rules for English morphology. From her findings she suggested that perhaps "factors that influence other aspects of language development may have no effect on morphological acquisition." (Berko, 1958a, 58)

Lacking I.Q. scores on her subjects, Berko was able only to speculate on the relationship between understanding of morphology and intelligence. Madorah Smith (1926) suggested that one of the best single tests of intelligence is a vocabulary test, since at every age vocabulary depends on intelligence. In this study the I.Q. scores were obtained from the Peabody Picture Vocabulary Test. This test correlates with WISC I.Q. scores in the high .70's and .80's. (Buros, 1965, 823)

The major intrinsic factor influencing language

development is intelligence; the major extrinsic factor is environment. (McCarthy, 1946) It was the intent of this study to examine the effects of intelligence and environment on the child's understanding of morphology.

Objectives

Examination of the interrelationships of intelligence, environment and understanding of morphology was accomplished through the following four specific objectives:

1. To measure the subjects' understanding of morphological rules.
2. To appraise the findings from Objective 1 and to determine if variations occur between the two groups.
3. To obtain intelligence quotient scores by administering the Peabody Picture Vocabulary Test to each subject.
4. To compare, within each group, the subjects' understanding of morphological rules and their intelligence quotient scores.

Definitions of terms

The definitions of terms as operationalized in this study were:

1. Community Play Group (C.P.G.) - Children who would be eligible for Head Start programs and who were participants in the Michigan State University play group.

2. Laboratory Preschool Group (L.P.S.) - Children who were enrolled in the Michigan State University Laboratory Preschool.

The 3 major concepts dealt with in this study were:

1. Morphology - The branch of linguistics which deals with the forms and grammatical inflections of words as they undergo modification for tense, number, case, person, etc. (Carroll, 1961, 355)
2. Intelligence - Intelligence is defined in various ways, but for the purposes of this study intelligence refers to the child's level of achievement on the Peabody Picture Vocabulary Test.
3. Environment - The child's membership in either the Laboratory Preschool Group or the Community Play Group. According to Cattell's Metric Scale for Social Status, (Cattell, 1946, 142) children in the first group were representative of the upper middle class, and children in the second group were members of lower class families.

Assumptions

Four assumptions underlying this study were:

1. Berko's study of English morphology is valid and reliable research.
2. Children between 48 and 60 months operate with measurable morphological rules. (Berko, 1958a, 56)

3. A valid identification has been made of the culturally disadvantaged children in the Community group.
4. The Peabody Picture Vocabulary Test is a reliable and valid instrument which provides valid intelligence quotient scores.

Hypotheses

The two major hypotheses investigated in relation to morphology were:

1. Children in the LPS group will achieve higher scores on the Berko test for morphological rules than will children in the Community group.
2. There is a positive correlation between the acquisition of English morphology, as measured by the Berko test, and intelligence, as measured by the Peabody test.

A review of the related literature is found in Chapter Two. The procedures followed in this study are described in Chapter Three. The analysis and discussion of the data gathered during this study is summarized in Chapter Four. Summary and conclusions and implications for further research are discussed in Chapter Five.

This study is a replication of selected aspects of the Jean Berko research.

CHAPTER II

REVIEW OF THE LITERATURE

The child's acquisition of language has been of interest for many years to many scholars. Scientific linguists, sociologists, psychologists, educators, and structural linguists have observed and recorded the child's learning of language through various means and for different reasons. Carroll (1961) attributes the interest in this particular aspect of a child's development to the complexity of language and the apparent swiftness of learning. Another important reason for the concern is that language development is generally agreed to be positively correlated with intelligence. (Leopold, 1952, 10) The interest in studying child language learning stems from various disciplines.

Major fields of study

Scholars in the history of language, such as Jespersen (1922), have studied the child's learning of his mother tongue to aid in obtaining information about the historical character of language. Carroll reports that so far there is no positive answer as to whether the gradual changes of languages over generations are to any extent caused by the variations observed in the child's speech

as compared with that of his parents. (1961, 331)

Sociologists, such as Bernstein, have studied the language habits of children and have discovered that status differences are revealed almost from the beginning of speech. An investigation of the child's language reveals the purpose of language as a means of eliciting and strengthening ways of feeling and thinking which are functionally related to the social group. (Bernstein, 1961) Because of the recent interest in eliminating the devastating effects of cultural deprivation, the linguistic patterns of children have been studied. These studies have attempted to account for and remedy differences which contribute to underdeveloped verbal skills and substandard speech patterns among those who are deprived. (Hurst & Jones, 1961, 409)

Skinner and other psychologists see language as one of many learned behavior patterns. Study of the process by which the child learns to speak and understand language may hold the key to many fundamental behavioral problems. (Carroll, 1961) Piaget studied the content of the child's language to gain a better understanding of his thought processes and concept formations. (Piaget, 1965)

Educators, such as Thorndike and Lorge, are concerned with the kind of language that is characteristic of a particular age range, to help them make comparisons as well as to gain helpful information for developing school curriculums. (Thorndike & Lorge, 1944) Other educators

look at a child's language development for a better understanding of the child's intelligence, personality and social adjustment.

Linguists study the child's language for the sake of language and structure. The child's language provides clues to structure and facilitates analysis of adult language. (Berko, 1958a, 1) Knowledge gained from observation of the child's acquisition of language has helped develop techniques for teaching foreign students.

The literature on the acquisition of language is now voluminous; a great deal of it was summarized by McCarthy. Her emphasis was on the ontogenetic development of spoken language in normal children. (McCarthy, 1946, 476) Leopold (1952) has also summarized some of the writings; his bibliography is particularly valuable because it covers non-English material. More recent summaries can be found in Brown & Berko (1960), Ervin & Miller (1963) and Ervin-Tripp (1966).

All of the evidence summarized by McCarthy supports the general prediction that the quality of the child's language is dependent on the intelligence of the child. The most extrinsic factor influencing language development is the environment in which the child is raised. Regardless of the child's intelligence, if the models available to him are not adequate his language development will be substandard. Templin found in one of her studies that upper

socio-economic groups "received higher scores quite consistently at each age level for all language measures." (Templin, 1958, 333)

Components of the language system

Research discussed in the early literature was collected in natural settings, often by parents using non-standardized techniques. Theories of language learning cannot ultimately be tested unless an experimental approach is adopted.

The analyses of language development reported in the early studies, such as those of McCarthy and M. Smith, centered largely on the size of vocabulary, sentence length, sentence complexity, sound discrimination and verbal comprehension. More recent studies by Loban and others have pointed out that these previously-used criteria are largely inadequate for measuring accurately the essentials of language. (Loban, 1963, 9) More descriptive analyses of the structure of the language are now being used to understand language acquisition; this new approach has been used since the mid '50's.

The structure of the language system is divided into two fundamental levels. The first is the phonological or sound system; the second level is grammatical. The phonemes are the vowels, consonants, levels of pitch, pauses and stresses of a particular language. They are the minimal sound units which occur in a particular language and

make differences in meaning, for example, the phonemes [s] and [S] in "sin" and "shin." The number of potential sounds in a language approaches infinity but in languages so far studied the number of phonemes runs about 25 to 30. (Carroll, 1961, 332)

Jakobson's research concerning the child's acquisition of phonemes was reported by Velten, "The hypothesis is that the development of the sound system [phonology] can be described in terms of successive contrasts between features that are maximally different and which permeate the whole system. Thus the first distinction is between a vowel and a consonant, since vowels and consonants are more different than any other part of the system. Next the child might learn to contrast a stop with a nonstop, for example /p/ and /m/, or /p/ and /f/. Theoretically, the child could double his stock of consonants with each pair of contrasting features." (Ervin & Miller, 1963, 112) A more complete description of the developmental sequence can be found in Ervin-Tripp.(1966, 68)

One theory of phonological acquisition is that the original phonetic equipment of the individual is very large and that learning takes place by a process of adjustment: it is necessary for the child to eliminate sounds not used in his language while strengthening or reinforcing the sounds which are used. Therefore, during the infant's babbling stage a great number of phonemes are voiced, but

as the child's oral cavity and dental arch develop and his parents reinforce the particular phonemes they recognize, the child's phonetic equipment is acquired. (Esper, 1935)

The grammatical description of language is often subdivided into morphology and syntax. Morphemes are the smallest meaningful units in a language, represented by a sequence of one or more phonemes, as in "Saskatchewan," "teach," "-er," "-ing." (Ervin-Tripp, 1966, 96) In speech, the plural morpheme appears as /-s/, /-z/, /-ez/, /-en/, or a vowel change as in "cats," "dogs," "bridges," "children," or "men." All of the various forms of the plural morpheme are called allomorphs. (Ervin & Miller, 1963, 117)

Morphemes are combined to form the most complex level of grammar--syntax. Syntax includes phrase structure and a system of handling the more complicated features of clauses and sentences. (Ervin-Tripp, 1966, 97)

The grammar categories (morphology and syntax) often overlap and are difficult to describe independently. According to Brown and Berko:

> Not all languages express the same grammatical categories, and each language is unique in its choice of morphological and syntactical meanings of expression. Often grammatical meanings can be expressed in two or more ways in the same language; one of these ways can involve morphology and the other, syntax; in English, for example, genitive relations can be shown either by special endings (morphology), as in the horse's hoof, or by juxtaposition of words and special function words (syntax), as in the hoof of the horse. It is thus impossible to describe grammar without considering both morphology and syntax. (1960, 541)

Word order is very important in English, while inflexional endings are of more importance in other languages. In English, "The farmer loves the girl," and "The girl loves the farmer," are two quite different statements. The actor and the object are indicated only by the position of words. The opposite is true in Latin; both "Puellam amat agricola" and "Agricola amat puellam" mean "The farmer loves the girl." (Brown & Berko, 1960, 541) Since syntax is more important in English, it is acquired before morphology. The order of acquisition is dependent on the structure of the language learned. English speaking children speak in one or two-word sentences usually accompanied by gestures to express complete thoughts by about 12 to 18 months. (Hurlock, 1964, 230) The inflexional endings are not noticed in the child's speech until about three years of age.

Research on the acquisition of syntax is relatively new and most of it has been directed by Roger Brown. He points out that in the early stages of language development, most nouns are picturable objects while most verbs are observable physical actions. It would seem that very early in the course of language development, children form concepts of the form-classes we call nouns and verbs. (Brown & Berko, 1960, 552) Suppose a person heard the sentence: The <u>iggle</u> <u>squigs</u> <u>trazed</u> <u>wombly</u> in the <u>harlish</u> <u>goop</u>. Although the meanings of the major words are not known, it is possible to assign them to form classes on the basis of their

order in the sentence and the inflections and function words. The actors are the squigs; to be more descriptive, they are iggle squigs. The action which they performed was tazed and they did it in a wombly fashion. The actors performed their act in the harlish goop. So by putting the words into classes it is possible to derive some understanding of the sentence. (Brown & Berko, 1960, 549) Further information concerning syntax can be found in Brown & Bellugi (1964), Brown & Fraser (1964), Brown & Berko (1960), Ervin & Miller (1963) and Ervin-Tripp (1966).

Studies of morphology

A study by Jean Berko focused on the child's acquisition of morphology. Morphemes are the smallest individual, meaningful elements in the utterances of a language. Free morphemes are meaningful forms that can stand alone, such as "cat" and "dog." Bound morphemes are forms that never stand alone but retain some consistent meaning in the various combinations into which they enter, for example, the possessive "'s" of "cat's" and "dog's." Morphological rules describe the construction of new words from free to bound morphemes. (Brown & Berko, 1960, 518) These rules are not explicitly known to the child or naive adults; they are implicitly known in that they are followed.

In 1958, Berko developed a set of materials that could be used to make a complete inventory of the English inflectional system: the plural and possessive endings of

nouns; the simple past, the third person present indicative, and the progressive of verbs; the comparative and superlative of adjectives. These materials were used to measure the child's understanding of English morphology. To test for this knowledge, nonsense words were used. Berko reasoned that a child able to supply the correct endings to nonsense words had successfully internalized the rules. For example, if a child responded wugs for the plural form of wug, it can be assumed that he has internalized the rule for the plural allomorph. Whereas, if the child were to supply the correct ending to a common noun such as "dog-dogs," there is no guarantee that the child hadn't just memorized the plural form of "dog."

In her study, Berko attempted to answer the following questions: Have young children been exposed to enough language to possess the rules for English morphology? If children do have the knowledge of morphological rules, how does this knowledge evolve? Is there a progression from simple, regular rules to the more irregular and qualified rules that are adequate fully to describe English? (Berko, 1958b, 150)

To find answers to these questions, Berko presented her materials in a picture book form to children ranging in age from four to seven years. She also presented the 27 picture cards to twelve adults whose responses to the inflexional items were considered correct answers. This

made it possible to rate the children's responses. In general, she found that adult opinion was unanimous. Where they differed was with the common but irregular formation, for example, heaf became heaves in the plural for many speakers and in these cases both responses (heafs, heaves) were considered correct.

In a study of preschool children's grammatical errors, M. E. Smith (1933) found that three year olds were able to generalize in the use of inflected words. Because of this they often made errors by extending the rules for the formation of regular forms to other words irregularly inflected, for example, "bringed." By examining a vocabulary list of elementary school children's 1,000 most frequently used words, Berko found all of the English inflexional morphemes present. With reference to Berko's first question, then, preschool children have been exposed to enough language to operate with clearly delimited morphological rules.

Berko's other major conclusions were: there is no apparent difference between the sexes concerning the understanding of morphological rules. Boys and girls in this age range are equal in their ability to handle the English morphology represented by these items. (Berko, 1958a, 33) There are differences between the preschoolers and the first graders, but the improvement was in the direction of perfecting knowledge already possessed--the simple

plurals and possessives, and the progressive tense. (Berko, 1958a, 33) The children's responses were consistent, regular and simple; they did not treat new words according to idiosyncratic patterns. Berko stated, "Where they provided inflexional endings, their best performance was with those forms that are the most regular and have the fewest variants. With the morphemes that have several allomorphs, they could handle forms calling for the most common of those allomorphs that appear in a limited distribution range." (Berko, 1958a, 68) The following is a further explanation of morphological rules by Berko:

> In a great majority of cases the plural form is made by adding /-ez/ to the singular if it ends in a voiceless sound other than a sibilant or affricate, or /-z/ if the singular ends in any voiced sound other than a sibilant or affricate, so that we have plurals like "batches", "bags", "backs". This summary can be set forth as a general rule for English. It does not mean that the plural must be formed in this way, and it does not imply that exceptions like "men" or "oxen" or "children" do not exist. But since it is so common, and since new words coming into the language seem to be treated according to this formation it is called the regular or productive form of the plural. (1958a, 18)

> The productive allomorphs of the plural, the possessives, and the third person singular of the verb are phonologically conditioned and identical with one another. These forms are /-s -z -ez/, with the following distribution:
> /-ez/ after stems that end in /s z š ž č j/, e.g. "glasses", "watches";
> /-s/ after stems that end in /p t k f θ/, e.g. "hops", "hits";
> /-z/ after all other stems, viz. those ending in /b d g v ð m n ŋ r l/, vowels and semivowels, e.g. "bids", "goes".

> The productive allomorphs of the past are /-t -d -ed/, and they are also phonologically conditioned, with the following distribution:
> /-ed/ after stems that end in /t d/, e.g. "melted";
> /-t/ after stems that end in /p k č f θ š/, e.g. "stopped";
> /-d/ after stems ending in voiced sounds except /-d/, e.g. "climbed", "played". (1958a, 19)

> The progressive -ing and the adjective -er and -est do not have variants. It might also be noted that the possessive has an additional allomorph /-Ø/; this occurs after an inflexional /-s/ or /-z/, so that if the form "boy" is made plural, "boys", the possessive of that plural form is made by adding nothing, and indicated in writing only by the addition of an apostrophe: "boys'". (1958a, 20)

This review of the literature has attempted to demonstrate that considerable attention has been directed toward the study of the child's acquisition of language. Most of the early research evaluated language skills on such measures as size of vocabulary, parts of speech, sentence length and sentence complexity. Comparative studies of children from different socio-economic groups seem to agree that children who are socially disadvantaged on such objective criteria as income and the educational level of their parents tend to be deficient on many measures of language skills. (Cazden, 1966, 213)

A few studies have focused more on the elementary units of the language, such as phonemes, morphemes, and syntax, but these have not been comparative studies.

The study done by Berko attempted to describe the acquisition of morphology by children enrolled in the

Harvard Preschool in Cambridge and a neighboring elementary school. From her findings she suggested that "every child is in contact with a sufficiently varied sample of spoken English in order for him to be exposed at an early age to the basic morphological processes. These processes occur in simple sentences as well as complex ones. Practice with a limited vocabulary may be as effective as practice with an extensive vocabulary, and the factors that influence other aspects of language development may have no effect on morphological acquisition." (Berko, 1958a, 57-58)

Morphology is an area of language acquisition which has not been systematically studied in the disadvantaged child. The present study was an attempt in part to replicate Berko's by comparing a sample similar to Berko's with a group of disadvantaged children.

CHAPTER III

PROCEDURES

Sources of subjects

The two groups of subjects selected for this study were enrolled in the Michigan State University nursery schools during the winter quarter (January-March), 1967. The nursery schools serve as a laboratory for the Department of Home Management and Child Development in the College of Home Economics.

The children who attended the Laboratory Preschool were representative, in general, of the upper middle class according to Cattell's Metric Scale for Social Status. (Cattell, 1946, 142) Participants in the Laboratory Preschool are chosen for enrollment on the basis of sex, age, and position on a waiting list.

In the summer of 1965, a Community Play Group was organized by the nursery school staff. Half of the group attended the Spartan Nursery School; the remainder attended the other university preschool. The thirty children enrolled in the Play Group were selected by criteria similar to those used for children in Head Start preschool programs. According to Cattell's scale, these children were members of lower class families.

Procedure for selection

English speaking children who were between 4.0 and 5.2 years at the time the testing program was initiated and who were emotionally mature enough to leave the classroom with an examiner qualified as subjects for this study.

All of the Laboratory Preschool children (LPS) who fulfilled the same requirements were listed by age and sex; eighteen of these children were then paired with their counterparts in the Community Play Group. If more than one LPS child matched in age and sex with a CPG child, the examiner randomly selected the LPS child to complete the pair. The teachers were consulted to determine if any of the children were participants in other research projects or might be leaving school before the end of the school term. A total of 20 girls and 10 boys was selected for the study. For a description of the sample see Table 1.

Testing environment and test materials

Twenty-four of the children were tested in the basement of the Laboratory Preschool. The room, 16 1/2' x 34 1/2', was a bright yellow color. At one end of the room was a kitchen unit; at the other end there was a counter with cupboards. The furnishings consisted of 4 desks and 2 small tables. One table, 19" high, was used for the testing. The child and examiner sat on chairs 11" high. The size and furnishings of the room were distracting to some subjects.

Table 1

Description of Sample

	Sample Size			Mean Ages in Months			Second Year in Nursery School			Bilingual Children		
	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
Laboratory Preschool Group	5	10	15	51.8	55.6	54.3	4	5	9	-	-	-
Community Play Group	5	10	15	52.2	56.9	55.3	1	2	3	3	3	6
Total	10	20	30	52.0	56.2	54.8	5	7	12	3	3	6

The remaining 6 children were tested at the other University nursery school (Spartan Nursery School) in a 7' x 12' room furnished as a workshop. The test was administered on a 1 1/2' x 3 1/2' workbench. Neither room was soundproof. It was not possible to eliminate all distractions.

First, the Peabody Picture Vocabulary Test (PPVT) was administered according to the procedures outlined in the test manual. This test consists of 150 plates with four illustrations on each plate. The black and white drawings, of equal size, intensity, and appeal, are presented to the subject who is asked to point to the drawing which represents the stimulus word. A ceiling level is reached when the subject misses 6 out of 8 consecutive responses. Children in the age range from 4.0 to 5.2 years on the average respond to approximately 40 pictures. A raw score is determined which can then be converted into either an age equivalent (mental age), a standard score equivalent (intelligence quotient) or a percentile equivalent. (Dunn, 1959) For the purpose of this study only the intelligent quotient scores were derived from the raw scores.

The second test administered to each child was designed by Jean Berko to measure a child's understanding of English morphology. The test comprises a set of twenty-seven brightly-colored picture cards which are presented to the subject (Appendix A). A text is read for each

picture card and the subject is expected to complete the statement. Variations of the original nonsense word were noted phonemically.

Most of the children understood what was being asked of them; it took between 10 to 15 minutes to administer the instrument. Some of the subjects in Berko's study, as well as some in this study, thought they were being taught new words and repeated the nonsense word after the examiner. For example, when the examiner said, "This is a tass," the child would immediately respond with "Tass."

If a child did not attempt to complete the statement, the examiner re-read the text on the card. After three readings if the child still did not respond no response was recorded and the next card was read. Very few children failed to complete all of the statements. Their responses will be discussed in the following chapters.

Procedure for testing

All of the tests reported in this study were administered by the writer.

The examiner spent time in each nursery school classroom prior to the testing to become more familiar with the children. During the actual testing the examiner approached each child in his nursery school room and informed him that it was his turn to play a picture game. When a child refused to participate he was asked at a later time; two and sometimes three attempts were made to invite

the child to participate. If after the third invitation the child seemed apprehensive and refused to play the "game" he was dropped from the study. The order in which the subjects were selected for administration of the tests depended upon which subjects were present on the testing day and which of those subjects were not engaged in thematic or creative play at a particular time.

After the child had agreed to go with the examiner, both went to the head teacher and explained where they were going. This was done partly to help the teacher keep track of the children, but mainly to let the child know that the teacher was familiar with the examiner and the testing situation. The examiner attempted to establish rapport through conversation from the time she took the child from the classroom until she was seated with him in the testing room. The directions for the test were read; a sample item was presented to insure comprehension of the task; then the child was given the test. When 6 errors in any 8 presentations were made on the Peabody Picture Vocabulary Test, the examiner turned back to easier items and let the child "administer the game" to the examiner. All of the children enjoyed this part of the experience. Some even insisted on changing seats and keeping a record of the responses on the score sheet. After completion of the testing procedure, the child was returned to the classroom. The same procedure was used for the administration of the second

test. Sufficient rapport was established during the first test so that all of the children approached for the second test readily agreed to participate.

Procedure for analysis

Hypothesis I was tested by the "t" test for small samples, equal N's and equal variances. A Chi-square test of independence was used to examine more closely the findings of Hypothesis I.

Two correlation coefficients were calculated for the testing of Hypothesis II. The first was Spearman's rank correlation coefficient; the second was the Pearson product-moment correlation coefficient.

A third hypothesis, arising from the results of Hypotheses I and II, was tested by an analysis of covariance.

CHAPTER IV

PRESENTATION AND DISCUSSION OF RESULTS

The hypotheses that were tested are:

Hypothesis I: Children in the Laboratory Preschool Group will achieve higher scores on the Berko test for morphological rules than will children in the Community Play Group.

Hypothesis II: There is a positive correlation between the acquisition of English morphology, as measured by the Berko test, and intelligence, as measured by the Peabody test.

The results of the tests of Hypotheses I and II yielded Hypothesis III: There is a difference in the performance of the two groups on the Berko test when the effect of I.Q. is controlled.

Results

Hypothesis I. Berko scores were assumed to be normally distributed; the variances of the two samples were tested for equality using F and found to be equal. The "t" test for small samples, equal N's, and equal variances was used to test Hypothesis I. The means for the LPS and CPG groups were 14.3 and 7.7 respectively. The findings for this one-tail test were $t = 3.204$, $p < .01$.

The null hypothesis was rejected; the means are different.

A further exploration of Hypothesis I was made using the Chi-square test of independence. The subjects of both the groups were categorized as being of high or low achievement depending on their performance scores on the Berko test. The Chi-square test with Yates correction for continuity was used to test whether the observed pattern of level of achievement was the same for both groups. The observed pattern for both groups, the chi-square value for each test, and the level of confidence for each value are summarized in Table 2. The first Chi-square test was for the total scores achieved on the Berko. The total scores were then subdivided into: (1) plural formation of nouns; (2) past tense of verbs; (3) third person singular of verbs; (4) progressive form of verbs; and (5) the two possessive forms of the noun.

Hypothesis II. Two correlations between I.Q. and Berko scores were calculated. First, the two groups were combined and ranked on the two tests and the Spearman's rank correlation coefficient was computed. The rank correlation coefficient obtained was .61. Second, the individual scores were also correlated using the Pearson product-moment correlation coefficient; the r obtained was .62. These correlations were tested for difference from zero; both were found to be significantly different from zero at the .05 level of confidence.

Table 2

Chi-square Results

Berko scores	Laboratory Preschool	Community Play Group	Chi-square Value	Level of Significance
Total				
High	11	5	4.954	.05
Low	4	10		
Subgroups				
Plurals				
High	13	4	11.122	.001
Low	2	11		
Verbs				
High	11	2	11.122	.001
Low	4	13		
Third Person Singular				
High	11	6	3.527	.10
Low	4	9		
Progressive				
High	12	10	.850	--
Low	3	5		
Possessive				
High	9	5	2.275	--
Low	6	10		

The effect of I.Q. on the Berko test was also estimated by means of linear regression. The relationship based on the sample of 30 children was $Y = -7.36 + 0.18X$ where Y = Berko score and X = I.Q.

Hypothesis III. Findings in Hypothesis II indicated that an uncontrolled variable, I.Q., may have been in effect in the analysis of Hypothesis I. Due to the findings of Hypothesis II and due to the fact that the mean I.Q. scores of the two groups were substantially different, a further statistical test was made. An analysis of covariance was used to test the difference in mean scores between the two groups when the effect of I.Q. is controlled. Table 3 presents the figures used in this analysis. The F value of 1.36 was not significant at the .05 level of confidence ($df = 1,27$). There is no significant difference between the two groups when the effect of I.Q. is controlled.

Discussion

The results of Hypothesis I indicate that the Laboratory Preschool group--children from upper middle class homes--have a better understanding of English morphology than the Community Play Group--children from lower class homes.

At this time it is essential to describe the home environment characteristic of lower class families. In discussing the environment of a lower class home and its effect on the child's learning ability, Deutsch states that

Table 3

Results of Analysis of Co-Variance

Source of Variation	Degrees of Freedom	Adjusted Sum of Squares	Adjusted Mean Squares	F
Between Group	1	34.7	34.7	
Within Group (error)	27	688.90	25.51	
Total	28	723.60		1.36

in large families there is "little opportunity for individuation." There is little time and less knowledge that is shared by adults with children. Books, toys, puzzles, pencils, and scribbling paper are rarely available to the child. The scarcity of manipulable objects and the lack of visual stimuli affect the child's visual perception.

The child has a restricted range of experiences, "lacks expectations from accumulation of knowledge, from task orientation and from adult reinforcement." The meaningless background noise contributes to the learning of inattention. The child does not get practice in auditory discrimination or feedback from adults correcting his enunciation, pronunciation, and grammar. (Deutsch, 1961)

There is little verbal interaction between the adults and the children. Communication is largely through the use of gestures and other non-verbal means. When speech is used it is what Bernstein refers to as <u>public</u> language. Some of its characteristics are: short, grammatically simple, often unfinished sentences with a poor syntactical form; simple and repetitive use of conjunctions; rigid and limited use of adjectives and adverbs. (Bernstein, 1961, 310)

Most of the child's language is learned by "receptive exposure--by hearing, rather than by the corrective feedback of his own active speech." (John & Goldstein, 1964, 273) When corrective feedback is available, that which is

fed back is often an incorrect model.

In summary, deprivation affects the adult-child relationship, perceptual and auditory discrimination, ability to sustain attention, motivation for task completion, and verbal usage. The implications of Deutsch's statements affect the present study.

In this study the Community Play Group children had trouble focussing their attention on the tests. The experience alone with an adult, the large size of the room, the distractions in the room, and the test-taking situation seemed to divert the children's attention from the tests. Some of the children could not recall the nonsense names of the Berko items. The experimenter had to repeat the words, sometimes more than once. This may have been due to either a lack of retention or difficulty in auditory discrimination or lack of practice in similar tasks.

The adult reinforcement may have motivated the upper middle class child while the same type of reinforcement may have had little or no effect on the lower class child.

The quality and quantity of the language models presented in the lower class homes are not as adequate as the models found in the upper middle class homes. Yet, English grammar must have been used correctly to some extent or the Community Play Group children could not have responded as well as they did.

The results of Hypothesis II indicated a positive correlation between I.Q. scores and the Berko scores. On the basis of these results, it is tempting to assume that since the LPS children had higher scores on the Berko test and since I.Q. is positively correlated with the Berko scores, it follows that the LPS children have higher I.Q.'s. The mean I.Q. for the LPS was actually higher than that of the CPG, but one must keep in mind the type of test used to obtain the I.Q. scores. The PPVT is a picture vocabulary test in which the examiner asks the child to point to a particular referent. The raw score obtained on the vocabulary test is converted to an intelligence quotient. Therefore, since the PPVT is a vocabulary test, and since the CPG children have deficiencies in language, the PPVT is not a valid index of intelligence for these children.

A previously cited study (John & Goldstein, 1964) found that lower class Negro children had particular difficulty on the PPVT with action words, words related to rural living, and words whose referents may be rare in low class homes. The PPVT is a measure of the child's English vocabulary and should not be used as a measure of intelligence for lower class children. It is difficult to find a standardized test that can be used with these children. Deutsch stated, "As a result of experiential poverty a child is probably further from his maturational ceiling.

This would contribute to his poorer performance on standardized tests of intelligence." (1961, 169)

A lower class child having no experience with picture books would be in an unfamiliar situation when an adult asks him to point to particular pictures. The upper middle class child, being more familiar with picture books, is more able to cope with the testing situation because he knows what is expected of him.

If a child's visual perceptual skills are not as developed and if he has had little experience attaching labels to pictures, he may not perceive the object in the picture as representative of a real object or action with which he is familiar. This being the case, the mode of presentation of the I.Q. test was also inappropriate for the lower class children.

A third added disadvantage for the CPG was that many of the children came from bilingual families. A child learning two languages simultaneously has a slower acquisition of both languages. On the average, the children who came from bilingual environments had fewer English words in their vocabularies and subsequently had lower I.Q. scores. They may also have been learning the grammar of two languages and hence may not have understood English morphology as well as their peers.

A further explanation as to the meaning of the scores is necessary. A child's I.Q. score was obtained

by comparing his raw score with norms based on children of the same age. For example, a score of 56 at 4 years would yield an I.Q. score of 120, while at 5 years the same raw score would be converted to an I.Q. score of 111. On the Berko test all 30 children were measured on the same scale; age was not taken into consideration except that the two samples for this study were matched on the basis of age. This explains discrepancies such as the following:

Subject A I.Q. = 125, Berko = 5;
Subject B I.Q. = 105, Berko = 18.

The first child was only 4 years old; the second child was 5 years and 2 months old. An explanation of this finding is that age is a variable which must be considered in rating a child's level of morphological understanding.

Examination of Hypothesis III demonstrated that there was not a significant difference in the mean Berko scores between the two groups when the effect of I.Q. was controlled. This finding further emphasizes the positive relationship between morphological acquisition and intelligence. The two variables are so closely linked that when the effect of I.Q. is held constant across the two socioeconomic groups, the difference between the mean Berko scores disappears.

Around 4 years of age the child is just beginning to comprehend the inflexional endings of words. A verbally enriched environment does not seem to accelerate the child's learning of morphology nor does a verbally deficient

environment (as described above) decelerate the learning, if the child has been exposed to inflexional endings. The CPG children had been attending the university nursery school 6 months prior to the time they took the Berko test. Their exposure to good English models and the corrective feedback given by the teachers and other children may have influenced the children's language acquisition and, more specifically, morphology.

A content analysis of the responses revealed results similar to those in Berko's study. The plural allomorph most often used by the children was /-z/, followed by /-s/, and finally /-ez/. Although these children have in their vocabularies real words which form their plural in /-ez/, they were not able to generalize to form new words in /-ez/. Berko stated the children's rule for plural formation as, "to add /-s/ or /-z/, unless the word ends in /s z š ž č ǰ/. To words ending in these sounds add nothing to make the plural--and when asked to form a plural, repeat the stem as if it were already in the plural." (Berko, 1958a, 59) Some of the children who were unable to form the /-ez/ plural allomorph were able to supply /-ez/ as the inflexional ending on the third person singular of the verb.

A similar situation arose with the past tense allomorph of the verb. Although the children had forms like "melted" in their vocabularies, they were unable to generalize the /-ed/ form to new words ending in /t d/. Berko

found that the children treated these forms as if they were already in the past. She suggested that the children's "real morphological rules for the formation of the past tense is to add /-d/, and under certain conditions it will automatically become /-t/." (Berko, 1958a, 63) The children did not use irregular patterns to form the past tense, for example, "ring" became "ringed."

The best performance on the verb inflexions was with the progressive form. There is only one allomorph for the progressive and that is "-ing." The children either responded with the correct form or not at all. Children in this age group are more involved with the present and might be more familiar with the progressive form of the verb than the past tense.

Formation of the two possessives is accomplished in writing by adding either "'s" or "s'" to the singular form; in speech, by adding a morphological zero. Therefore, if a child supplied the correct plural allomorph for either the singular or plural possessive he was credited with a correct response. Some children responded with real words instead of the nonsense words for the possessive forms, for example, instead of "bik's hat," they responded with "man's hat," "cartoon's hat" or "boy's hat." In such cases partial credit was given.

Although not considered in the total score, the adjectival inflexion was tested. The test item attempted

to elicit comparative and superlative endings for the adjective quirky. Instead of using the inflexional endings many children responded with homonyms (such as "turkey," murkey) or synonyms (such as "spotty," "Beagle," "Collie"). If a child did not supply the comparative form of the adjective, the experimenter supplied that form when asking for the superlative form. The majority of the children repeated the "-ier" form after the experimenter. Two children attempted the superlative with "more quirkier" and "quirkier than the last." Only one child supplied the correct response--quirkiest. These responses were congruent with those discussed by Berko.

Summary

The results of the first statistical test supported Hypothesis I; children in the LPS Group achieved higher scores on the Berko test than children in the CPG. There was a cause and effect relationship between environmental experiences and test-taking abilities.

Two correlation coefficients were obtained and supported Hypothesis II; there is a positive correlation between I.Q. scores and Berko scores. Implications of this result were discussed as they pertained to the inadequacy of the PPVT to evaluate the intelligence of the lower class children.

The difference in the performance of the two groups on the Berko test when the effect of I.Q. is controlled

was not found to be significant. This finding further emphasized the complex interrelationship of language acquisition and intelligence.

These findings suggest that morphological acquisition is another aspect of language development which is extrinsically influenced by environment and intrinsically influenced by intelligence.

CHAPTER V

SUMMARY, CONCLUSIONS AND IMPLICATIONS

Summary

For the past several years, the child's acquisition of spoken language has been the basis for a considerable amount of writing and research. In the early studies the size of a child's vocabulary, the parts of speech used, and the length and complexity of his sentences were utilized to evaluate his language skills. The findings from studies which compare children from various socio-economic classes seem to indicate that children from the lower class homes tend to be deficient in many of the measured language skills.

In the more recent studies on language development, the methods of measuring language have been more precise. The acquisition of language structure has been studied by investigating the elementary units of the language--the phonemes, morphemes and syntax. However, research which more accurately measures the essentials of language has not been comparative in nature.

The purpose of this study was to measure certain preschool children's understanding of English morphology. A study conducted by Jean Berko in 1958 found that children as young as four years of age begin to operate within

clearly defined morphological rules. She suggested that "every child is in contact with a sufficiently varied sample of spoken English in order for him to be exposed at an early age to the basic morphological processes." (Berko, 1958a, 57)

The specific problem involved in the present study was to compare children from upper middle class homes to children from lower class families on their understanding of the morphological rules. A second aspect of English morphology investigated was the relationship of language acquisition to intelligence.

The sample consisted of two groups of children ranging in age from 4 years old to 5 years 2 months old. One group, from the Laboratory Preschool on the Michigan State University campus, was comprised of 15 children from upper middle class homes. The 15 children in the Community Play Group, also from the university nursery schools, were representatives of lower class homes.

Each child was tested on two separate occasions; on the first occasion the Peabody Picture Vocabulary Test was administered in order to obtain an intelligence quotient score; and the second test, designed by Jean Berko, was used to measure the child's understanding of English morphology. The latter test consisted of 27 brightly-colored pictures representative of nonsense words. Berko hypothesized that if a child were able to supply the correct

endings to nonsense words, he would have successfully internalized the morphological rules. On the other hand, a child able to supply the plural allomorph to a common noun may have just memorized the plural form of the word and not have internalized the rule. The Berko test measured the complete system of English inflexions: the plural and possessive endings of nouns; the simple past, the third person present indicative and the progressive of verbs; the comparative and superlative of adjectives.

The two major hypotheses tested in this study were: I. Children in the Laboratory Preschool Group (LPS) will achieve higher scores on the Berko test for morphological rules than will children in the Community Play Group (CPG); II. There is a positive correlation between the acquisition of English morphology, as measured by the Berko test, and intelligence, as measured by the Peabody test. A third hypothesis, arising from the findings of Hypotheses I and II, was examined: III. There is a difference in the performance of the two groups on the Berko test when the effect of I.Q. is controlled.

The findings of the first statistical test ($t=3.204$, $p < .01$) supported Hypothesis I. Children in the Laboratory Preschool did achieve higher scores on the Berko test than did children in the Community Play Group. Implications of this result were discussed as they pertained to a cause and effect relationship between environmental experiences

and test-taking abilities.

A rank correlation coefficient of .61, and a product-moment correlation coefficient of .62 supported Hypothesis II. There is a positive correlation between the understanding of English morphology and intelligence. The probable reasons for this finding are again due to environmental differences; the children from lower class families have not had as much experience with attaching labels to pictures as have upper middle class children. Because of this, the lower class children would not perform as well on a picture vocabulary test as would the upper middle class children. This is a possible explanation for the lower mean I.Q. score achieved by the CPG children.

Due to the fact that the test used to measure I.Q. was not an appropriate measure for evaluating the intelligence of lower class children, the data were further statistically tested. An analysis of co-variance was used to test the difference between the two groups after controlling the effect of I.Q. The F obtained in this statistical test was not significant at the .05 level. The most probable explanations for this finding seem to be: (1) intelligence and language are so complexly interrelated that if intelligence (as measured by an I.Q. test) is held constant the proficiency of verbal skills is minimized; (2) the CPG children had been in nursery school 6 months prior to the time they were given the Berko test, so even

if they had not been exposed to the inflexional endings in their homes, their exposure to them in nursery school might have had a positive influence on their Berko scores; and (3) acquisition of morphological rules is developmental and children in this age range are just beginning to understand morphology. Therefore, a child raised in a verbally-sophisticated environment is unlikely, at this age, to have a comprehensive understanding of morphology. It has been pointed out in this study that age is an important variable which must be considered when measuring a child's understanding of morphology.

Conclusions and implications

Implications from the findings in this study suggest that further comparative investigation is needed in the area of grammar acquisition. Morphological understanding should be measured in children older than the ones in this study. Since these children were in the developmental sequence of learning the rules of morphology, the discrepancy between the groups' means was not significant when the effect of I.Q. was controlled. Whether or not the discrepancy would appear at an older age is left to speculation. The 12 adults in Berko's study, whose responses to the inflexional items were considered correct answers, were all college graduates. Whether or not adults of the lower class have mastered the morphology rules has not been investigated. The findings from such an investigation might

have implications for early childhood education. If the adults do understand the morphological rules, perhaps every child is exposed to enough correctly spoken English to acquire a basic understanding of English morphology.

Intelligence is a very important factor involved in the acquisition of this aspect of language. It is such an inseparable variable that when the effect of I.Q. is held constant, the language difference between the two socio-economic groups disappears. Considering this fact, the only way to do a study of language acquisition comparing children of differing class groups would be to match the groups on I.Q. as well as age. In this way, the difference in language would be due to environmental factors, not intelligence quotient.

A more accurate correlation between the understanding of morphology and intelligence could be obtained if environmental factors were held constant. A large sample of children from approximately the same socio-economic class could be evaluated on both a standardized intelligence test and the Berko test. The results of such a correlation would be due more to intelligence than to environment.

Another approach to the relationship between morphology and intelligence was suggested by Berko. After a group of children have been evaluated by a standardized intelligence test, the Berko cards could be used as practice

with half the children until they have acquired all the morphological items. A retest of the group on the I.Q. measure could then be used to see if specific instructions in morphology at the preschool level results in higher performance on the standardized I.Q. test. (Berko, 1967)

Until researchers have a more complete understanding of the developmental sequence of the acquisition of language in the early years, one may assume that intelligence, environment, and age are all greatly influential in the acquisition of morphology.

REFERENCES

Berko, Jean. "The Child's Learning of English Morphology." Unpublished doctoral dissertation, Radcliffe College, 1958 (a).

Berko, Jean. "The Child's Learning of English Morphology." Word, 1958, 14, 150-177 (b). Also cited in S. Saporta (Ed.), Psycholinguistics. New York: Holt, Rinehart & Winston, 1961. Pp. 359-375.

Berko, Jean. Personal communication. January, 1967.

Bernstein, B. "Aspects of Language and Learning in the Genesis of Social Process." Journal of Child Psychology and Psychiatry, 1961, 6, 313-325.

Brown, R., & Bellugi, Ursula. "The Acquisition of Language." Monograph of the Society for Research in Child Development, 1964, 29, No. 1.

Brown, R., & Berko, Jean. "Psycholinguistics Research Methods." In P. Mussen (Ed.), Handbook of Research Methods in Child Development. New York: John Wiley & Sons, Inc., 1960. Pp. 517-557.

Brown, R., & Fraser, C. "The Acquisition of Syntax." Monograph of the Society for Research in Child Development, 1964, 29, 43-79.

Buros, O. Sixth Mental Measurement Yearbook. Highland Park, New Jersey: The Gryphon Press, 1965.

Carroll, J. "Language Development in Children." In S. Saporta (Ed.), Psycholinguistics. New York: Holt, Rinehart & Winston, 1961. Pp. 331-345.

Cattell, R. "The Concept of Social Status." In P. Harriman (Ed.), 20th Century Psychology. New York: The Philosophical Library, 1946. Pp. 128-145.

Cazden, C. B. "Subcultural Differences in Child Language: An Inter Disciplinary Review." Merrill-Palmer Quarterly, 1966, 12, 185-219.

Deutsch, M. "The Disadvantaged Child in the Learning Process." In A. H. Passow (Ed.), Education in Depressed Areas. New York: Teachers College Press, 1965. Pp. 163-179.

Dunn, L. Manual for the Peabody Picture Vocabulary Test. Minneapolis: American Guidance Service, Inc., 1959.

Ervin, Susan, & Miller, W. "Language Development." In H. Stevenson (Ed.), Child Psychology. 62nd Yearbook of the National Society for the Study of Education. Chicago: University of Chicago Press, 1963. Pp. 108-143.

Ervin-Tripp, Susan. "Language Development." In Hoffman & Hoffman (Ed.), Review of Child Development Research. New York: Russell Sage Foundation, 1966. Pp. 55-105.

Esper, E. "Language." In C. Murchinson (Ed.), Handbook of Social Psychology. Worcester: Clark University Press, 1935. Pp. 417-460.

Hurlock, Elizabeth. Child Development. New York: McGraw-Hill, 1964.

Hurst, C., & Jones, W. "Psychosocial Concomitants of Substandard Speech." The Journal of Negro Education, 1966, 35, 409-421.

Jesperson, O. Language: Its Nature, Development and Origin. New York: Holt, 1922.

John, Vera, & Goldstein, L. "The Social Context of Language Acquisition." Merrill-Palmer Quarterly, 1964, 10, 265-275.

Leopold, W. Bibliography of Child Language. Evanston, Illinois: Northwestern University Press, 1952.

Loban, W. The Language of Elementary School Children. Champaign: National Council of Teachers of English Research Report, No. 1, 1964.

McCarthy, Dorthea. "Language Development in Children." In L. Carmichael (Ed.), Manual of Child Psychology. New York: John Wiley & Sons, Inc., 1946. Pp. 492-630.

Piaget, J. The Language and Thought of the Child. New York: The World Publishing Company, 1965.

Smith, Madorah. "An Investigation of the Development of the Sentence and the Extent of Vocabularies in Young Children." University of Iowa Study of Child Welfare, 1926, 3, No. 5.

Smith, Madorah. "Grammatical Errors in the Speech of Preschool Children." Child Development, 1933, 4, 201-213.

Templin, Mildred. "Relation of Speech and Language Development to Intelligence and Socio-Economic Status." Volta Review, 1958, 60, 331-334.

Thorndike, E., & Lorge, I. The Teacher's Wordbook of 30,000 Words. New York: Teachers College Press, 1944.

APPENDIX A

Description of the Berko Cards

The following is Berko's description of the 27 brightly-colored picture cards. She has included a statement of what is being tested, a description of the card, and the text which is read. Pronunciation is indicated by regular English orthography; a phonemic transcription is included for first occurrences of nonsense words.

1. Plural. One bird-like animal, then two. "This is a wug /wʌg/. Now there is another one. There are two of them. There are two _____."

2. Plural. One bird, then two. "This is a gutch /gʌč/. Now there is another one. There are two of them. There are two _____."

3. Past tense. Man with a steaming pitcher on his head. "This is a man who knows how to spow /spow/. He is spowing. He did the same thing yesterday. What did he do yesterday? Yesterday he _____."

4. Plural. One animal, then two. "This is a kazh /kæž/. Now there is another one. There are two of them. There are two _____."

5. Past tense. Man swinging an object. "This is a man who knows how to rick /rik/. He is ricking. He did the same thing yesterday. What did he do yesterday? Yesterday he _____."

6. Diminutive and compounded or derived word. One animal, then a miniscule animal. "This is a wug. This is a very tiny wug. What would you call a very tiny wug? This wug lives in a house. What would you call a house that a wug lives in?"

7. Plural. One animal, then two. "This is a tor /tɔr/. Now there is another one. There are two of them. There are two _____."

8. Derived adjective. Dog covered with irregular green spots. "This is a dog with quirks /kwərks/ on him. He is all covered with quirks. What kind of a dog is he? He is a ____ dog."

9. Plural. One flower, then two. "This is a lun /lʌn/. Now there is another one. There are two of them. There are two ____."

10. Plural. One animal, then two. "This is a niz /niz/. Now there is another one. There are two of them. There are two ____."

11. Past tense. Man doing calisthenics. "This is a man who knows how to mot /mat/. He is motting. He did the same thing yesterday. What did he do yesterday? Yesterday he ____."

12. Plural. One bird, then two. "This is a cra /kra/. Now there is another one. There are two of them. There are two ____."

13. Plural. One animal, then two. "This is a tass /tæs/. Now there is another one. There are two of them. There are two ____."

14. Past tense. Man dangling an object on a string. "This is a man who knows how to bod /bad/. He is bodding. He did the same thing yesterday. What did he do yesterday? Yesterday he ____."

15. Third person singular. Man shaking an object. "This is a man who knows how to naz /næz/. He is nazzing. He does it every day. Every day he ____."

16. Plural. One insect, then two. "This is a heaf /hiyf/. Now there is another one. There are two of them. There are two ____."

17. Plural. One glass, then two. This is a glass. Now there is another one. There are two of them. There are two ____."

18. Past tense. Man exercising. "This is a man who knows how to gling /glin/. He is glinging. He did the same thing yesterday. What did he do yesterday? Yesterday he ____."

19. Third person singular. Man holding an object. "This is a man who knows how to loodge /luwdž/. He is looding. He does it every day. Every day he ____."

20. Past tense. Man standing on the ceiling. "This is a man who knows how to bing /bin/. He is binging. He did the same thing yesterday. What did he do yesterday? Yesterday he ____."

21. Singular and plural possessive. One animal wearing a hat, then two wearing hats. "This is a niz who owns a hat. Whose hat is it? It is the ____ hat. Now there are two nizzes. They both own hats. Whose hats are they? They are the ____ hats."

22. Past tense. A bell. "This is a bell that can ring. It is ringing. It did the same thing yesterday. What did it do yesterday? Yesterday it ____."

23. Singular and plural possessive. One animal wearing a hat, then two. "This is a wug who owns a hat. Whose hat is it? It is the ____ hat. Now there are two wugs. They both own hats. Whose hats are they? They are the ____ hats."

24. Comparative and superlative of the adjective. A dog with a few spots, one with several, and one with a great number. "This dog has quirks on him. This dog has more quirks on him. And this dog has even more quirks on him. This dog is quirky. This dog is _____. And this dog is the _____."

25. Progressive and derived agentive or compound. Man balancing a ball on his nose. "This is a man who knows how to zib /zib/. What is he doing? He is ____. What would you call a man whose job is to zib?"

26. Past tense. An ice cube, then a puddle of water. "This is an ice cube. Ice melts. It is melting. Now it is all gone. What happened to it? It ____."

27. Singular and plural possessive. One animal wearing a hat, then two. "This is a bik /bik/ who owns a hat. Whose hat is it? It is the ____ hat. Now there are two biks. They both own hats. Whose hats are they? They are the ____ hats."

(Berko, 1958a, 25-29)