



1969

# Construct validation of a language inventory

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**CONSTRUCT VALIDATION OF A LANGUAGE INVENTORY**

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**A Thesis**

**Presented to**

**the Faculty of the Department of Speech**

**University of the Pacific**

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**In Partial Fulfillment**

**of the Requirements for the Degree**

**Master of Arts**

---

**by**

**Margaret Louise Cheney Drennan**

**September 1969**

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by

Margaret L. Drennan

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Jerald W. Nelson

1969

This thesis, written and submitted by

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## TABLE OF CONTENTS

	Page
ACKNOWLEDGMENT . . . . .	iv
LIST OF TABLES . . . . .	vii
 Chapter	
1. INTRODUCTION . . . . .	1
THE PROBLEM . . . . .	1
DEFINITION OF TERMS . . . . .	2
DEDUCED CONSEQUENCES . . . . .	5
NEED . . . . .	5
UNDERLYING ASSUMPTIONS . . . . .	7
GENERALLY-STATED HYPOTHESIS . . . . .	8
2. THEORY AND RATIONALE . . . . .	9
3. DESIGN AND PROCEDURE . . . . .	18
STUDY DESIGN . . . . .	19
Bereiter-Engelmann Language Program . . . . .	20
Traditional . . . . .	20
Team Teaching . . . . .	20
SUBJECT SELECTION . . . . .	21
SUBJECT DESCRIPTION . . . . .	22
INSTRUMENT CRITERIA . . . . .	24
INSTRUMENT DESIGN . . . . .	24
INSTRUMENT ADMINISTRATION . . . . .	25
DATA COLLECTION . . . . .	26

Chapter	Page
EXTERNAL VALIDITY . . . . .	26
Interaction Effect of Selection Biases . . . . .	26
Interaction Effect of Pretesting . . . . .	27
Reactive Effects of Experimental Procedures . . . . .	27
INTERNAL VALIDITY . . . . .	27
Contemporary History . . . . .	27
Maturation Processes . . . . .	27
Pretesting Procedures . . . . .	28
Measuring Instruments . . . . .	28
Statistical Regression . . . . .	28
Differential Selection of Subjects . . . . .	29
Experimental Mortality . . . . .	29
Interaction of Selection and Maturation, Selection and History . . . . .	30
Summary of External and Internal Validity . . . . .	30
DESCRIPTION OF STUDIES . . . . .	30
SUMMARY . . . . .	43
4. RESULTS OF THE STUDY . . . . .	45
SUMMARY . . . . .	56
5. DISCUSSION, SUMMARY AND RECOMMENDATIONS . . . . .	57
DISCUSSION . . . . .	57
SUMMARY . . . . .	63
RECOMMENDATIONS . . . . .	64
BIBLIOGRAPHY . . . . .	66
APPENDIXES . . . . .	69
A. Inventory of Language Maturity . . . . .	70
B. Four Areas of Linguistic Skills . . . . .	71

## LIST OF TABLES

Table	Page
1. Organizational Model of Generative-Transformational Grammar . . . . .	12
2. Grammar Used to Produce the Sentences in the LI . . . . .	14
3. Multiple Design Using Various Populations . . . . .	19
4. Description of Disadvantaged Population . . . . .	22
5. Description of Advantaged Population . . . . .	23
6. Experimental Mortality . . . . .	29
7. Population Description: Question #1 . . . . .	31
8. Population Description: Question #2 . . . . .	32
9. Population Description: Question #3 . . . . .	33
10. Population Description: Question #4 . . . . .	34
11. Population Description: Question #5 . . . . .	35
12. Population Description: Question #6 . . . . .	36
13. Population Description: Question #8 . . . . .	37
14. Population Description: Question #9 . . . . .	38
15. Population Description: Question #10 . . . . .	39
16. Population Description: Question #11 . . . . .	40
17. Population Description: Question #12 . . . . .	41
18. Paired Questions from LI for Measurement of Split-Half Reliability . . . . .	43
19. Analysis of Variance: Question #1 . . . . .	46
20. Analysis of Covariance: Question #2 . . . . .	47
21. Analysis of Covariance: Question #3 . . . . .	48
22. Analysis of Variance: Question #4 . . . . .	49



Table

Page

23. Analysis of Variance: Question #4 . . . . .	50
24. Two Factor Analysis of Variance: Question #7 . . . . .	52

## Chapter 1

### INTRODUCTION

Language is the all-encompassing term used in many places and having various denotations. For this reason language has uses, too. Oral language is used as a principal factor to determine cultural disadvantage and is the primary medium of instruction in the school setting. Language operates as the intangible aspect in measurements of intelligence. The term 'language development' is used whenever one refers to the merits of federally funded preschool projects and is accepted without definition while the counter term 'linguistics' brings confusion in the mind of many classroom teachers and administrators. Commercial materials carry the label "linguistic method" or a "language development program" for a specific population. For educators 'language' is a loose, all-powerful term which needs to be limited in meaning to a specific set of principles.

### THE PROBLEM

The purpose of this study is to construct a validation study of a locally devised language inventory designed to measure the child's linguistic abilities. This inventory was developed in response to the need for a sound, theory-based examination which would give an accurate measure of language. Validating an instrument can be described as an attempt to give meaning to a test by noting the ability of that test to produce different results in scores when applied to different kinds of people.

For example, the Stanford-Binet Intelligence test is valid because it produces higher scores for children who can learn easily in school than it does for those children who find academic learning to be difficult.

#### DEFINITION OF TERMS

Some terms will be used repeatedly throughout the paper, others lend general information to the subject. The validation of an inventory should begin with an agreement on 'construct' and 'validate' to orient the reader to the basic plan of the paper.

Construct. According to one source,<sup>1</sup> construct means "to form by putting together parts; build; frame; devise. A complex image or idea formed from a number of simpler images or ideas." The use of construct in the form of a question shows its application in a sentence. 'What factors or constructs account for variability in test scores?'<sup>2</sup>

Validation. The term validate means "to make valid; substantiate; confirm . . . to give official sanction, confirmation or approval to, as documents".<sup>3</sup> In the chapter on validity, Kerlinger refers to four types of validity: "predictive, concurrent, content, and construct".<sup>4</sup> These two terms, construct and validation, adequately explain this paper as it is a description of a language inventory by putting together many sub-studies for verification of both a theory and the instrument designed to

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<sup>1</sup>Jess Stein, (ed.), The Random House Dictionary of the English Language (New York: Random House, 1966).

<sup>2</sup>Fred N. Kerlinger, Foundations of Behavioral Research (New York: Holt, Rinehart and Winston, Inc., 1964) p. 448.

<sup>3</sup>Stein, op. cit., p. 1578.

<sup>4</sup>Kerlinger, op. cit., p. 445.

substantiate the observable aspects of that theory. That is, construct validation is the verification of selected types or sources of variability in test scores.

Language. A broad definition of language is "a structured system of arbitrary vocal, graphic and gestured symbols which is used in interpersonal communication and which catalogs the things, events, and processes of human communication".<sup>5</sup> A very different definition comes from the field of linguists, "A language is in fact a very complicated mechanism for the production of sentences."<sup>6</sup> Chomsky expands this by stating, "The principles of sentence formation and interpretation formulated in a grammar are those that must be presupposed to account for the actual use of language."<sup>7</sup> From communication to grammar, this helps to point out what happens when two people talk about 'language' without prior discussion of its meaning to them. Chapter 2 will present a clearer explanation of the fundamentals of language as they will be used in the inventory.

Grammar. As with the term 'language', grammar has many meanings. Each reviews uses as follows:

. . . grammar is used in several different senses. It may mean a particular kind of book, a text book for learning a language, or a reference book for looking up various points of usage. It may mean the system of a language, the underlying regularities obeyed by speakers of the language. Or it may

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<sup>5</sup>Committee on Language Development and Disorders. "Report", Journal of the American Speech and Hearing Association, July, 1967, p.273.

<sup>6</sup>Paul Roberts, Modern Grammar. (New York: Harcourt, Brace & World, 1968), p. 1.

<sup>7</sup>Noam Chomsky, "Introduction", English Syntax, Paul Roberts, author, (alternate edition, New York: Harcourt, Brace & World, Inc., 1964), p. x.

mean a series of statements or formulas describing this underlying structure, in short, a theory about language.<sup>8</sup>

Grammar as it is used in this paper follows the more limited definition of Koutsoudas.

A grammar is a finite set of rules which enumerates (or generates) an infinite number of grammatical (or well-formed) sentences of a language and no ungrammatical ones and assigns to each sentence generated its proper structural description.<sup>9</sup>

This concept of grammar is expanded into the theory presented in Chapter 2.

Linguistics. From the writings of Lamb, linguistics is ". . . the scientific study of language. Such study may concentrate on the sounds of language (phonology), the origin and changing meaning of words (etymology and semantics), or the arrangements of words in meaningful context in different languages (syntax-structural or transformational grammar)."<sup>10</sup>

Standard English. According to the Dictionary of Linguistics, standard English is "that dialect of a language which has gained literary and cultural supremacy over the other dialects and is accepted by the speakers of the other dialects as the most proper form of the language."<sup>11</sup>

Preschool. The term 'preschool' is generally thought of as a program for three and four year old children with the majority in the four

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<sup>8</sup>Emmon Bach, An Introduction to Transformational Grammars (New York: Holt, Rinehart and Winston, Inc. 1964), p. 4.

<sup>9</sup>Andreas Koutsoudas, Writing Transformational Grammars: An Introduction (New York: McGraw-Hill Book Co. 1966), p. 4.

<sup>10</sup>Pose Lamb, Linguistics in Proper Perspective (Columbus, Ohio: Charles E. Merrill Pub. Co., 1967), p. 4.

<sup>11</sup>Mario A. Pei and F. Gaynor, A Dictionary of Linguistics New Jersey: Littlefield, Adams & Co. 1967), p. 203.

year old category. In some states where the kindergarten is not part of the school system, preschool incorporates the children of kindergarten age. In San Joaquin County, California, kindergartens are part of the school sequence and therefore, preschool does not for this paper include those children. As a distinction, 'early childhood' education focuses on the ages of three to seven.

#### DEDUCED CONSEQUENCES

It is a fact that language is basic to the development of academic skills and if reading and writing are the tools to develop academic skills, then the Language Inventory (LI) should predict later achievement in reading and writing. On a short-term basis, then, the LI should also differentiate between groups of children who are in differing stages of readiness for learning the basic reading and writing skills.

#### NEED

"Verbal and reasoning abilities - which may be combined under the general rubric of ability to manipulate symbols - have been found to be the major factor in academic achievement throughout the school years. Thus, from the point of view of success in school, the disadvantaged children are retarded most in the areas that count the most."<sup>12</sup> The relationship between social, personal, and economic success in life, and one's ability to handle the dominant linguistic form of the culture has been mentioned by many writers in education, psychology and sociology,

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<sup>12</sup>Carl Bereiter and Siegfried Engelmann, Teaching Disadvantaged Children in the Preschool (New Jersey: Prentice Hall, Inc. 1966), p. 5.

that the idea has become commonplace. Lack of social mobility, personal dissatisfaction with one's life and work, economic deprivation all have been repeatedly related to inability to use the common cultural medium of exchange 'language' in a relatively uniform way.

California initiated its new program of English as a separate subject with emphasis on thoroughness, according to the Education Code, in the fall of 1968 within the state public school system.<sup>13</sup> The emphasis was on spoken rather than written language and the relation of concept formation to linguistic structures. The relation between success in completing the school career and the ability to handle the Standard English has been confirmed by many sources.

The greatest deficit, and threat to academic achievement, of the disadvantaged child is his retardation in the development of language and conceptual skills.<sup>14</sup>

'Cultural disadvantage' has become the common euphemism for minority children's troubles in school but many educators now maintain their main disadvantage is verbal, not cultural.<sup>15</sup>

. . . dialect-speaking Negro children have to spend most of their energy overcoming deviations which white children never encounter.<sup>16</sup>

For these reasons it is vitally important that a precise measure of children's language performance and competence be available to assess the particular language deficits in a diagnostic manner so that the

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<sup>13</sup>California State Department of Education. English Language Framework for California Public Schools (Sacramento, California: Office of State Printing, 1968), p. 8.

<sup>14</sup>Robert L. Politzer, Foreign Language Learning: A Linguistic Introduction (New Jersey: Prentice-Hall, 1966).

<sup>15</sup>University of California, "Different But Equal", A Special Report to the Regents of the University of California. (May, 1968), p. 12.

<sup>16</sup>University of California, loc. cit.

classroom teacher can systematically present remedial and enrichment curriculum to begin to reduce the language differences. This describes the beginnings of a symbol-manipulation curriculum, the mastery of which should allow many children to move with more ease into and through the learning of the traditional academic skills.

#### UNDERLYING ASSUMPTIONS

Some underlying assumptions of importance to this paper are listed as follows:

1. Mastery of language from the language arts view is both the spoken and written form.
2. Writing is a reflection of spoken language. (The system of writing refers "to a system of conventions in the use of certain symbols as the basic signals in a code.")<sup>17</sup>
3. Reading is the process of decoding the graphemic symbols into phonemes.
4. Schools provide speaking models and standards in English.
5. Teachers are the primary speech models of the school.
6. The language spoken by the teachers of the schools is the prestige dialect of the given region and is usually the closest to standard English.<sup>18</sup>
7. Some Afro-American students do not speak standard English.<sup>18</sup>
8. Some Caucasian-American students do not speak standard English.<sup>18</sup>
9. Some Mexican-American students do not speak standard English.<sup>18</sup>

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<sup>17</sup>H. A. Gleason, Jr., An Introduction to Descriptive Linguistics (Revised Edition, New York: Holt, Rinehart & Winston, 1961), p. 408.

<sup>18</sup>See the definition of standard English, p. 4 text.



## GENERALLY-STATED HYPOTHESIS

- A. A language inventory test should differentiate between children who have had differing programs of education.
- B. A language inventory test should differentiate between children having differing cultural, social, or ethnic backgrounds.
- C. A language inventory test should not differentiate between boys and girls.
- D. A language inventory test should be closely related to scores obtained from other proven achievement-related tests.
- E. A language inventory test should be a reliable instrument when used in the field of early childhood education.

## Chapter 2

### THEORY AND RATIONALE

The study of human speech as conceived in traditional departments of Speech in American Universities has been influenced very little by linguistic science. This is regrettable inasmuch as linguistics deals primarily with the systematic analysis of facts of speech. Phonology has been perhaps one of those provinces of linguistics that has called the attention of the speech therapist, probably because it offers logical explanation to the frequently intricate realm of articulatory phonetics.

The field of linguistic science was explored in order to develop a testing instrument according to which trends of human speech, language, could be detected; both on a developmental stage as well as in its mature functioning. After exploring the province of structural linguistics as postulated by American Scholars (Boas, Sapir, Bloomfield, Hachet, Z. Harris, Gleason and others) it was decided not to accept their approach to language analysis. It is true that descriptive linguistics has sufficient descriptive power to categorize linguistic units in terms of item arrangement or process, but it lacks to some extent the explanatory power to show the generative process of syntactic units. These units are most observable in the sentence, inasmuch as we talk in well formed formulated sentences all the time; therefore, the research centers on the field of generative-transformational grammar. The generative-transformational theory of language permits one to find out whether the language competence and performance expected in a given population was already sufficient to

explain developmental trends in the many dialects of English.

Since the terms "generative" and "transformational" lend themselves to various interpretations, the term 'transformations' "have been defined as those processes which convert deep structures into intermediate and/or surface structures."<sup>1</sup> The structure of a transformational grammar emerges between two facts of human speech; (1) competence, (2) performance, which are the fundamental distinctions between knowledge and behavior. "Performance limitations impose a constraint on our ability to use the infinite language we know."<sup>2</sup> In other words performance limitations, such as memory, severely hamper one's infinite knowledge of language namely one's competence.

A transformational grammar postulates the existence of a deep structure and a surface structure. It is by means of various processes of transformations that a deep structure becomes surface structure; i.e., into an observable form. It was precisely in this observable form that the inventory could be developed. Further, it was in the generative-transformational model that both the explanatory and descriptive powers were found.

This chapter contains the outlined theoretical principles used in constructing the Language Inventory (LI). Both language and grammar were defined in Chapter 1; language being formulation and interpretation of sentences and grammar, the finite set of rules which generates an infinite set of sentences. To expand the theoretical framework of the LI defini-

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<sup>1</sup>Roderick Jacobs and Peter Rosenbaum, English Transformational Grammar (Waltham, Massachusetts: Blaisdell Publishing Company, 1968), p.23.

<sup>2</sup>Ibid., p. 268-269.

tions of sentence, string and rule were necessary.

Jacobs and Rosenbaum wrote, "A sentence is a string of words, but not every string of words is a sentence."<sup>3</sup> They presented four skills used in perceiving sentences, which are the following:

1. "the ability to distinguish between the grammatical and ungrammatical strings of a potentially infinite set of utterances,"
2. "the ability to interpret certain grammatical strings even though elements of the interpretation may not be physically present in the string,"
3. "the ability to perceive ambiguity in a grammatical string,"
4. "the ability to perceive when two or more strings are synonymous,"<sup>4</sup>

Koutsoudas explains 'string' in the following manner:

A string is one or more concatenated (i.e. strung together) vocabulary symbols . . . e.g. Name + Verb and Bill + hit + John. Each vocabulary symbol in a string is said to be an element in the string and to represent a bit of structure.<sup>5</sup>

He follows the definition of 'string' with 'rule':

A rule is considered an instruction to rewrite one string (or two strings . . . .) as another string: e.g.  $S \longrightarrow NP + VP$ , where the arrow stands for 'rewrite'.<sup>6</sup>

These definitions constitute part of the theoretical base for the LI. Grammar as defined contains the following structural levels of representation:

#### A. Syntactic

1. Phrase Structure Rules
2. Transformational Rules

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<sup>3</sup>Ibid., p. 3.

<sup>4</sup>Ibid., p. 7.

<sup>5</sup>Koutsoudas, op. cit., p. 5.

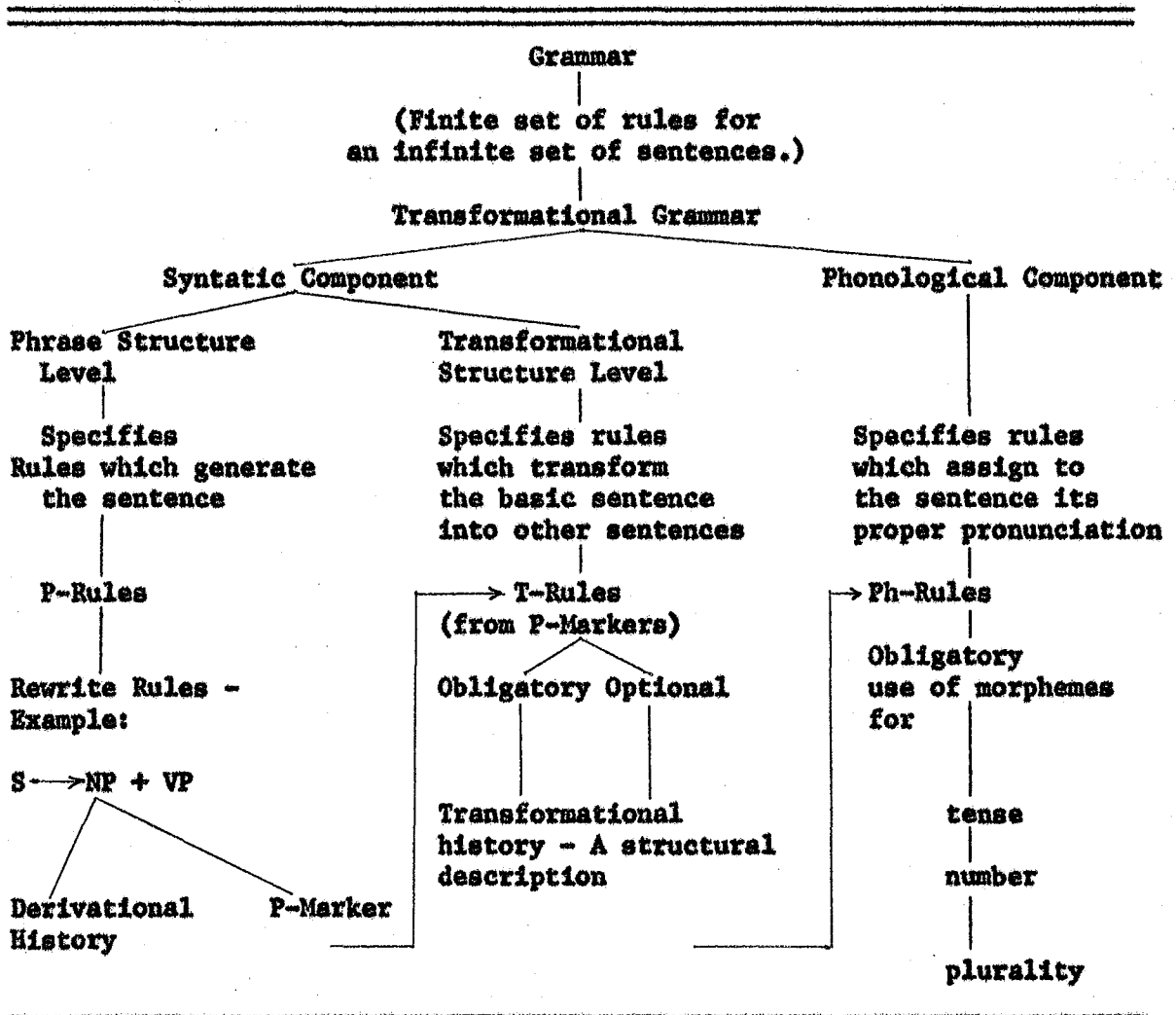
<sup>6</sup>Ibid.

**B. Phonological**

**1. Phonological Rules**

These rules are incorporated in the model of generative-transformational grammar as follows:

**Table 1**  
**Organizational Model of Generative-Transformational Grammar**



From the preceding comprehensive model, comes an example of a simplified grammar.

1. Sentence  $\rightarrow$  Noun Phrase + Verb Phrase

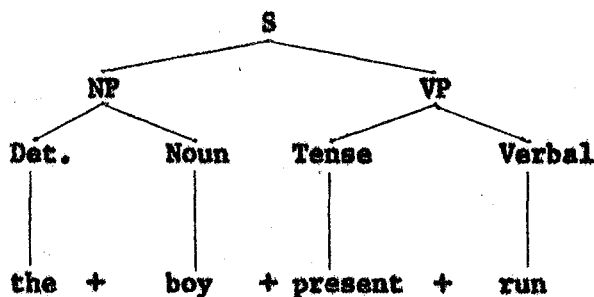
2. Noun Phrase-----> Determiner + Noun
3. Determiner-----> Article
4. Article-----> Definite  
Non-definite
5. Noun-----> Count + (plural)
6. Verb Phrase-----> Tense + Verbal
7. Tense-----> Present
8. Verbal-----> Vi (Verb intransitive)
9. Non-definite-----> a
10. Count-----> boy, girl, dog, cat, train, . . .
11. Vi-----> run, sleep, walk, jump, . . .

From this grammar many sentences may be generated such as: The boy runs.

The derivation of the sentence: The boy runs, is presented in the following manner:

- (1) NP + VP
- (2) Det. + N + VP
- (3) Det. + N + Tense + V
- (4) the + N + Tense + V
- (5) the + boy + Tense + V
- (6) the + boy + present + V
- (7) the + boy + present + run

The last line of the derivation is the string which produced the sentence: The boy runs. Since the LI included a limited number of sentences, it was more expedient to use tree diagrams in order to show the Phrase rules that generated a particular sentence. The derivation of the preceding sentence could be shown also using the tree diagram method:



(The s is supplied to run, when the phonological rule is applied to the verb using the morpheme subclass  $-Z_3$  .)<sup>7</sup>

The main goal of the LI was to find out what rules were already in existence in a given population. These findings were expected to show not only how children produce them but also how they interpret them when produced by adults or other children. The vocabulary was not given any particular attention because of the main concern in detecting the degree of linguistic maturity in terms of competence and performance as shown by the manipulation of rules.

The sentences used in the LI were written from the following single grammar of English:

Table 2

Grammar Used to Produce the Sentences in the LI

---

1. Sentence	→	Noun Phrase + Verb Phrase
2. Noun Phrase	→	Determiner + Noun
3. Noun	→	Count (singular, plural) Non-count
4. Verb Phrase	→	Auxiliary + Verbal Auxiliary + be + Past Participle

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<sup>7</sup>Gleason, op. cit., p. 103.

Table 2 (continued)

---

5. Auxiliary----->	Tense + Model
6. Tense----->	present, past
7. Model----->	will, Ø, be + ing
8. Verbal----->	Verb-intransitive + Past Participle Verb-intransitive + Adverb-place Verb-transitive + Noun Phrase Verb-transitive + Noun Phrase + Verb Phrase
9. Past Participle-->	Preposition + Noun Phrase
10. Noun----->	worm, rock, dog, bush, boy, face, leaf, bird, nest, branch, wasp, spider web, toad, bug, turtle, hole, fish, cheese, girl, butterfly, man, bone, ground corn, dish
11. Determiner----->	the, Ø
12. Vi----->	crawl, play, sit, stand
13. Vt----->	build, see, bring, dig, catch, want, leave
14. Preposition----->	over, behind, in, under
15. Adverb-place----->	here

Apply successively the following rules:

T-Relative, Deletion

The final string from above was included with the following phrase rules:

1. Sentence----->	Noun Phrase + Verb Phrase
2. Noun Phrase----->	Determiner + Noun
3. Noun----->	Count (singular, plural)
4. Verb Phrase----->	Auxiliary + Verbal
5. Auxiliary----->	Tense + Model Tense + have + Participle + Model
6. Tense----->	present, past
7. Model----->	be + ing be going to



Table 2 (continued)

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8. Verbal----->	Vt + Noun Phrase
9. Determiner----->	the, some, three
10. Vt----->	take, find, want, eat, get, lose, bring

---

When the phonological rules were applied to the strings generated by these rules, the fifteen sentences in the LI were produced.

Any theory of language would be incomplete without reviewing the overall spectrum of language universals. Chomsky in a series of lectures at the University of California spoke of language universals in the following manner:

In practice, the linguist is always involved in the study of both universal and particular grammar. When he constructs a descriptive, particular grammar in one way rather than another on the basis of what evidence he has available, he is guided, consciously or not by certain assumptions as to the form of grammar, and these assumptions belong to the theory of universal grammar. Conversely, his formulation of principles of universal grammar must be justified by the study of their consequences when applied in particular grammars. Thus, at several levels the linguist is involved in the construction of explanatory theories, and at each level there is a clear psychological interpretation for this theoretical and descriptive work. At the level of particular grammar, he is attempting to characterize knowledge of a language, a certain cognitive system that has been developed - unconsciously, of course - by the normal speaker-hearer. At the level of universal grammar, he is trying to establish certain general properties of human intelligence. Linguistics, so characterized, is simply the subfield of psychology that deals with these aspects of mind.<sup>8</sup>

Since the scope of this paper does not include the presentation of various

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<sup>8</sup>Noam Chomsky, Language and Mind (San Francisco: Harcourt, Brace & World, Inc., 1968), p. 24.

theories of grammar and their relationship to thinking, an extensive discussion concerning this matter will be excluded. The use of Roberts' idea of generative-transformational grammar is an explanation of the manipulation of symbols only and therefore has its limitations. Since a mental process cannot be observed there is one way open to the researcher namely, language behavior, which can be described or used diagnostically to postulate a mental process behavior. Behavioral psychology bases the learning of language on pure experience in a given environment, where as the mentalistic approach to language learning postulates acquisition of generative rules at a very early age.<sup>9</sup> "The process of normal language learning being, unconscious, we have absolutely no ideas about the form of grammars, though we have clear ideas about the forms of sentences which grammars account for."<sup>10</sup> The meaning transmitted is that the grammars are established and analysed after the sentences have been produced. The question remains, 'What are exactly those rules that generate the sentences that children use in the English language?' The creation of the LI was for the purpose of answering such questions.

The rationale, rules and diagrams for each sentence developed for the LI are presented in the Appendix. The information was based upon the theory as it was presented in this chapter.

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<sup>9</sup>Paula Menyuk, Sentences Children Use (Cambridge: The M.I.T. Press, 1969)

<sup>10</sup>Paul Kiparsky, "Linguistic Universals and Linguistic Change", Universals in Linguistic Theory (E. Bach & R. Harms, editors. San Francisco: Holt, Rinehart and Winston, Inc., 1968), p. 172.

## Chapter 3

### DESIGN AND PROCEDURE

Since language is one of the major distinctions separating those classified as culturally disadvantaged and those of the dominant society, the urgent need for adequate measures of language differences is obvious. Any measure of this kind needs to be definitive, to give clues as to areas of remediation and enrichment, and to guide program development for select populations. Secondly, the measure should serve as a means of checking the value of the transformational linguistic theory presented.

Chapter 1 pointed out the general way that language is used and the need for a precise description of language. Chapter 2 presented the linguistic theory which is now being introduced to education through the linguistic approach to English, spelling and reading. A diagnostic and predictive tool is a necessary part of the theory-curriculum component of education. Without such a measure, the educational picture would not be complete. This study was established to validate the Language Inventory, to evaluate specific federally funded programs in Stockton Unified School District and to verify the validity of the linguistic theory presented.

Included in this chapter is the study design, subject selection, subject description, instrument criteria, instrument design, instrument administration, data collection, internal and external validity, and description of studies.

## STUDY DESIGN

The validation study encompasses many substudies in order to gain information from various vantage points. The following table presents an overview of all of the populations used in the various substudies.

Table 3

## Multiple Design Using Various Populations

Population by schools	Pretest	Treatment	Posttest
<u>Title I Funded Schools - Disadvantaged Population</u>			
Garfield	P K	Bereiter- Engelmann Language Program	P K
Fair Oaks	F	Team Teaching	F
Van Buren	P K F	Traditional Traditional Traditional	P K F
<u>Non Title I Funded Schools Disadvantaged Population</u>			
Taft	P K F	Traditional Traditional Traditional	P K F
Nightengale	-	Traditional	P
<u>Non Title I Funded Schools - Advantaged</u>			
A.B.C. Nursery Sch.	-	Traditional	N
John Adams	-	Traditional	K
John Adams	-	Traditional	F
<u>Title I Funded Schools - Follow Through</u>			
Garfield	-	Preschool Exp.	K
Fair Oaks	-	Preschool Exp.	F
Van Buren	-	Preschool Exp.	K-F

In the preceding table, the symbols were as follows: P=Preschool, K=Kindergarten, F=First Grade, N=Nursery School, Exp.=Experience.

#### Bereiter-Engelmann Language Program

The objectives of this program are best explained by this statement:

Two possible strategies . . . suggested for producing the necessary learning in the limited time available: (1) "verbal bombardment," which consists of cramming an extraordinary amount of teacher-directed verbal experience into each class period; and (2) direct instruction, consisting of deliberately planned lessons involving demonstrations, drill, exercises, problems, and the like.<sup>1</sup>

This program was in its first year at Garfield when the children were given the Language Inventory.

#### Traditional

The label refers to the traditional curriculum presented in the field of primary and nursery school education. The traditional nursery-school curriculum has a primary social and emotional orientation with learning coming from an experimental mode, rather than a structured direct teaching approach.

#### Team Teaching

Four first grade classes were combined and then grouped according to ability levels in different academic areas. The facilities were two classrooms and a large hall or converted auditorium. The children moved freely from room to room, teacher to teacher, from one activity period to the next.

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<sup>1</sup>Bereiter, op. cit., p. 63.

## SUBJECT SELECTION

The subjects were selected with the help of Mr. James Shannon, Research Director for the Stockton Unified School District. (See Table 3.) In the presence of the experimenter, Mr. Shannon called each principal of the participating schools. He explained in his call that there would be an experimental examination in language administered in the school, that it would be given by an experimenter not requiring teacher time, and that space in or near the room would be needed. The principals were asked to select the grades and the teachers they wished to have participate in the study. Mr. Shannon further explained an examiner would follow up the call with a personal appointment to discuss the testing arrangements and dates involved.

Within the week, the examiner contacted each principal by telephone for an appointment. During the interview with each principal in his school, a room was arranged, dates and times were established and classrooms were selected. It was the duty of the principal to inform the staff members of the forthcoming testing. Three of the six did inform the teachers prior to the arranged test date.

Fair Oaks was listed as a classroom but the class arrangement was on paper only. The children, equivalent to four traditional classes, were grouped and regrouped continuously throughout the day according to their academic abilities in a given subject area. Every fifth child from the composite list was selected. The teachers showed concern that in all cases, the very low children had been chosen in the selective process. This list was dismissed and the children were selected on the basis of seven high, middle and low performance in the classroom setting. It was

learned later that several children from the high group were bussed in on a voluntary integration plan. They were not included in Fair Oaks population.

The advantaged nursery population, Table 3, was from A.B.C. Nursery School, Mrs. Ida Brooks, Director; and the advantaged kindergarten and first grades were from John Adams elementary school which was suggested by Mr. Shannon to be representative of Stockton's advantaged population by area and by reading scores collected by the school district.

The follow through population, Table 3, was selected from the pre-school records of June, 1968 and June, 1967. The kindergarten and first grade children tested were checked in these files to find those children who had prior preschool experience.

#### SUBJECT DESCRIPTION

The subjects selected had the following description by category: Grade=Preschool, Kindergarten, First; Program=Title I, Non Title I; Population=Advantaged, Disadvantaged. Other details are presented by these categories in the following table.

Table 4

#### Description of Disadvantaged Population

	Preschool		Kindergarten			First Grade		
	T-I*	Non T-I*	T-I	Non T-I	T-I	Non T-I	T-I	Non T-I
<u>Sex</u>								
Males	9	2	19	10	16	9		
Females	7	1	16	5	20	4		
<u>Preschool</u>								
Experience	--	--	11	3	9	6		

Table 4 (continued)

<u>Ethnic Group</u>	Preschool		Kindergarten		First Grade	
	T-I*	Non T-I*	T-I	Non T-I	T-I	Non T-I
Afro-American	7	1	28	6	19	4
Caucasian	3	2	5	4	10	3
Mexican-American	6	0	2	5	7	6

\*T-I = Title I; Non T-I = Non Title I.

The next Table presents the description of the advantaged population. The numbers represent the posttest period only as in contrast with Table 4 where the numbers represented the same children both pre and post.

Table 5

## Description of Advantaged Population

	Preschool	Kindergarten	First Grade
<u>Sex</u>			
Males	10	10	7
Females	9	10	12
<u>Ethnic</u>			
Mexican-American	1	0	0
Caucasian	18	18	18
Other (Oriental)	0	2	1

In some of the substudies, the scores of the Oriental children were not used since they exhibited some of the same language differences as the disadvantaged children.



## INSTRUMENT CRITERIA

None of the existing language instruments have met the requirements needed for an effective evaluation of children's linguistic abilities. The instrument must be based upon the following criteria:

1. A sound theory of language.
2. Specific items to cover the major points of the linguistic theory.
3. Repetition of certain basic theoretical points so that a pattern may be established.
4. A rationale for every item in the examination.
5. A culture free vocabulary.
6. An easily identifiable set of stimulus items.
7. Economic directions so that a teacher could administer the inventory to her students.
8. A scoring design adaptable to data processing cards for record keeping and storing, and for analysis.
9. A short administration time to eliminate fatigue.
10. Continuity for the purposes of diagnosis, and design of remediation or curriculum, to meet the children's needs.

## INSTRUMENT DESIGN

The complete rationale as written for this instrument (LI) is in Appendix A. Briefly, the examination is based upon Roberts' theory of transformational grammar as presented in Chapter 2. The format was in a series of fifteen sentences, Appendix B. Each sentence was carefully prepared according to certain rules of the grammar. There were five kernel sentences and ten transformed sentences. Each sentence was divided into

seven parts. Sections A, B, and C, measure the child's linguistic competence while Sections D, E, F, and G, record the linguistic performance levels of language.

Section A covered the child's abilities with noun phrases, while Sections B and C noted his competence in the verb phrase portion of sentences. The C section, most often a noun phrase, resembled what traditionally was considered the objective position in sentences. Sections A, B, and C covered the meaning transmitted through the structure of the sentence.

Sections D, E, and F of the performance part measured verb forms and morpheme production while G measured the child's ability to handle key phonemes of English.

This pattern was repeated in each of the fifteen sentences. The directions were repeated on every page and the type of response desired was given in the answer column to eliminate, as far as possible, a wide range of judgements on the part of the examiners. For this inventory, the answers were either right or wrong. Illustrations accompanied each sentence, Appendix C. The illustrations were colored with crayons, covered with acetate and bound across the top.

#### INSTRUMENT ADMINISTRATION

The examiner was seated at the teacher's desk. The child was either called by name or chosen by the one before him. When the child arrived at the desk the examiner stated, "Here are some pictures. I am going to tell you a story about them and then ask you some questions." Then the examiner began the narration for the first sentence. The child stood at the examiner's left and looked at the picture as the examiner

stated the stimulus sentence. When the sentence, parts A through G, was completed, either the examiner or the child would turn the page to the next picture.

At the end of the fifteen sentences the examiner told the child that he did well or was a good child, a positive note of praise on either performance or behavior; then the child was directed to pick out someone else to "see the pictures in the book". The responses were written in the examination booklet after each response, part or whole, and later the items were scored on data processing cards.

#### DATA COLLECTION

With the exception of Fair Oaks first grade, the tests were administered in the classroom at the teacher's desk. The speech therapy room was used in Fair Oaks.

The pretesting schedule was established in the last two weeks of November and the inventory was administered during the first three weeks of December, 1968. The posttest period was the month of May and first week of June, 1969. The same order in test schools was maintained in the post-test period.

Data analyzed in this study, other than the LI test scores, was gathered in the Preschool Education Office, Stockton Unified School District.

#### EXTERNAL VALIDITY

##### Interaction Effect of Selection Biases

The majority of the population was from minority groups and from areas of the Stockton Unified School District qualifying for federal funds.

John Adams and A.B.C. Nursery School represented the dominant population of this community. Generalizations must be made on the basis of likeness to the characteristics specifically presented in this study.

#### Interaction Effect of Pretesting

The age of the children, time span, and lack of social sensitivity in a testing environment led the examiner to believe that there was negligible effect from pretesting.

#### Reactive Effects of Experimental Procedures

The measurement of experimental procedures was confined to the study of the curriculum impact on the children. No devices, additional personnel or special curricula were introduced to alert the teachers or children to the study.

### INTERNAL VALIDITY

#### Contemporary History

The children in the disadvantaged population were not exposed to formalized curriculum with language models other than what the public schools were providing for all classes. Each school maintained its own instruction and did not mix programs during the pretest - posttest interim.

#### Maturation Processes

All children were pretested within three week span of time. Those tested first were, insofar as possible, posttested in the same order. The time difference between the pretest and posttest was therefore, about the same for all children. The testing was conducted both times in the same

period of the day. Most of the preschool and kindergarten programs were only three hours in duration; therefore, there was a span of three hours for both test periods.

#### Pretesting Procedures

Since the span of time between the pretest, posttest period was long for young children, and since the test did not require training; therefore, there was slim chance that the pretesting would affect the posttest results.

#### Measuring Instruments

The instruments and raters remained the same for both test periods. No rating was involved in the data collection. The answers were either right or wrong according to the sample given in the LI booklet. If the verbal response did not measure the written response then it was termed incorrect. Minimal examiner judgement was involved. Other instruments were used for comparative purposes. They were explained with each study.

#### Statistical Regression

Statistical regression as stated by Van Dalen<sup>2</sup> was to be expected.

Regression toward the mean occurs because of random imperfections in measuring instruments. The less-than-perfect capacity of T<sub>1</sub> and T<sub>2</sub> to measure knowledge will cause a variation of Ss performances. Pupils are likely to obtain somewhat similar scores on the T<sub>1</sub> and T<sub>2</sub>, but their scores are likely to vary within a given range . . . .<sup>3</sup>

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<sup>2</sup>Van Dalen, Deobold B., Understanding Educational Research (New York: McGraw-Hill Book Company, 1966), p. 250.

<sup>3</sup>Ibid.

Differential Selection of Subjects

All three grades were exposed to the school curriculum from September, 1968 to December, 1968 when the pretest was administered. This determined their abilities and initial differences.

Experimental Mortality

Each substudy deals with the mortality that existed in each particular problem. Only those completing both the pre and posttests were used in most instances.

Table 6  
Experimental Mortality

School	Class	Test	# Complete	# Incompl.	# Refused	# Moved	# Absent	# Dropped from Program
Garfield	P	Pre	17					
		Post	18			3		2
	K	Pre	18					
		Post	15			2	1	
Fair Oaks	F	Pre	20					
		Post	23				2	
Van Buren	P	Pre	7	2	5			
		Post	17			1	2	
	K	Pre	21					
		Post	20				1	
	F	Pre	20					
		Post	18			2		
Taft	P	Pre	5	4	4			
		Post	4				2	
	K	Pre	16					
		Post	15			1		
	F	Pre	16					
		Post	13			2	1	
Nightengale	P	Post	18	1				
A.B.C.	N	Post	19					
John Adams	K	Post	20					
		Post	20					

In a few schools (Example: Van Buren - Preschool) there were more children in the posttest population. Additional tests were given when data was available from other test results.

Not all of Fair Oaks population was used at one time since some of those students were bussed in from other advantaged areas. This population shifted from study to study depending on the questions.

The children who moved to a neighborhood school late in the study were kept with the original population when found and tested. Only those children who moved and were not locatable were shown in the "moved" column.

#### Interaction of Selection and Maturation, Selection and History

Neither the subjects nor the teachers were aware of the prepost design in terms of curriculum content or program effectiveness. No one group volunteered for the study. They were chosen by the principal of the school and then their cooperation was requested.

#### Summary of External and Internal Validity

The external and internal validity sections were as a superficial view of the study population as a whole. Each of the comments will be relevant to the substudies, some more than others. The validity review will serve for the rest of the paper and will not be covered in discussing each study separately.

### DESCRIPTION OF STUDIES

This section is organized around a series of questions designed to

extract specific areas of knowledge from the data collected. The areas covered will constitute the construct validation of the Language Inventory, hereafter referred to as the "LI".

Question 1. Will there be a difference between the LI scores of those children who received the Bereiter-Engelmann training and those who did not?

Purpose: Validity assessed by changes in performance.

Table 7

Population Description: Question #1

<u>School/Grade</u>		<u>Pretest</u>	<u>N</u>	<u>Treatment</u>	<u>N</u>	<u>Posttest</u>
Experimental - Garfield		T <sub>1</sub>		B & E		T <sub>2</sub>
	Preschool	E	12		12	E
	Kindergarten		15		15	
Control - Van Buren		T <sub>1</sub>		Trad.		T <sub>2</sub>
	Preschool	C	4		4	C
	Kindergarten		20		20	

Since the Bereiter-Englemann program is a language based program, those children receiving training should show larger LI score gains than those in the traditional program. These two schools are approximately six blocks apart and draw from the same general socio-economic population. The LI was administered to the children in all four classrooms, and two-factor analysis of variance was used with the collected data.

Question 2. Will there be a difference between the LI scores of those children who attended schools receiving Title I funds and those who attended non Title I funded schools?



Purpose: Validity assessed by changes in performance.

Table 8

Population Description: Question #2

School/Grade	N	Pretest	Title I Funds	Posttest
E - Garfield			Yes	
Preschool	12	X		X
Kindergarten	15	X		X
E - Fair Oaks			Yes	
First Grade	11	X		X
E - Van Buren			Yes	
Preschool	4	X		X
Kindergarten	20	X		X
First Grade	18	X		X
C - Taft			No	
Preschool	3	X		X
Kindergarten	15	X		X
First Grade	13	X		X

Federal funds enable the school personnel to serve the unique needs of the particular school population. The experimental schools (E), were selected as being in areas attended by children from low socio-economic homes. It is generally accepted that language difficulties accompany the learning problems of these children. Therefore, the effects of the special instruction and staff training should show in the language of the children attending the Title I schools, and these children should show greater LI scores as compared to the children in the non Title I school after all scores have been adjusted for initial differences.

All children were given the LI. The results were submitted to analysis of covariance for determination of significance.

Question 3. Will there be a difference between the children who received preschool education experience and those who did not attend the preschool programs?

Purpose: Validity assessed by changes in performance.

Table 9

Population Description: Question #3

Grade	N	Preschool Experience	Posttest
Kindergarten - E	14	Yes	X
Kindergarten - C	14	No	X
First Grade - E	15	Yes	X
First Grade - C	15	No	X

Preschool education is an enriched program for disadvantaged four year old children. It provides in its curriculum varied experiences for language development. The scores on the LI should reflect the previous language training in the population that attended the preschool programs.

All those having preschool experience were selected from the total disadvantaged population and were randomly matched with those not having attended preschool. Analysis of covariance for equal N's was used to determine significant differences between the performances of the groups.

Question 4. Will there be a difference between the LI scores of Preschool, Kindergarten, and First Grade children?

Purpose: Validity established by group difference.

Table 10

## Population Description: Question #4

Grade	Disadvantaged	Advantaged	Posttest
Preschool	56	19	X
Kindergarten	50	19	X
First Grade	46	19	X

Three natural groups have been created by grade level. Although each level has a range of responses, the scores should reflect the increases in levels of language development. This question was further divided by asking the difference in grade levels of the disadvantaged and advantaged populations. There should be a significant difference between the advantaged and disadvantaged populations since socio-economic levels are reflected in the linguistic competencies of children.

A randomized design analysis of variance was used to determine the degree to which the LI scores verified the predicted differences.

Question 5. Will there be a difference between the LI scores of the disadvantaged children as compared with the advantaged children of the same grade level and city?

Purpose: Validity established by group difference.

Table 11  
Population Description: Question #5

Grade	N	Total N	Posttest
Disadvantaged		100	
Preschool	19		X
Kindergarten	50		X
First Grade	41		X
Advantaged		65	
Nursery School	19		X
Kindergarten	20		X
First Grade	26		X

The school district maintains that there is no difference in staff, schools or equipment from one school population to another, and that all are receiving equal education. Assuming this is true, then any differences in scores would reflect a difference in the linguistic skills of the two populations. ✓ A t-test for differences between two independent means was used to determine the differences if any between the two groups.

Question 6. Will there be a difference between the LI scores of the Afro-American, Mexican-American and Caucasian children?

Purpose: Validity established by group difference.

Table 12  
Population Description: Question #6

Grade	Afro- American	Caucasian	Mexican- American	Posttest
Preschool	8	4	7	X
Kindergarten	34	8	8	X
First Grade	<u>23</u>	<u>13</u>	<u>13</u>	X
Total N	65	25	28	

Many of the Mexican-American children come from bi-lingual homes. If they themselves do not speak Spanish, they are at least exposed to others who do and thereby they are exposed to the pitch, inflection, rhythm and phonemes of Spanish. The Afro-American children come from another linguistically different background; different in that they are exposed to a dialect other than standard English. The low socio-economic Caucasian children should perform better on the LI since they do not have another linguistic pattern to afford confusion in approximating standard English. An analysis of covariance was used to examine the differences between the three groups.

Question 7. Will there be a difference between the LI scores of the males and the LI scores of the females?

Purpose: Validity determined by group difference.

A great deal has been written on the differences between males and females developmental rates. As part of the construct validation study, this question is included. A population of 62 males and 49 females

was used for the comparative purposes. They were selected from the disadvantaged population tested. Since there is generally thought to be a true developmental-experiential language difference which exists at the four year, five year and six year old levels, then there should be a difference in the scores of the males and the females. A two-factor Analysis of Variance was used with the data collected.

Question 8. Will the children whose scores were established at an earlier date on the PPVT perform in the like manner on the LI?

Purpose: Validity determined by measuring the degree of relationship between the LI and the PPVT.

Table 13

Population Description: Question #8

Grade	N	Peabody Picture Vocabulary Test	Language Inventory
Kindergarten	11	May, 1968	May, 1969
First Grade	4	May, 1967	May, 1969

Both the Peabody<sup>4</sup> and LI tests use lexical item identification. The Peabody format called for a response to isolated lexical items by pointing to pictures. The LI, parts A, B, and C requires a response to lexical items in context by pointing to pictures. Since both tests have some part in common, those children who score high on the Peabody should score high on the LI. A Pearson Product-Moment correlation established

<sup>4</sup>Lloyd M. Dunn, Peabody Picture Vocabulary Test, Minneapolis: American Guidance Service Inc., 1965.

the level of the relationship between the two tests.

Question 9. Will there be a difference between the LI scores and the LRS Seriation Test scores?

Purpose: Validity determined by measuring the degree of relationship between the LI and the ST.

Table 14

Population Description: Question #9

Preschool Classes by School	LI	LRS Seriation Test	Posttest
Garfield	18	18	X
Nightingale	17	17	X
Van Buren/Taft	18	18	X

LI is based upon the theory of language performance as a product of language competence which is built upon the deep structure of language. The LRS Seriation Test,<sup>5</sup> "considered an operation or basic cognitive process by Piaget, refers to the ability to order environmental objects along one stimulus continuum or with respect to copying pattern of stimuli."<sup>6</sup>

The analysis of this data using Pearson Product-Moment correlation answers not only the immediate question of group comparison on two tests

<sup>5</sup>Ralph Scott, J. Nelson and A. Dunbar, L R S Seriation Test (New York: Harper & Row, Publishers, 1968).

<sup>6</sup>Jerald Nelson, "Construct Validation of the Learning Readiness System - Seriation Test" (unpublished Doctor's dissertation, Indiana University, 1968), p. 5.

but also alludes to a larger question, that of the relationship between language and cognition. If language and cognition are closely related, then the correlation between the LI and the ST should be high.

Question 10. Will there be a difference between the LI scores and the Columbia Mental Maturity scores?

Purpose: Validity determined by measuring the degree of relationship between the LI and the Columbia.

Table 15

Population Description: Question #10

Preschool Classes by Schools	LI	Columbia	Posttest
Garfield	6	6	X
Nightingale	13	13	X
Van Buren	3	3	X

The Columbia Mental Maturity<sup>7</sup> is a test of general intelligence. It is a series of long, narrow cards in which one item does not belong to the general category. The child is to point to the incorrect item. The items range from gross to finite discrimination of differences. The degree to which these two test scores compare may indicate the degree to which general intelligence is directly relatable to language performance. A Pearson Product Moment correlation was used to measure the relationship

<sup>7</sup>Columbia Mental Maturity Scale, San Francisco: Harcourt, Brace & World, 1959.



between the two test results, and it was expected that this correlation would be high.

Question 11. Will there be a difference between the LI scores and the scores on the Berry Visual-Motor Integration Test?

Purpose: Validity determined by measuring the degree of relationship between the LI and the Berry V-MI.

Table 16

Population Description: Question #11

Preschool Classes by School	LI	Berry V-M.I.	Posttest
Garfield	6	6	X
Nightingale	13	13	X
Van Buren	3	3	X

The Berry Visual-Motor Integration Test surveys the child's ability to repeat with a pencil line forms that he sees. It is closer to a test of perception than most of the other preschool tests available to schools. The data is in the form of Mental Ages, years and months. To use the scores for comparative purposes with the LI, the mental ages were converted into months as opposed to the year-month score given for each child.

A comparison of the LI and the Berry may lead to some thought involving the relationship between language and perception. Pearson Product-Moment correlation was used to determine the existing relationship between the two processes used in taking the tests. Tentatively, it would be expected that this relationship would be high. See studies cited by

Elkind, Horn and Schneider<sup>8</sup> on perception in addition to Frostig's work<sup>9</sup> in this area.

Question 12. Will there be a difference between the LI scores and the scores from the Caldwell Preschool Inventory?

Purpose: Validity determined by measuring the degree of relationship between the LI and the Caldwell.

Table 17

Population Description: Question #12

Preschool Classes by School	LI	Caldwell	Posttest
Garfield	4	4	X
Nightingale	13	13	X
Van Buren	3	3	X

The Caldwell Preschool Inventory<sup>10</sup> was developed for Head Start by Betty Caldwell. It samples general knowledge that children of four may know. For many projects, it has been used to determine the extent of knowledge acquired while the child attended preschool. The Caldwell was administered to the same children as the LI and the scores from the two

<sup>8</sup>D. Elkind, J. Horn and G. Schneider, "Modified Word Recognition, Reading Achievement, and Perceptual Decentration." Journal of Genetic Psychology, 1965, 107, 235-251.

<sup>9</sup>M. Frostig and others. "The Marianne Frostig Developmental Test of Visual Perception," Percep. Mot. Skills, 1964, 19, 463-499.

<sup>10</sup>Betty Caldwell, The Preschool Inventory, New York: State University of New York, 1967.

tests were compared. The results lead to the generalization of the relationship between general knowledge and linguistic skills. The Pearson Product-Moment correlation was the statistical procedure used, and the resultant relationship was expected to be high.

Question 13. Will the children's posttest scores remain the same if the test booklets are rated by two different people?

Purpose: Assessment of interrater reliability.

If an instrument is to be of use to more than one person, its results must maintain some degree of consistency from examiner to examiner in order to provide common linguistic information. The relationship of the results of two judges scoring the same 30 booklets selected at random should be high.

The examination booklets were first scored by the experimenter and then given to Miss Claudia Kroeck, a Junior at Fresno State College, Fresno, California. The instructions were, "If the answer in the booklet is different than the answer written in the booklet, mark it wrong." There was no further communication during the rescoring period. After two sets of scores were obtained for the thirty booklets, the data was statistically analyzed. The use of rank order correlation determined the degree of relationship between the two judges.

Question 14. Will there be a high correlation between the scores obtained on the two parts of the LI?

Purpose: Assessment of split-half reliability.

Table 18  
Paired Questions from LI for Measurement  
of Split-Half Reliability

	Sentence Numbers						
Part I	1	3	6	8	10	12	14
Part II	2	4	7	9	11	13	15

The LI is easily divided into two parts by comparing one question, with all seven parts, to the following question. The common element in both sentences is the use of identical deep structure, while the variation in both sentences is the different lexical items. Any difference in scores between the two paired sentences is the effect of the lexical items upon the performance of the deep structure of the sentence. (See appendix for illustrations of identical deep structure and the difference in lexical items.) Sentence #5 had the same deep structure as #4 and was omitted for lack of a pair.

The correlation between the scores obtained on two parts of the LI is an estimate of the reliability of the test. The use of Pearson Product-Moment correlation provides the degree of relationship between the two sets of scores.

#### SUMMARY

The study design and procedure has been covered in this chapter in addition to the presentation of fourteen questions designed to give concrete information about children's linguistic abilities as presented in theory form, Chapter 2; to yield statistical data for the purpose of the construct

validation of the LI, and to provide information to Stockton Unified School District for analysis and evaluation of federally funded projects. The results of the fourteen substudies are reported in detail in Chapter 4.

## Chapter 4

### RESULTS OF THE STUDY

It seems appropriate to return to the direction given in Chapter 1 when the meanings of "construct" and "validation" were presented. For review, construct was "to form by putting together parts"<sup>1</sup> and validation was to make valid; substantiate; confirm".<sup>2</sup> The construct validation of a language inventory is the process of substantiating or confirming the theory and design of the instrument by putting together a series of studies designed to determine the quality of the instrument. This chapter will present the statistical tests and results of the tests which were employed to help answer the fourteen questions posed in Chapter 3. The implications of the results and the confirmation of the theory is found in Chapter 5.

Question 1. Null hypothesis: There will be no significant difference between the LI scores of those children who received the Bereiter-Engelmann training and those who did not.

Since the Bereiter-Engelmann approach is a language based program for disadvantaged children, these children should show a gain in scores over another school within the same socio-economic vicinity using the traditional approach. Two preschool classes and two kindergarten classes were

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<sup>1</sup>Stein, loc. cit.

<sup>2</sup>Ibid.

used in this study, yielding an N of 27 for the experimental Bereiter-Engelmann approach and an N of 24 for the control population. Using the Table of Random Numbers,<sup>3</sup> three scores were omitted from the experimental group to produce equal N's. The results of analysis of variance are shown in Table 19 below.

Table 19

## Analysis of Variance: Question #1

Source	SS	df	ms	F	p
Total	19835	95			
pre/post	3385	1	3385	4.26	.01
school	442	1	442	0.56	n.s.
interaction	135	1	135	0.17	n.s.
error	15873	92	794		

Both schools showed gain between the pre/post testing, but the experimental children had a greater raw score gain than the control children. When the data was submitted to analysis of variance, however, the difference between the scores of the two groups was not significant. Therefore, the null hypothesis of no significant difference between the children's scores in the Bereiter-Engelmann program and the children's scores in the Traditional approach would be accepted.

Question 2. Null hypothesis: There will be no difference between the LI

<sup>3</sup>Allen L. Edwards, Experimental Design in Psychological Research (Revised edition, New York: Rinehart & Company, Inc., 1960), p. 333.

scores of those children who attended schools receiving Title I funds and the scores of those who attended non-funded schools.

Both populations (funded/non-funded) come from socio-economic areas considered below the average for the Stockton area. Two of the schools, Garfield and Van Buren received Title I funds for the 1968-1969 school year while Taft did not, so Taft was used as the control school. The test population was as follows: Garfield, N=38; Van Buren, N=42; and Taft, N=31. Using the table of random numbers<sup>4</sup> the scores were reduced to a population of N=31 for each school. Analysis of covariance produced the following tabled results. The results of the posttest were covaried upon the pretest scores to take into consideration any differences at the onset of the evaluation.

Table 20

## Analysis of Covariance: Question #2

Source	SS	df	MS	F	p
Total	6825	91			
Schools	309	2	154	2.11	n.s.
Error	6516	89	73		

In examining the mean gain of Garfield (12.29 points), Van Buren (mean gain of 6.64 points), and Taft (mean gain of 13.16 points), there was a greater gain in Garfield and Taft test scores. An analysis of covariance yielded non-significant results at the .01 level of confidence,

<sup>4</sup>Edwards, loc. cit.



however. Therefore, the null hypothesis that there will be no difference between the LI scores of Title I and non Title I scores must be accepted.

Question 3. Null hypothesis: There will be no difference between the children who received Preschool Education experience and those who did not attend the preschool programs.

From the total population tested on the LI, 29 children were found to have attended the preschool programs in either 1966-1967 or 1967-1968 school years. Equal number of children from the same classes of ethnic, sex and grade level were selected from those who had not attended a preschool program. The matching by sex, ethnic group, age and grade was an attempt to control some of the variables that would exist between the two groups other than the variable of preschool vs. non preschool experience. Using the pretest results as the covariant, the results of the comparison are as follows:

Table 21  
Analysis of Covariance: Question #3

Source	SS	df	MS	F	p
Total	3261	56			
Schools	23	1	23	2.56	n.s.
Error	3238	55	59		

From the results of this analysis, it can be seen that there was no significant difference between the two groups at the .05 level of confidence; therefore, the null hypothesis that there will be no difference

between the scores of the children with preschool experience and the scores of the children without preschool experience is accepted.

Question 4. Null hypothesis: There will be no difference between the LI scores of Preschool, Kindergarten and First Grade children.

The LI scores were analyzed by grade level after being separated into two groups. An analysis of variance with randomized design was used first with the disadvantaged and then advantaged. The disadvantaged population was Preschool, N=56; Kindergarten, N=50; and First Grade, N=46.

Table 22

Analysis of Variance: Question #4  
Disadvantaged Population

Source	SS	df	MS	F	p
Total	23466	151			
Between	2605	2	1302.5	9.30	.001
Within	20861	149	140.0		

The results yielded an F-ratio of 9.30 which is significant beyond the .001 level. A t-test among the three means established a significant difference between Preschool and Kindergarten but a non-significant difference between Kindergarten and First Grade (both at the .05 level).

The study was repeated with the advantaged scores, (N=19 for all three grades). The results are shown in Table 23.

Table 23  
Analysis of Variance: Question #4  
Advantaged Population

Source	SS	df	MS	F	p
Total	4920	56			
Between	2045	2	1022.5	19.22	.001
Within	2875	54	53.2		

Since  $p < .001$ , a t-test among the three means was again figured. It again showed a significant difference between Preschool and Kindergarten and an insignificant difference between Kindergarten and First Grade, (at the .05 level). The null hypothesis that there will be no difference between the LI scores of Preschool and Kindergarten was rejected for both the advantaged and disadvantaged populations while the null hypothesis was accepted on the Kindergarten, First Grade levels for both the advantaged and disadvantaged populations.

Question 5. Null hypothesis: There will be no difference between the LI scores of the disadvantaged children as compared with the scores of the advantaged children.

Because of the difference in N's of the two groups, papers containing the test results were placed face down and shuffled. One class was drawn from the pile, Van Buren, and all three grades, Preschool, Kindergarten and First were eliminated from the comparison. Scores from Garfield, (Preschool, Kindergarten); Fair Oaks (First Grade), and Taft (Preschool, Kindergarten, First Grade) were used to represent the

disadvantaged population, while A.B.C. Nursery School and John Adams (Kindergarten, First Grade) scores were used to represent the advantaged population.

A t-test for differences between two independent means was used on the posttest scores to analyze the data. On the basis of  $t=1.95$  with 163 degrees of freedom the differences between the two means was found to be not significant. Therefore, the null hypothesis of no difference in LI scores between the advantaged and disadvantaged population was accepted.

Question 6. Null hypothesis: There will be no difference between the LI scores of the Afro-American, Caucasian-American and Mexican-American children.

Because the difference in N's of the Afro-American scores were greater than twice that of the Mexican-American or Caucasian-American scores, analysis of covariance was not used with the existing populations and the study as designed was not completed. A comparison of mean or average scores for the three groups tested on the LI were within 2.5 points of each other.

Question 7. Null hypothesis: There will be no difference between the LI scores of the males and the LI scores of the females.

All of the LI test scores of the boys and girls in the disadvantaged population were analyzed to answer this question. A two-factor analysis of variance was computed with an  $N=62$  for the males and an  $N=49$  for the females. The results are given in the following table.

Table 24  
Two Factor Analysis of Variance:  
Question #7

Source	SS	df	MS	F	p
Total	33907	221			
Pre/Post	6304	1	6304	50.0	
Male/Female	2	1	2	0.016	n.s.
X	19	1	19	0.15	n.s.
Error	27582	218	126.5		

The resultant F-ratio of .016 relevant to the male-female comparison was not significant. Therefore, the null hypothesis that there will be no difference in scores of the males and females on the LI was accepted.

Question 8. Null hypothesis: Children whose scores were established at an earlier date on the PPVT will not perform in the like manner on the LI.

A group of children who had been tested in previous years while attending Preschool were selected from the population given the LI. Their previous scores on the Peabody Picture Vocabulary Test were compared with the posttest scores of the LI. From the computation,  $r=13$  (using the Pearson Product-Moment correlation). By squaring  $r$ , the resulting 1.7% gave 1.7 out of 100 common results between the two tests. This very low degree of correlation is stated as "negligible or chance relationship" on Koenker's scale (.00 to .19)<sup>5</sup>. The null hypothesis was therefore accepted.

<sup>5</sup>Robert H. Koenker, Simplified Statistics (Illinois: McKnight & McKnight Publishing Co., 1961), p. 52.

Question 9. Null hypothesis: There will be no difference between the LI scores and the LRS Seriation scores.

The posttest scores from both the LI and SRT from the following preschool classes were used in the population of this study, (Garfield, N=18; Nightingale, N=17; and Van Buren/Taft, N=18). Using the Pearson Product-Moment Correlation (N=53) the correlation of 0.37 was obtained, a significance greater than .01. By squaring .37 the resulting 14% estimates the percent of common variance operating in both the LI and SRT tests. The remaining 86% indicates the amount of variance which is operating separately in each task, language and thinking. The null hypothesis that there will be no difference between the LI scores and the LRS Seriation test scores was therefore rejected at the .01 level of significance.

Question 10. Null hypothesis: There will be no difference between the LI scores and the Columbia Mental Maturity scores.

The population consisted of those preschool children from Garfield, Nightingale, and Van Buren who were given both the LI and Columbia in the posttest period, (N=22). Computing the Pearson Product-Moment correlation,  $r=0.40$ , (squaring  $r=0.16$  or 16%), which is at the lower end of a range accepted as indicating a "fair degree of relationship".<sup>6</sup> Although this was a fair degree of correlation, it was not significant; therefore, the null hypothesis that there will be no difference between the LI scores and the Columbia Mental Maturity scores is accepted.

Question 11. Null hypothesis: There will be no difference between the LI scores and the scores on the Berry Visual-Motor Integration Test.

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<sup>6</sup>Ibid.

The children represented in the preceding study were also given the LI and the Berry (N=22). The resultant Pearson correlation of  $-0.03$  would indicate a negligible or chance relationship. The null hypothesis that there will be no difference between the two tests was accepted.

Question 12. Null hypothesis: There will be no difference between the LI scores and the Caldwell Preschool Inventory scores.

Twenty of the same children represented in the preceding two studies were given both tests during the posttest period. Using the Pearson correlation,  $r=0.20$ , which is barely in the range accepted as indicating a "slight relationship"<sup>7</sup> by using the squared  $r$  equals 4% commonality. This correlation was not significant and so the null hypothesis that there will be no difference between the two kinds of test scores was rejected.

Question 13. Null hypothesis: There will be no difference in posttest LI scores when the booklets are rated by two different people.

The author rated thirty booklets and then gave them, with specific scoring directions, to a second judge, Miss Claudia Kroeck. (See Chapter 3, Question #13). The scores from Judge 1 were ordered from highest to lowest with the corresponding score from Judge 2 in the second column. There was a Rank Order correlation of 0.97 between the scores of the two judges. Using the scale presented by Koenker<sup>8</sup> 0.97 lies well within the .80 to 1.00 range which is interpreted as "highly dependable

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<sup>7</sup>Ibid.

<sup>8</sup>Ibid.

relationship". The 0.97 correlation was so high that there was little if any doubt that the null hypothesis: that there will be no difference in posttest scores when the linguistic responses in the LI booklets are rated by two different people, should be accepted.

Question 14. Null hypothesis: There will be no difference between the scores obtained on the two parts of the LI.

The Pearson Product-Moment correlation was used to compute split-half reliability. This correlation, when corrected for attenuation, was 0.86 (N=314 pairs of scores). The following statement helps in determining acceptance or rejection of the null hypothesis, based upon these results:

In calculating the correlation coefficient the higher the 'r' the greater the reliability of a test. Most good standardized tests have reliability coefficients above .85. No general rule can be set as to how high a reliability coefficient must be to be acceptable, since the greater the range of the scores, in general, the higher the correlation.<sup>9</sup>

The null hypothesis was therefore accepted in this study, indicating an acceptable level of reliability for the LI.

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<sup>9</sup>Ibid., p. 63.



### SUMMARY

The statistical data needed to determine the results and answers to the fourteen questions has been presented in this chapter question by question. Parts of the population, as shown in the table on 'Multiple Design Using Various Populations', Chapter 3, were used in different combinations for each question. The statistical results will be presented in an analytical discussion of the studies throughout Chapter 5.

## Chapter 5

### DISCUSSION SUMMARY, AND RECOMMENDATIONS

In Chapter 1, a set of five general hypothesis was set down for the framework of this study. Following in Chapter 3 was the development of the hypothesis into fourteen designs for study by posing fourteen questions. Chapter 4 contained the results of the studies by giving the statistical data needed to accept or reject the specific fourteen hypotheses presented. This chapter then gives analysis of the fourteen questions and their relevance to the five general hypotheses, followed by a summary and recommendations.

#### Question 1. Bereiter-Engelmann vs. Traditional Preschool Program.

Though there was not enough of a difference in the gain scores of the two preschool classrooms to state that one program was statistically significantly different from the other, from an educational point of view, the increased gain of the Bereiter-Engelmann children over the traditional children warrants further inquiry to determine those aspects of the program which equip the children to respond with higher scores. Since the LI expected responses in sentence form and since the B-E program encourages responses in full sentences, this factor may account for the difference between the two groups.

#### Question 2. Title I vs. Non Title I Schools.

The result of no significant difference intentionally did not reflect any socioeconomic or educational program differences by school but

only by funding source. Three schools, Fair Oaks, (First Grade) was combined with Garfield, (Preschool, Kindergarten) scores and further combined with Van Buren (P,K,F) to comprise the Title I funded population. These scores were used in comparison with Taft scores (P,K,F), which provided very unequal N's. The mean gain of each school separately indicated the trends the schools were taking in respect to this examination. Garfield (Fair Oaks) mean gain = 12.29; Van Buren mean gain = 6.64; Taft mean gain = 13.16 which showed the trend toward the non funded school (Taft). There was an apparent gain of Taft over Van Buren but not in the ratio needed for significance. One factor may account for the difference other than educational program is the neighborhoods from which the children come. Van Buren draws from surrounding housing projects while Taft draws from individually owned dwellings.

Question 3. Preschool Experience vs. No Preschool Experience.

Though there was no significance between the two groups, the mean gain for the Preschool group was 8.8 while the mean gain for the No Preschool group was 9.6. Factors such as family income, number of parents in the home, educational level of adults in the home may have contributed to the gain of the No Preschool group over the Preschool group. One may speculate how much further behind the Preschool group might have been without the Preschool experience to bring them up.

Question 4. Difference between Grade Levels.

The resulting significance between the Preschool - Kindergarten groups and no significance between the Kindergarten - First Grade groups for both the Advantaged and Disadvantaged populations could be due to more than one possibility. By holding the questions to a few of the many rules

possible, the range of the examination may have been restricted allowing both Kindergarten and First Graders to do well on it. Another possibility might have been the developmental ages of the children. Kindergarten and First Grade children may be too close to the end of the language development period to show significant difference in gains. Their language may still improve but not in the ways being sampled on the LI.

Question 5. Advantaged vs. Disadvantaged.

The fact that the advantaged and disadvantaged populations were similar on the LI, may indicate that there was more similarity between the two groups language wise than what has been written in the past. Most authors point to vocabulary differences and phonological changes from one dialect to another. Since the LI is based mainly on the structure of language and not the superficial areas of vocabulary and sound changes, it may mark a true linguistic similarity in the structure of the two groups. Or it could mirror the fact that the LI is insensitive to the language differences between the two groups. (Question 4 indicates the same results)

Question 6. Difference between Ethnic Groups.

Rather than dropping sample sizes down to very small levels to equate N's across cells, the ethnic analysis was dropped. It was not really needed since the analysis of advantaged and disadvantaged was completed. The racial-ethnic differences has repeatedly been shown to be explainable in terms of an underlying socio-economic difference according to the Coleman study.<sup>1</sup> A comparison of means indicated difference between

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<sup>1</sup>J. Coleman and others, Equality of Educational Opportunity, Washington, D.C.: U.S. Government Printing Office, 1966.

the groups tested on the LI were within 2.5 points of each other.

This should be investigated thoroughly in a study designed to clearly control racial-ethnic and socio-economic variables.

Question 7. Males vs. Females.

The fact that sex had no significant effect upon student response on the LI, may lead to discussions of limited structural difference between children linguistically speaking. The onset of speech and language may be sooner for some girls yet they may both possess the same structure by the time they mature to the Preschool, Kindergarten, First Grade levels.

Question 8. LI vs. Peabody Picture Vocabulary Test.

The relationship between these two tests may have been low due to the time difference in test administration; nevertheless, there was something to say for the differences in the two measures. The Peabody tests the receptive (decoding) process of language only by response to isolated words while the LI actively involves reception and expression (decoding and encoding processes). The stimuli is given in complete sentence form with reference to earlier information which is a further involvement with language and its recall ability.

Question 9. LI vs. LRS Seriation Test.

A discussion of the linguistic connection with seriation was presented by Nelson <sup>2</sup> as follows:

Jean Piaget, a leading developmental psychologist, has theorized that pre-reasoning is developed as the child works

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<sup>2</sup>Jerald Nelson, "A Study of Pre-Reasoning Ability in the SUSD Preschool Programs" (Stockton, California: University of the Pacific, 1969), P.1. (Mimeographed).

with classifying (grouping) and seriating (ordering). Classifying can be thought of as the usual type of word training which the teacher does as she tries to help children develop concepts, such as tree, blue, or fuzzy. Seriation is exemplified in a more specific set of words, each of which helps us to relate or order collections of things. All of the superlatives and comparatives are seriating words because they are relational (taller than, near, between, last, first, bigger than). By definition, all of the prepositions are also relational or ordering types of words.

The low correlation between the LRS Seriation Test and the LI indicated the areas of language (generative-transformational) and of seriation (cognition or thinking) are not synonymous areas. In administering the Seriation Test to the children in the Bereither-Engelmann program, it was noted the children were able to name the size and shape of the objects to be matched but when it came to the operation and manipulation of the test items they were unable to function up to their linguistic capacity. In other programs the children were able to perform the tasks correctly but unable to give the linguistic labels to the items or the operation.

Question 10. LI vs. Columbia Mental Maturity.

The small N's in this study do not allow for a clear analysis of the existing results; but, from the results gathered, the low correlation between the two came from the areas sampled. One, the structure of language; the other, the discrimination of like and unlike objects which substantiated the results in Question 9 that language and thinking encompass some areas which are not in common.

Question 11. LI vs. Berry Visual-Motor Integration Test.

The low correlation in this comparison could have been because language and perception may have started from common beginnings but

developed along separate parallel paths. Perception being a sensori-motor function while language a generative process, may account for some of the differences.

Question 12. LI vs. Caldwell.

The low correlation between these two tests may be because the latter samples general knowledge which encompasses language and non-language readiness areas while the LI samples the rules used in generating the language. It might have been attributable to the small N's used in the correlation as well.

Question 13. Interrater Reliability.

Part of the high correlation between raters is due to the predetermined right-wrong judgements at the time of test construction. The answers were given below the response line so the gross judgements were already made nevertheless, there remained a few finite judgements which were measured on this sample. The Inventory was designed for teacher administration and because of the high interrater reliability it appears to be well suited for multiple examiners.

Question 14. Split-Half Reliability.

Considering the low range of scores, the reliability estimate was good for this inventory. With an N=314 pairs of scores, it can be safely assumed that the instrument will be reliable on a wide range of populations, both advantaged and disadvantaged.

## SUMMARY

The fourteen studies presented were an out-growth of the five generally-stated hypotheses presented in Chapter 1. It is important then to review the studies in reference to these as stated.

A. A language inventory test should differentiate between children who have had differing programs of education.

The LI does not differentiate between children who have had differing programs as shown by Questions 1 through 4. In all four instances (Bereiter-Engelmann vs. Traditional; Title I vs. Non Title I Funded Programs; Preschool Experience vs. No Preschool Experience; and Difference between Grade Levels) there was no significant difference between the programs as presented.

B. A Language inventory test should differentiate between children having differing cultural, social, or ethnic backgrounds.

Though these studies were loosely defined as disadvantaged or advantaged without the statistical study of ethnic differences, the LI showed no significant difference. (See Questions 5 and 6)

C. A language inventory test should not differentiate between boys and girls.

The LI did not differentiate between males and females, (Question 7) and therefore this generally-stated hypothesis was accepted. It may be noted that this is the first of the three hypotheses to be accepted, and this could be due to the LI's insensitivity as an alternative explanation.

D. A language inventory test should be closely related to scores obtained from other proven achievement-related tests.

The LI did not seem to be clearly related to commonly used



achievement-related tests as shown in questions 9 through 12. Possibly larger N's for these questions would yield more reliable data in this area.

E. A language inventory test should be a reliable instrument when used in the field of early childhood education.

The LI has been shown to be easily scorable and minimally reliable with the use of split-half reliability and interrater reliability tests. Though it is reliable, it is not relatable to any other established measurement commonly used in the field of early childhood education.

#### RECOMMENDATIONS

The recommendations presented are both an out-growth of the studies presented and the underlying theory behind the LI. They are diverse in nature but should serve as points to consider in any future investigation along the lines presented.

1. Throughout this study raw scores were used in evaluating the responses of children, on the LI. An item analysis would have given more information about the test performance. In addition, normative tables using various types of derived scores would help those wishing to use the LI.
2. A greater range of items might help at the upper end of the examination. Although no child received a 100% score, many scores were concentrated in a small range, at the upper end of the scale.
3. Larger N's in the correlational studies would have given better data with which one could project the results.
4. A better statistical design would allow for investigation of the racial-ethnic, socio-economic variables and their interaction.
5. Either an expansion of Robert's rules for generating transformed

sentences or a different theoretical base should be explored to extend the range of the LI.

6. Linguistics in its truest sense does not dictate right or wrong. It is used to analyze language behavior to develop grammar, therefore, the 'right' answers given for each question were arbitrarily chosen to give some measure of performance. These 'right' answers should not be interpreted by educators as the only answer that is correct nor the only acceptable standard of children's language. The 'right' answers should be considered with caution.

7. Since this was a validation study, curriculum suggestions were not entered here. Four sample presentations based upon four areas of detecting linguistic skills were entered in the Appendix B for consideration.

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**APPENDIXES**

APPENDIX A

Inventory of Language Maturity

E.S.E.A. Title I Diagnostic Language Workshop

S. A. T. L. E. Program

(Sentence Analysis For the Training of Linguistic Expression)

INVENTORY OF LANGUAGE MATURITY

Stockton Unified School District  
Stockton, California  
September 12, 1968



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## INTRODUCTION

"Language is a well defined object in the heterogeneous mass of speech facts."

Ferdinand de Saussure  
Course in General Linguistics

### Rationale

The evaluation of language maturity among culturally disadvantaged as well as culturally privileged preschool, kindergarten, and first grade children requires careful examination of two main aspects of linguistic activity: language competence and language performance.

Language as an organized system consists of an infinite set of sentences formulated according to a finite set of rules. This means that the user of any language operates with established rules according to which he not only formulates sentences, but also understands sentences that other speakers of the same language may create. This implies that speakers of English, coming from various cultural environments, employ a common set of rules whenever they wish to put their ideas, thoughts or emotions into words syntactically concatenated for the purpose of effective communication.

Recent investigation has clearly indicated that the above mentioned conception of language presupposes the existence of a set of rules that the speaker of a language begins to internalize as soon as he needs to send and receive messages. The formalization of the same rules constitutes the structure of grammar in the traditional sense of the word. Such mental process will assist the child to acquire the structural pattern of his language. This reference frame, his language competence, will guide his participation in the multiple linguistic activities conditioned by the social environment.

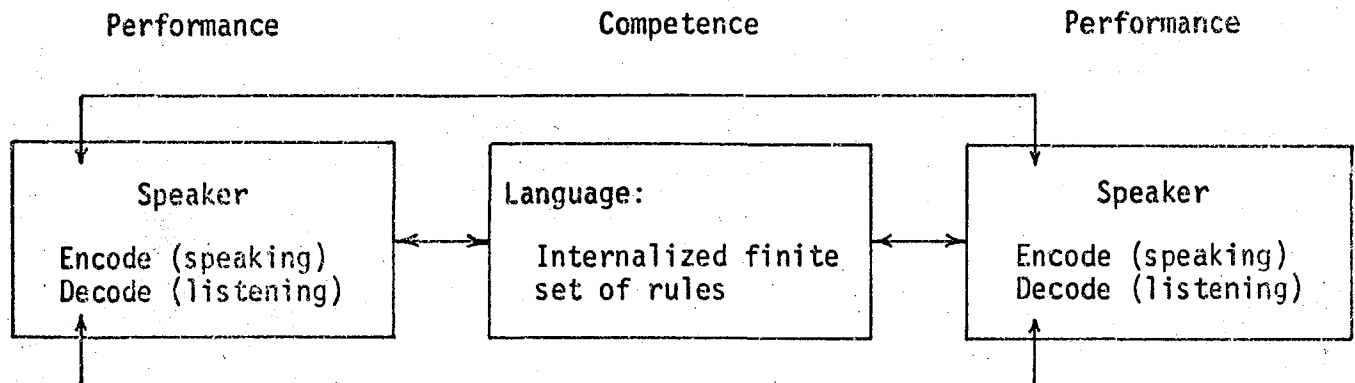


Figure I Cycle of Speech

The ideal structural pattern previously identified as the basis of the language competence of the speaker is not used homogeneously, but manifested in the most heterogenous ways conditioned by social environment. There are three main manifestations of English according to the social distribution of its structural pattern, namely: the "acrolect" dialect, the dialect of the high society; the "mesolect" dialect, the intermediate dialect spoken by the dominant group; and the "basilect" dialect, the form of the same language developed; and spoken in environments different from the other two speaking groups.

Linguistically speaking, users of different dialects are equally competent to use the structural pattern of language they have in common, but as earlier stated, social distribution and level of education may convert the common pattern of language into any of the English dialects. In a given basilect, for example, the obligatory phonological rules may not be present; or be manifested in a manner different from that dictated by the language; or may show phonetic shapes different from those used in a given acrolect. Therefore, it should be the purpose of education not to eliminate the speaker's dialectical patterns, but to add to his linguistic repertoire.

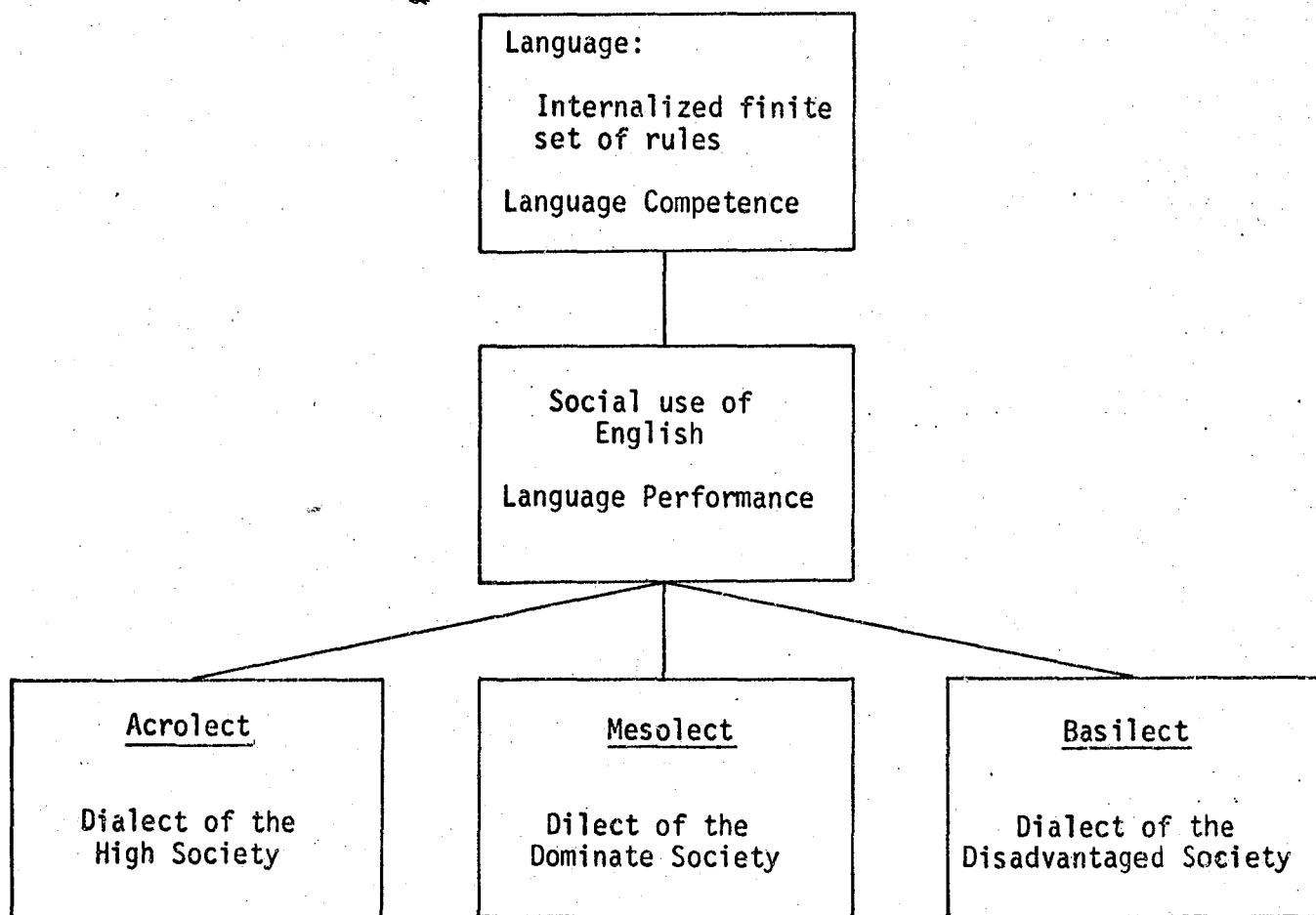


Figure II Common Language, Society & Dialects

The most appropriate scientific tool to approach the universe of language competence and language performance seems to be the so-called generative-transformational grammar recently developed in America. School grammar has been for decades interested in breaking down sentences to observe how they have been constructed, but has failed to elicit a system of economic rules according to which students learn to derive sentences. The transformational approach to grammar permits to infer the deep structure of sentences, and outline hypothetically the process by means of which the speaker brings the deep structures of language to the tangible surface of the utterance. This process permits also the observation of arbitrary rules as well as environmental influences which generate the various social dialects.

Transformational grammar can be defined as a finite set of rules that generates an infinite number of grammatical sentences of a language and no ungrammatical ones and assigns to each sentence generated its proper structural description. Transformational grammar has two components:

- A. The syntactic component consists of:
  - 1. Phrase structure level
  - 2. Transformational structure level
- B. The phonological component consists of a number of parts, for representing the structure of a sentence.

The rules of transformational grammar are instructions used in the production of the basic sentences of a language and rules used in the derivation of sentences from those basic ones. For example:

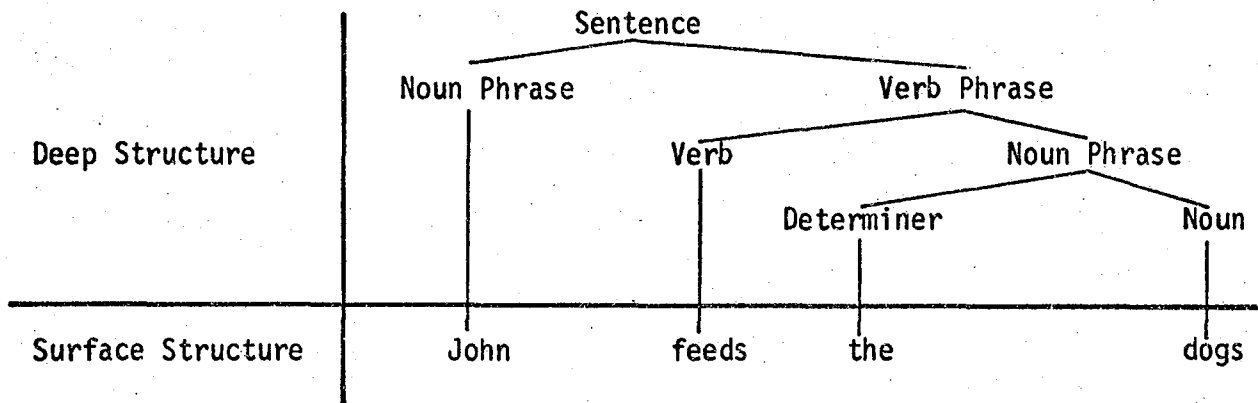
S -----NP + VP

This rule reads: Produce a Sentence as a Noun Phrase plus a Verb Phrase.

The rules for the production of the sentence: John feeds the dogs are:

Sentence -----Noun Phrase + Verb Phrase  
 Verb Phrase -----Verb + Noun Phrase  
 Noun Phrase -----Determiner + Noun  
 Noun -----John, dogs  
 Determiner -----the  
 Verb -----feeds

The sentence produced by the ordered application of the rules can be represented by the following diagram. The upper components, which are the components of an infinite number of sentences, represent the deep structure of the sentence. The lower components are actual words and represent the surface structure of the same sentence.



Applying transformational rules to "John feeds the dogs", the following derived sentences can be obtained:

1. The dogs that John feeds.
2. The dogs John feeds.

The rules of the phonological component assign the proper pronunciation to the sentences of a language. For example:

the verb feed in the sentence "John feeds the dogs", is assigned the correct pronunciation after the phonological rule has turned it into feeds in order to express person and tense.

The Inventory consists of fifteen sentences constructed according to some of the main rules that a child is able to manipulate from his third to his sixth year of life. The child will be exposed to these sentences that represent an aspect of his experience, according to a programmed stimulus in order to obtain the following:

- A. Recognition of vocabulary items projected in a given syntactic structure.
- B. Manipulation of the syntactic structure in which the vocabulary items have been projected.
- C. Utilization of sound as an integrating part of grammar.
- D. Articulations of sounds as word components.

## TEST KEY SYMBOLS

S-----Sentence

-----> Rewritten as

NP-----Noun Phrase

V ----- Verb

N ----- Noun

VP----- Verb Phrase

Aux ----- Auxilliary

PP ----- Prepositional Phrase

Det----- Determiner

Vi ----- Verb intransitive

Vt ----- Verb transitive

T----- Tense

M----- Modal

Prep----- Preposition


Pl ----- Plural

Sg ----- Singular

Pas ----- Past

Pres ----- Present

Part ----- Participle

----- Incorporation of phrase into sentence

Phrase Rules

for: The worms crawl over the rocks

- |                     |                       |
|---------------------|-----------------------|
| 1. S -----NP + VP   | 7. V -----Vi + PP     |
| 2. NP ----- Det + N | 8. PP ----- Prep + NP |
| 3. N ----- Cnt (pl) | 9. N ----- worm, rock |
| 4. VP -----Aux + V  | 10. Det --- the       |
| 5. Aux --- T + M    | 11. Vi ---- crawl     |
| 6. T ----- pres     | 12. Prep -- over      |

The application of these rules produce the following string:

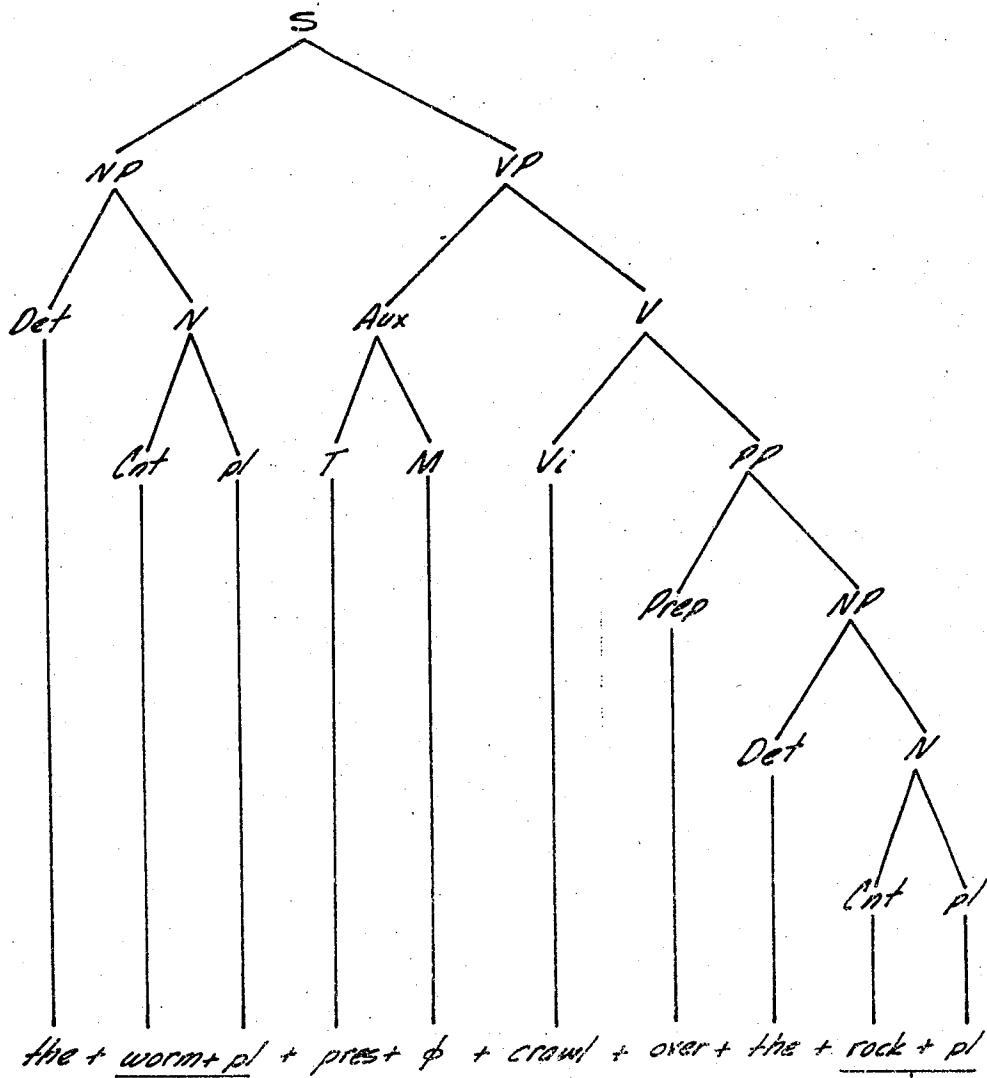
the + worm + pl + pres + crawl + over + the + rock + pl

Phonological Rules

1. Noun + Pl-----worm + s /z/ -----worms /wɔrmz/
2. Verb + pres (3-pl)----crawl +  $\phi$  ----- crawl /krɔl/
3. Noun + pl ----- rock + s / s /----- rocks /raks/

When the phonological rules are applied to the above string, the following sentence is obtained:

The worms crawl over the rocks.



Phonological Rules:

1. Noun + /z/
2. Verb + φ
3. Noun + /s/

Phrases:

NP  
The worms  
 1

VP  
crawl  
 2

PP  
over the rocks  
 3

Phoneme: /r/ as in rocks

Sentence: The worms crawl over the rocks



Phrase Rules

for: The dogs play behind the bushes.

- |                     |                       |
|---------------------|-----------------------|
| 1. S -----NP + VP   | 7. V ----- Vi + PP    |
| 2. NP ---- Det + N  | 8. PP ----- Prep + NP |
| 3. N ----- Cnt (pl) | 9. N ----- dog, bush  |
| 4. VP ---- Aux + V  | 10. Det ---- the      |
| 5. Aux --- T + M    | 11. Vi ----- play     |
| 6. T ---- pres      | 12. Prep --- behind   |

The application of these rules produce the following string:

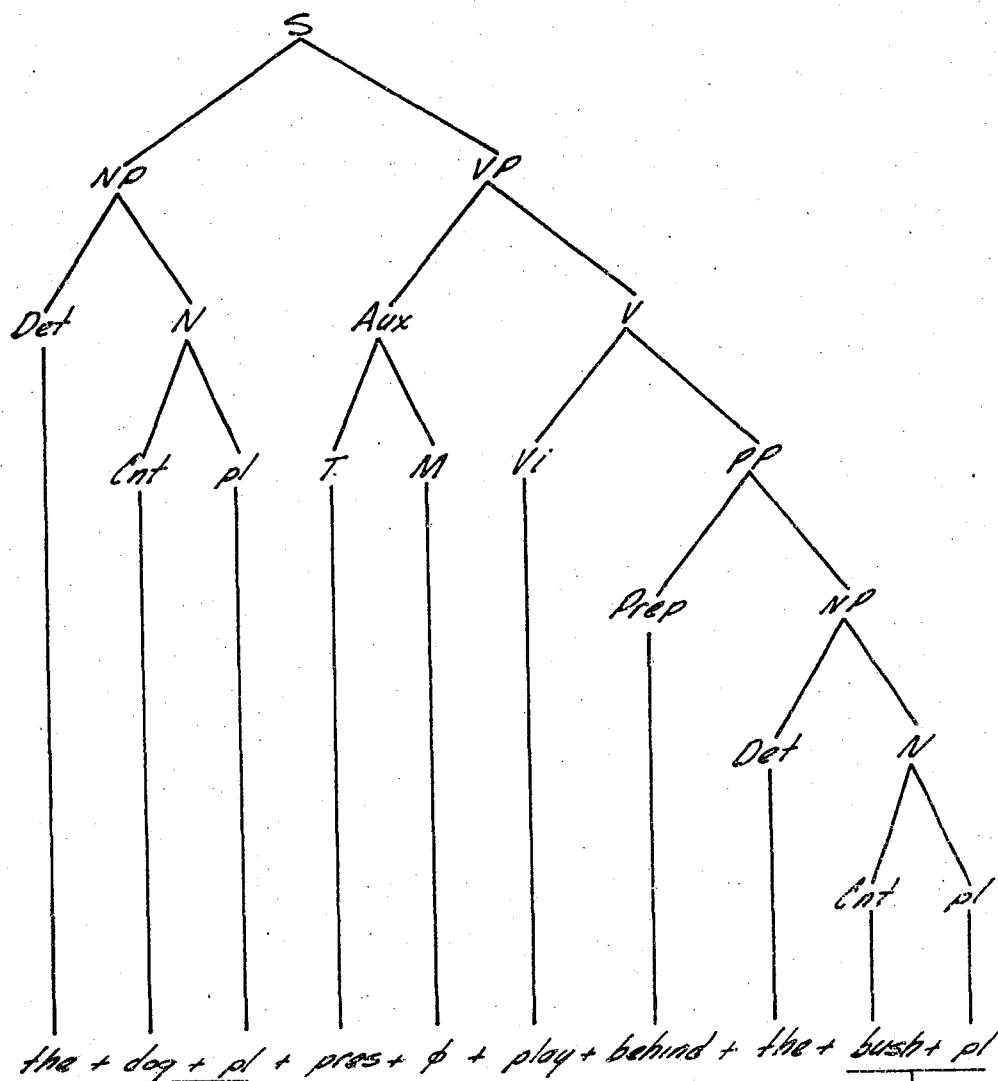
the + dog + pl + pres + play + behind + the + bush + pl

Phonological Rules

1. Noun + pl ----- dog + s /z/-----dogs / dɔgz/
2. Verb + pres (3-pl) play +  $\emptyset$ -----play /pley/
3. Noun + pl ----- bush + s /ɪz/----- bushes /buʃɪz/

When the phonological rules are applied to the above string, the following sentence is obtained:

The dogs play behind the bushes.



Phonological Rules:

1. Noun + /z/
2. Verb +  $\phi$
3. Noun + /ɪz/

Phrases:

NP	VP	PP
<u>The dogs</u>	<u>play</u>	<u>behind the bushes</u>
1	2	3

Phoneme: /u/ as in bushes

Sentence: The dogs play behind the bushes.

Phrase Rules

for:           The boy sees the faces in the leaves.

- |                       |                          |
|-----------------------|--------------------------|
| 1. S-----NP + VP      | 7. V-----Vt + NP + VP    |
| 2. NP -----Det + N    | 8. PP-----Prep + NP      |
| 3. N-----Cnt (Pl, Sg) | 9. N-----boy, face, leaf |
| 4. VP -----Aux + V    | 10. Det-----the          |
| 5. Aux -----T + M     | 11. Vt-----see           |
| 6. T-----pres         | 12. Prep-----in          |

The application of these rules produce the following string:

the + boy + sg + pres + see + the + face + pl + in + the + leaf + pl

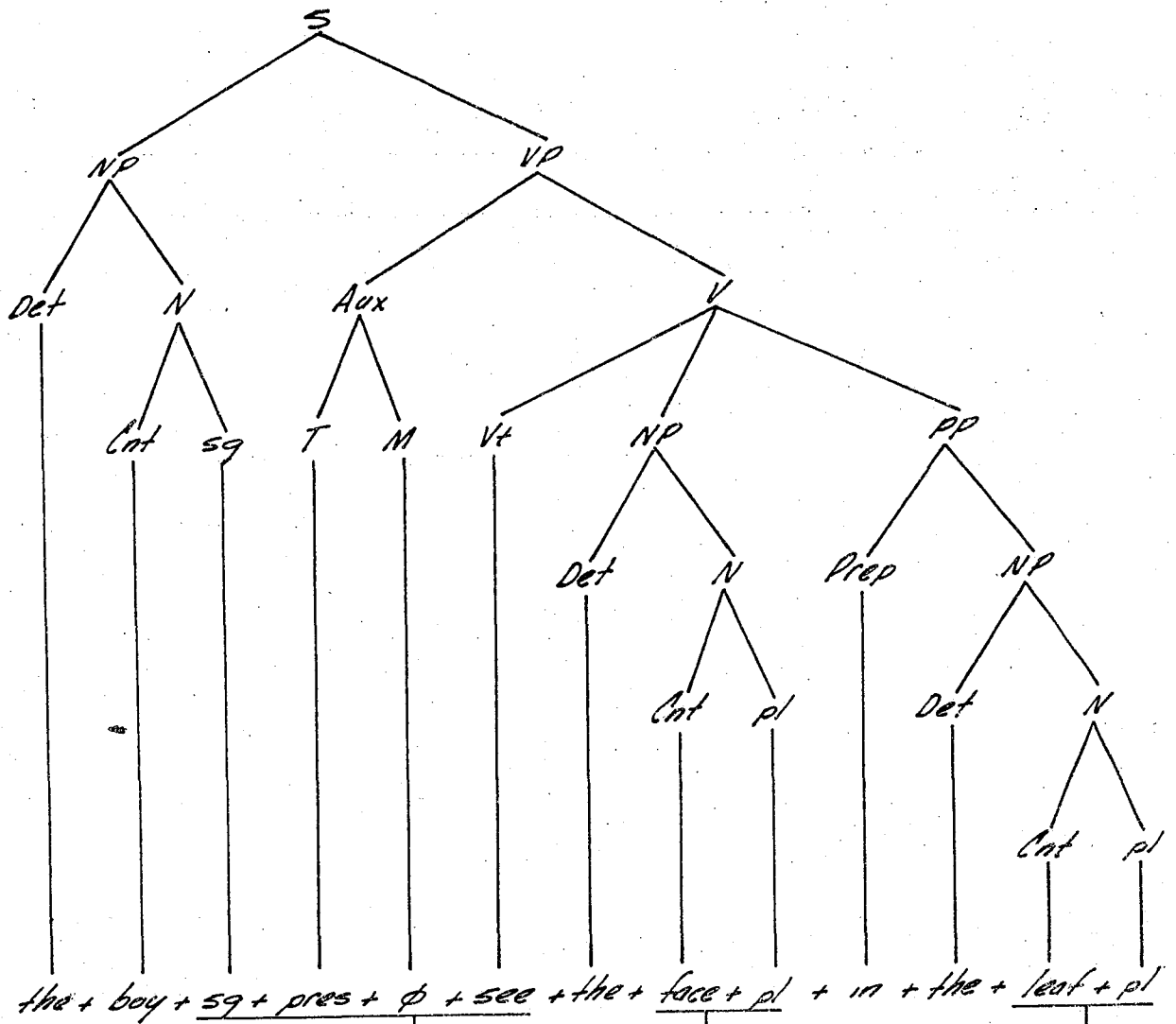
Phonological Rules

1. Verb + pres-----see + s /z/-----sees /siyz/
2. Noun + pl-----face + s /ɪ z/-----faces /feysɪz/
3. Noun + pl -----leaf + s /z/-----leaves /liyvz/

When the phonological rules are applied to the above string, the following sentence is obtained:

The boy sees the faces in the leaves.

Sentence 3



Phonological Rules:

1. Verb + /z/
2. Noun + /ɪz/
3. Noun + /z/

Phrases: NP

VP

PP

The boy  
1

sees the faces  
2

in the leaves  
3

Phoneme: /v/ as in leaves

Sentence: The boy sees the faces in the leaves.

Phrase Rules

for: The birds will build nests in the branches.

- |                     |                                |
|---------------------|--------------------------------|
| 1. S -----NP + VP   | 7. M ----- will                |
| 2. NP ----- Det + N | 8. V ----- Vt + NP+PP          |
| 3. N ----- Cnt (pl) | 9. PP ----- Pret + NP          |
| 4. VP ----- Aux + V | 10. N ----- bird, nest, branch |
| 5. Aux ----- T + M  | 11. Det ----- the              |
| 6. T ----- pres     | 12. Vt ----- build             |
|                     | 13. Prep -- in                 |

The application of these rules produce the following string:

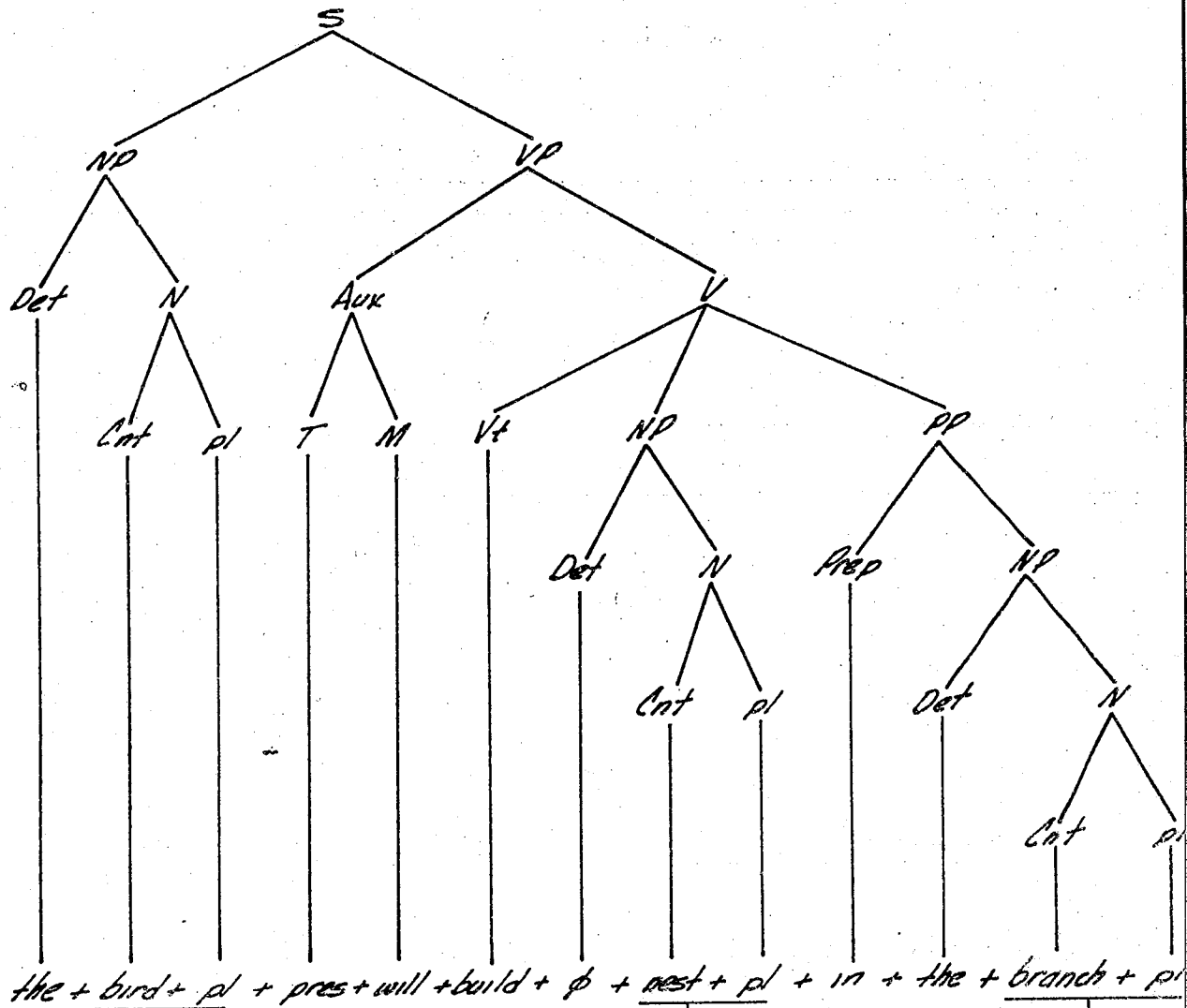
The + bird + pl + pres + will + build + nest + pl + in + the + branch + pl

Phonological Rules

1. Noun + pl -----bird + s /z/ -----birds / bɑrdz/
2. Noun + pl ----- nest + s /s/ ----- nests / nests/
3. Noun + pl----- branch + s /ɪz/----- branches / brænzɪz/

When the phonological rules are applied to the above string, the following sentence is obtained:

The birds will build nests in the branches.



Phonological Rules:

1. Noun + /z/
2. Noun + /s/
3. Noun + /ɪz/

Phrases:	NP	VP	PP
	<u>The bird</u>	<u>will build nests</u>	<u>in the branches</u>
	1	2	3
Phoneme:	/e/ as in <u>web</u>		

Sentence: The birds will build nests in the branches.

Phrase Rule

for:                    There are wasps in the spider webs.

- |                          |                              |
|--------------------------|------------------------------|
| 1. S ----- NP + VP       | 6. T -----pres               |
| 2. NP ----- Det + N      | 7. PP ----- Prep + NP        |
| 3. N----- Cnt (pl)       | 8. N ----- wasp , spider web |
| 4. VP -----Aux + be + PP | 9. Det ----- null, the       |
| 5. Aux ----- T + M       | 10. Prep----- in             |

Transformational Rules

The application of these rules produce the following string:

wasp + pl + pres + be + in + the + spider web + pl

Apply the T-There rule to the same string to produce:

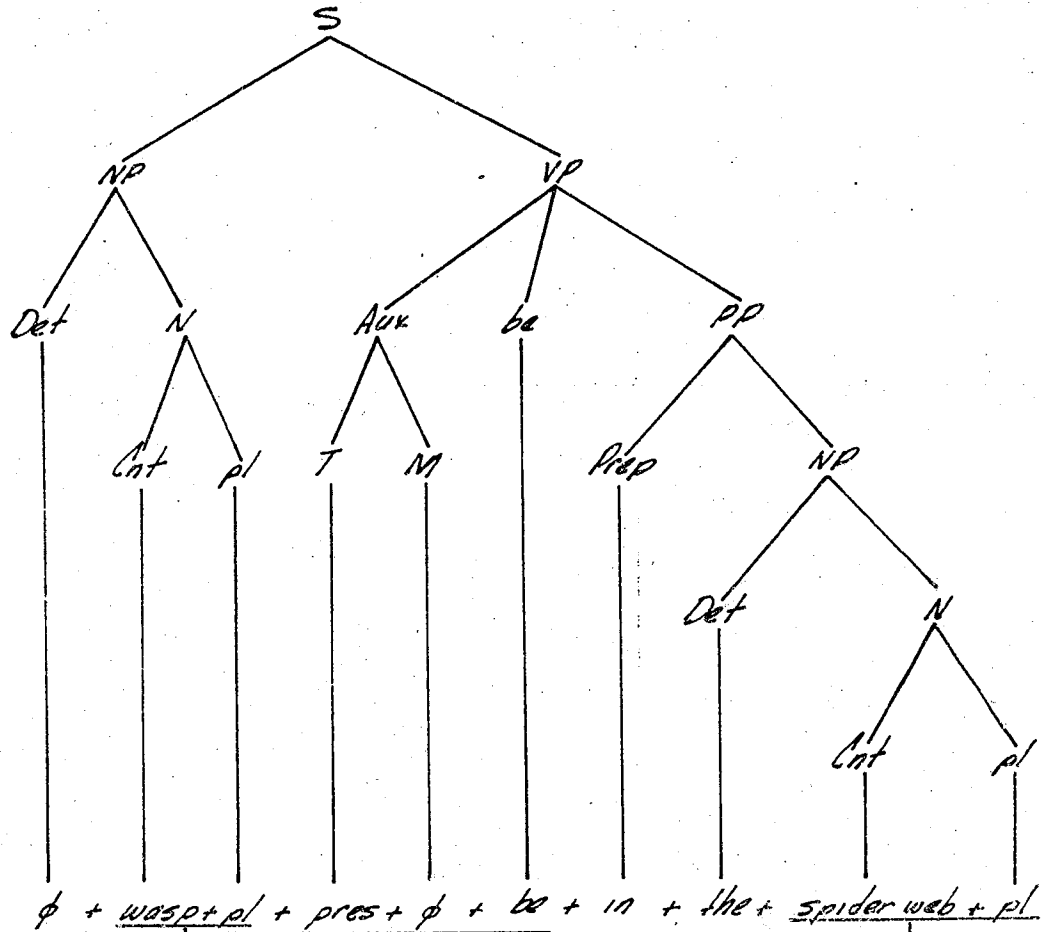
there + pres + be + wasp + pl + in + the + spider web + pl

Phonological Rules

1. Noun + pl -----wasp + s /s/-----wasps /wasps/
2. Be + pres ----- are /ar/
3. Noun + Pl-----spider web + s /z/-----spider webs /spaydər webz/

When the phonological rules are applied to the above transformed string, the following sentence is obtained:

There are wasps in the spider webs.



Phonological Rules:

1. Noun + /s/
2. Be + pres
3. Noun + /z/

Phrases:

V	NP	PP
<u>There</u>	<u>wasps</u>	<u>in the spider webs</u>
1	2	3

Phoneme: /e/ as in web

Sentence: There are wasps in the spider webs.



Phrase Rules

for: The toad brings the bugs.

- |                     |                      |
|---------------------|----------------------|
| 1. S ----- NP + VP  | 7. V ----- Vt + NP   |
| 2. NP ----- Det + N | 8. N ----- toad, bug |
| 3. N ----- Cnt (pl) | 9. Det ----- the     |
| 4. VP ----- Aux + V | 10. Vt ----- bring   |
| 5. Aux ----- T + M  |                      |
| 6. T ----- pres     |                      |

Transformational Rules

The application of these rules produce the string:

the + toad + sg + pres + bring + the + bug + pl

Apply successively the T-Relative, Deletion rules to the same string:

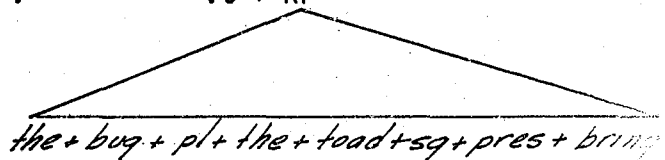
the + bug + pl + the + toad + sg + pres + bring

This final string will be included with the following phrase rules.

Phrase Rules

for: The lizard takes ( the bugs the toad brings.)

- |                     |                    |
|---------------------|--------------------|
| 1. S ----- NP + VP  | 7. V ----- Vt + NP |
| 2. NP ----- Det + N |                    |
| 3. N ----- Cnt (sg) |                    |
| 4. VP ----- Aux + M |                    |
| 5. Aux ----- T + M  |                    |
| 6. T ----- pres     |                    |
|                     | 8. N ----- lizard  |
|                     | 9. Det ----- the   |
|                     | 10. Vt ----- take  |



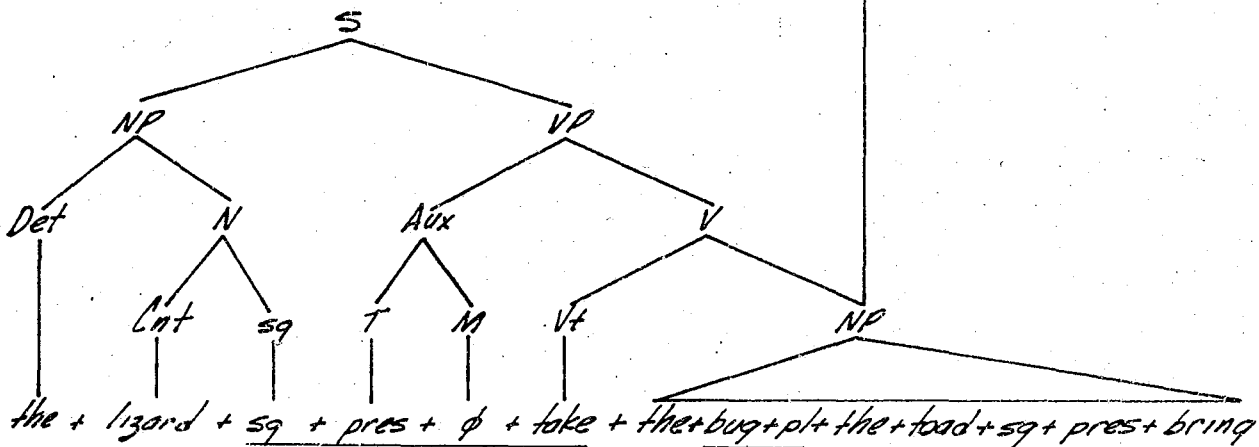
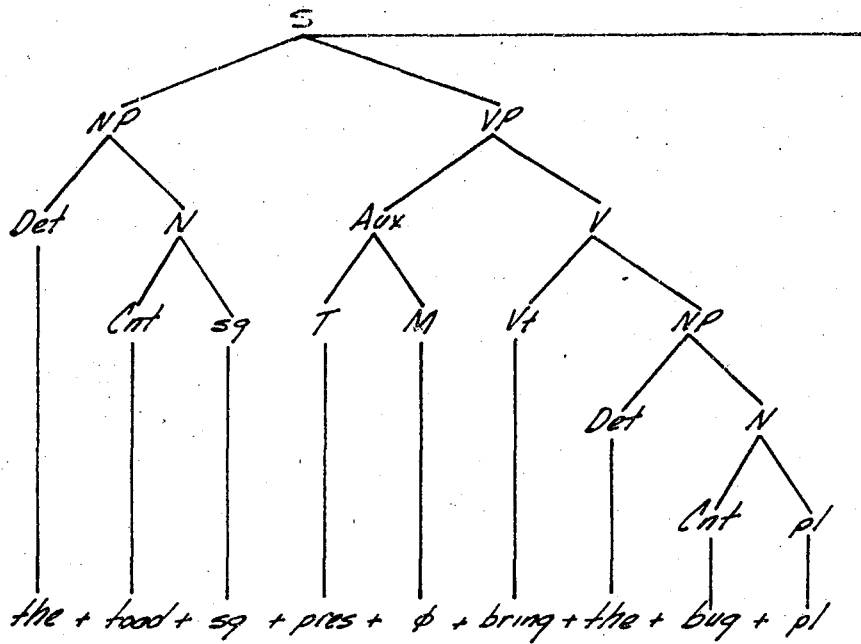
Phonological Rules

- Verb + pres ----- take + s /s/ ----- takes /teyks/
- Noun + pl ----- bug + s /z/ ----- bugs /bagz/
- Verb + pres ----- bring + s /z/ ----- brings /brinjz/

When the phonological rules are applied to the following total string:

the + lizard + sg + pres + take + the + bug + pl + the + toad + sg + pres + bring  
the following sentence is obtained:

The lizard takes the bugs the toad brings.



Phonological Rules:

1. Verb + /s/
2. Noun + /z/
3. Verb + /z/

Phrases:

NP	VP	NP
<u>The lizard</u>	<u>takes</u>	<u>the bugs the toad brings</u>
1	2	3

Phoneme: /ə/ as in bug

Sentence: The lizard takes the bugs the toad brings.

Phrase Rules

for: The turtle digs the holes.

- |                         |                         |
|-------------------------|-------------------------|
| 1. S ----- NP + VP      | 6. T ----- pres         |
| 2. NP ----- Det + N     | 7. V ----- Vt + NP      |
| 3. N ----- Cnt (sg, pl) | 8. N ----- turtle, hole |
| 4. VP ----- Aux + V     | 9. Det ----- the        |
| 5. Aux ----- T + M      | 10. Vt ----- dig        |

Transformational Rules

The application of these rules produce the string:

the + turtle + sg + pres + dig + the + hole + pl

Apply successively the T-Relative, Deletion rules to the same string:

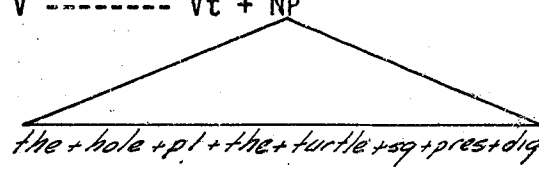
the + hole + pl + the + turtle + sg + pres + dig

This final string will be included with the following phrase rules:

Phrase Rules

for: The boy finds (the holes the turtle digs).

- |                     |                    |
|---------------------|--------------------|
| 1. S ----- NP + VP  | 7. V ----- Vt + NP |
| 2. NP ----- Det + N |                    |
| 3. N ----- Cnt (sg) |                    |
| 4. VP ----- Aux + V |                    |
| 5. Aux ----- T + M  |                    |
| 6. T ----- pres     |                    |
|                     | 8. N ----- boy     |
|                     | 9. Vt ----- find   |
|                     | 10. Det ----- the  |



Phonological Rules

- |  |
|--|
| 1. Verb + pres ----- find + s /z/ ----- finds /fayndz/ |
| 2. Noun + pl ----- hole + s /z/ ----- holes /howlz/    |
| 3. Verb + pres ----- dig + s /z/ ----- digs /digz/     |

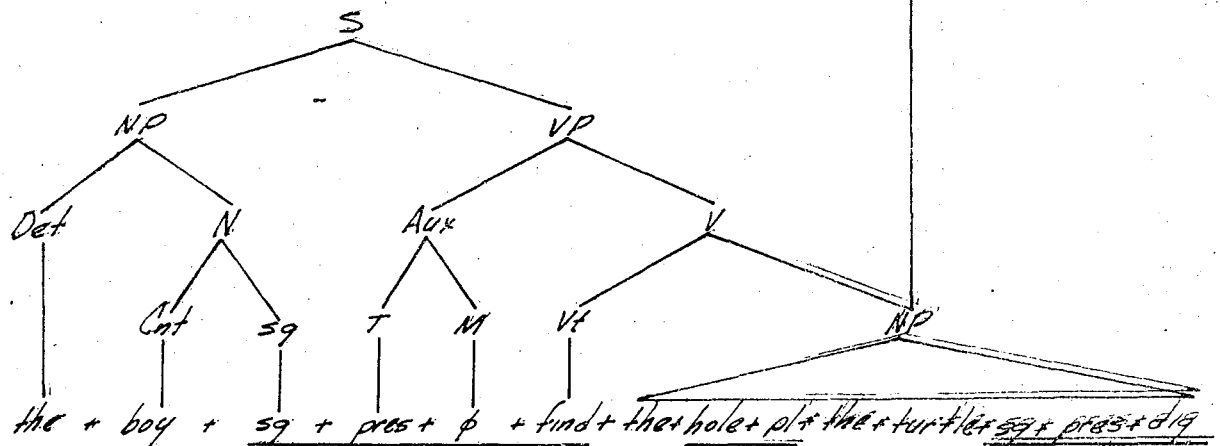
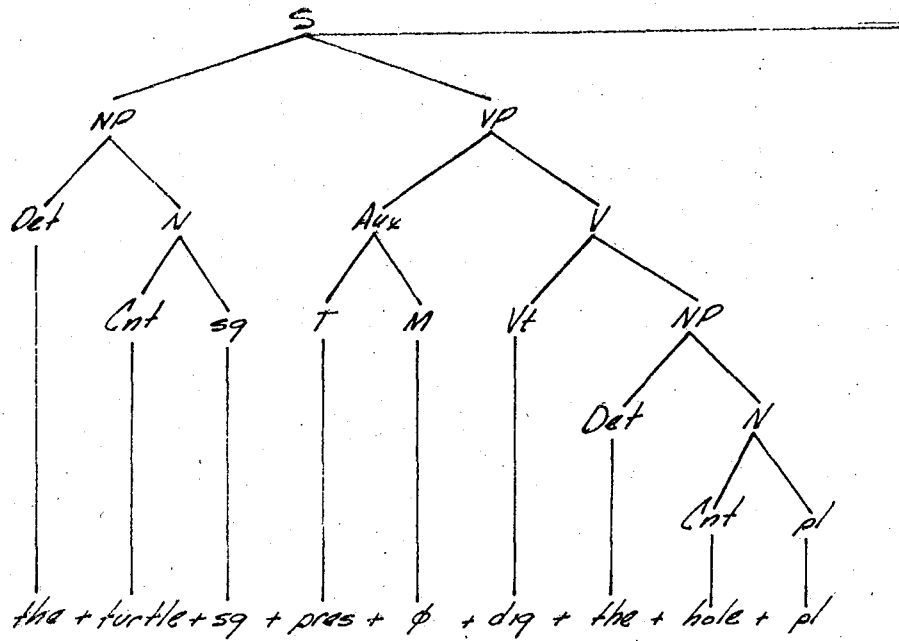
When the phonological rules are applied to the following total string:

the + boy + sg + pres + find + the + hole + pl + the + turtle + sg + pres + dig

the following sentence is obtained:

The boy finds the holes the turtle digs.

Sentence 7



Phonological Rules:

1. Verb + /z/

2. Noun + /z/

3. Verb + /z/

Phrases:

NP

VP

NP

The boy  
1

finds  
2

the holes the turtle digs  
3

Phonemes:

/i:/ as in dig

Sentence:

The boy finds the holes the turtle digs.

Phrase Rules

for: The boy catches the fish

- |                     |                      |
|---------------------|----------------------|
| 1. S -----NP + VP   | 7. V -----Vt + NP    |
| 2. NP ----- Det + N | 8. N ----- boy, fish |
| 3. N ----- Cnt (sg) | 9. Det ----- the     |
| 4. VP ----- Aux + V | 10. Vt ----- catch   |
| 5. Aux ----- T + M  |                      |
| 6. T ----- pres     |                      |

Transformational Rules

The application of these rules produce the string:

the + boy + sg + pres + catch + the + fish + pl

Apply successively the T-Relative, Deletion rules to the same string:

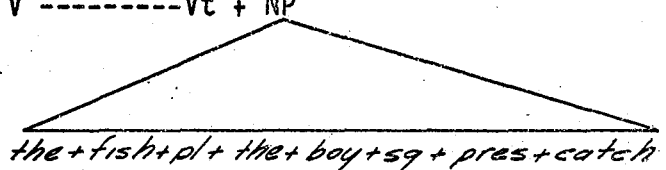
the + fish + pl + the + boy + sg + pres + catch

This final string will be included with the following phrase rules.

Phrase Rules

for: The girl wants (the fish the boy catches.)

- |                     |                   |
|---------------------|-------------------|
| 1. S -----NP + VP   | 7. V -----Vt + NP |
| 2. NP ----- Det + N |                   |
| 3. N ----- Cnt (sg) |                   |
| 4. VP ----- Aux + V | 8. N ----- cat    |
| 5. Aux ----- T + M  | 9. Det ----- the  |
| 6. T ----- pres     | 10. Vt ----- want |



Phonological Rules

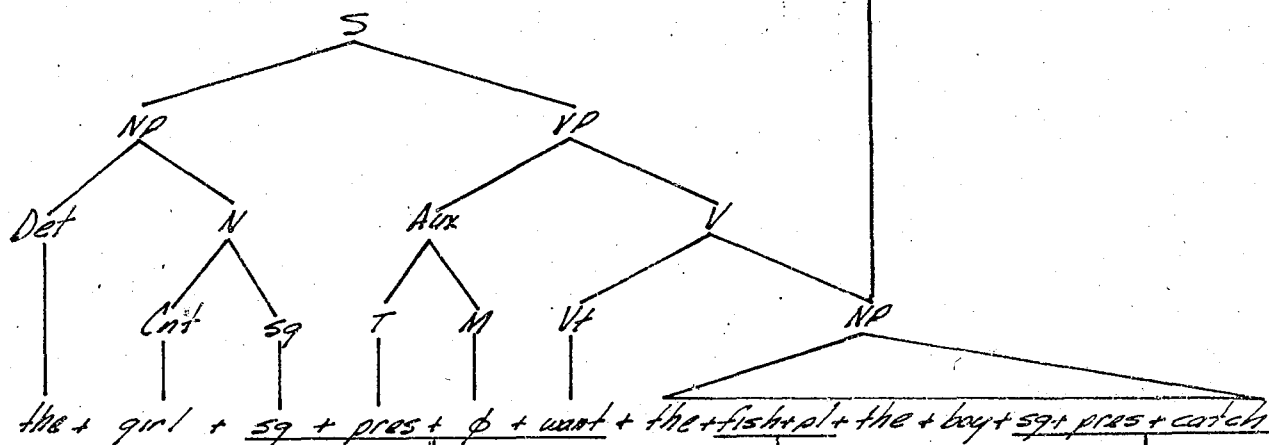
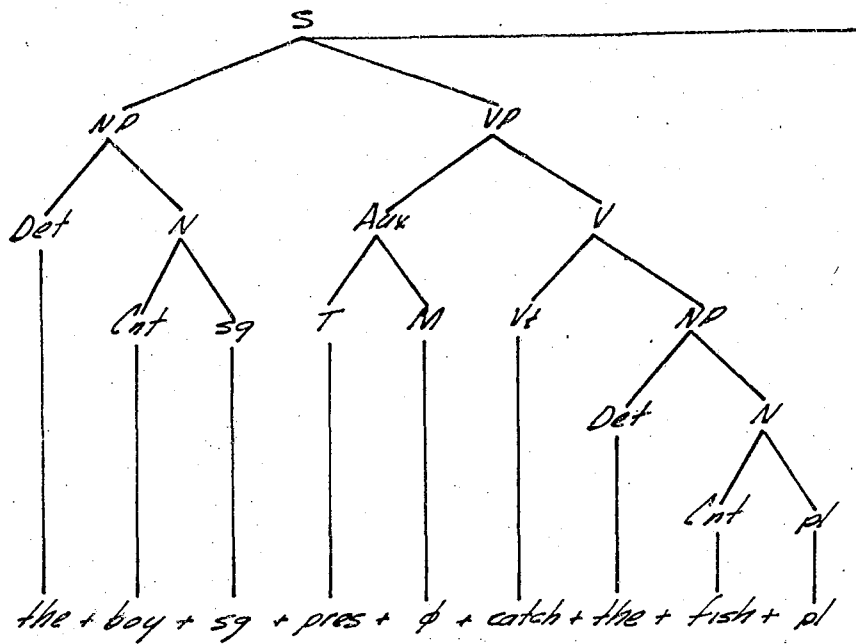
- |   |
|---|
| 1. Verb + pres -----want + s /s/ ----- wants / wants/       |
| 2. Noun + pl ----- fish + Ø ----- fish / fiʃ/               |
| 3. Verb + pres ----- catch + s /ɪz/ ----- catches / kætʃɪz/ |

When the phonological rules are applied to the following total string:

the + girl + sg + pres + want + the + fish + pl + the + boy +sg + pres + catch

the following sentence is obtained:

The girl wants the fish the boy catches.



Phonological Rules:

1. Verb + /s/
2. Noun +  $\phi$
3. Verb + /ɪz/

Phrases:

NP	VP	NP
<u>The girl</u>	<u>wants</u>	<u>the fish the boy catches</u>
1	2	3

Phoneme: /ʃ/ as in fish

Sentence: The girl wants the fish the boy catches.

Phrase Rules

for: The boy brought the cheese.

- |                                  |                        |
|----------------------------------|------------------------|
| 1. S -----NP + VP                | 6. T -----pas          |
| 2. NP ----- Det + N              | 7. V ----- Vt + NP     |
| 3. N ----- {Cnt (sg)<br>{N-Cnt}} | 8. N ----- boy, cheese |
| 4. VP----- Aux + V               | 9. Det ----- the       |
| 5. Aux ----- T + M               | 10. Vt ----- bring     |

Transformational Rules

The application of these rules produce the string:

the + boy + sg + pas + bring + the + cheese

Apply successively the T-Relative, Deletion rules to the same string:

the + cheese + the + boy +sg + pas + bring

This final string will be included with the following phrase rules.

Phrase Rules

for: The mouse was eating (the cheese the boy brought).

- |                     |   |
|---------------------|---|
| 1. S -----NP + VP   | 7. M ----- be-ing                         |
| 2. NP ----- Det + N | 8. V ----- Vt + NP                        |
| 3. N ----- Cnt (sg) | <i>the+cheese+ the+boy+sg+ pas+ bring</i> |
| 4. VP ----- Aux + V | 9. N----- mouse                           |
| 5. Aux ----- T + M  | 10. Det ----- the                         |
| 6. T ----- pres     | 11. Vt ----- eat                          |

Phonological Rules

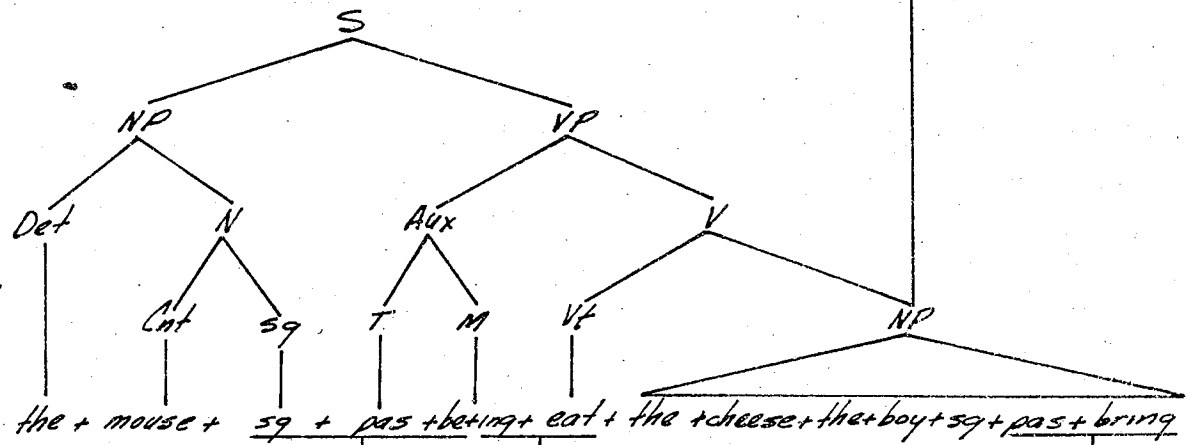
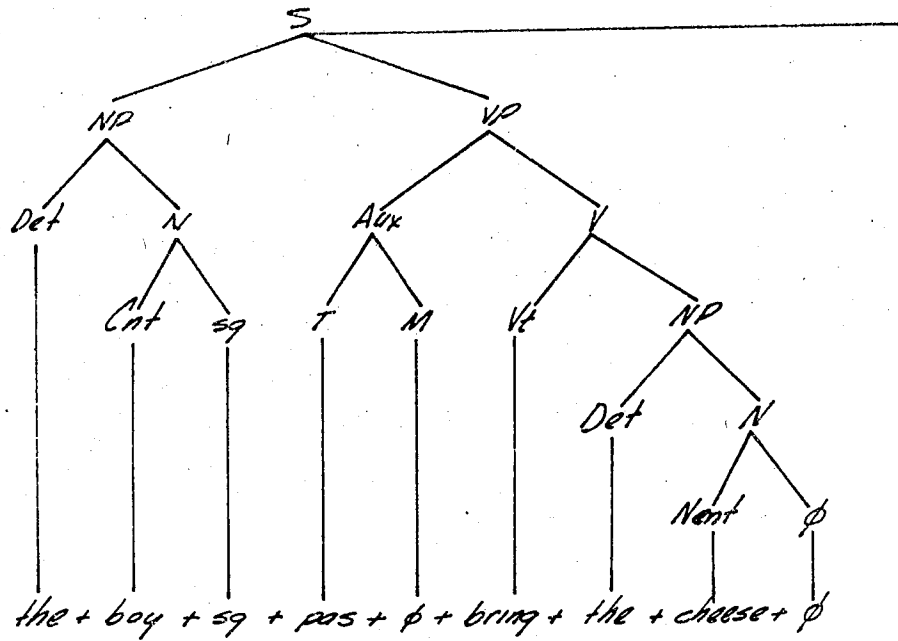
1. Be + pas -----was / wəz/
2. Verb + ing -----eat + ing /iŋ/----- eating / iytɪŋ/
3. Verb + pas ----- bring + pas ----- brought /brɒt/

When the phonological rules are applied to the following total string:

the + mouse + sg + pas + be + ing + eat + the + cheese + the + boy + sg + pas + bring

the following sentence is obtained:

The mouse was eating the cheese the boy brought.



Phonological Rules:

1. Be + pas
2. Verb + /ɪŋ/
3. Verb + pas

Phrases:	NP	VP	NP
	<u>The mouse</u>	<u>was eating</u>	<u>the cheese the boy brought</u>
	1	2	3

Phoneme: /ɪ/ as in cheese

Sentence: The mouse was eating the cheese the boy brought.



Phrase Rules

for: The girl wanted the butterfly

- |                     |                            |
|---------------------|----------------------------|
| 1. S -----NP + VP   | 7. V ----- Vt + NP         |
| 2. NP ----- Det + N | 8. N ----- girl, butterfly |
| 3. V ----- Cnt (sg) | 9. Det ----- the           |
| 4. VP ----- Aux + V | 10. Vt ----- want          |
| 5. Aux ----- T + M  |                            |
| 6. T ----- Pas      |                            |

Transformational Rules

The application of these rules produce the string:

the + girl + sg + pas + want + the + butterfly + sg

Apply successively the T-Relative, Deletion rules to the same string:

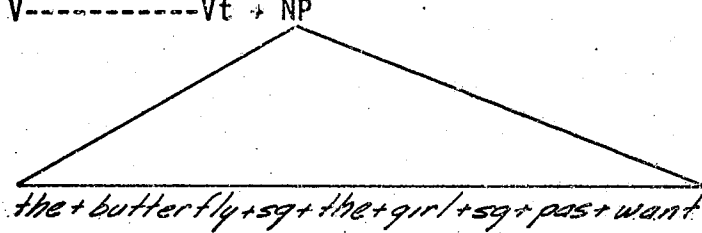
the + butterfly + sg + the + girl + sg + pas + want

The final string will be included with the following phrase rules:

Phrase Rules

for: The boy is taking (the butterfly the girl wanted.)

- |                     |                   |
|---------------------|-------------------|
| 1. S -----NP + VP   | 8. V-----Vt + NP  |
| 2. NP -----Det + N  |                   |
| 3. N ----- Cnt (sg) |                   |
| 4. VP ----- Aux + V |                   |
| 5. Aux ----- T + M  | 9. N-----boy      |
| 6. T ----- pres     | 10. Det ----- the |
| 7. M ----- be-ing   | 11. Vt ----- take |



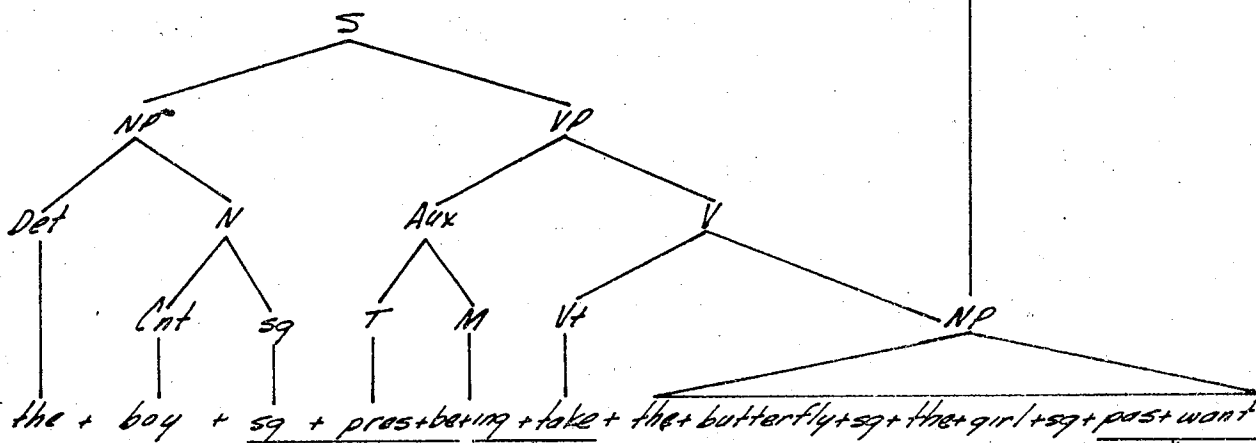
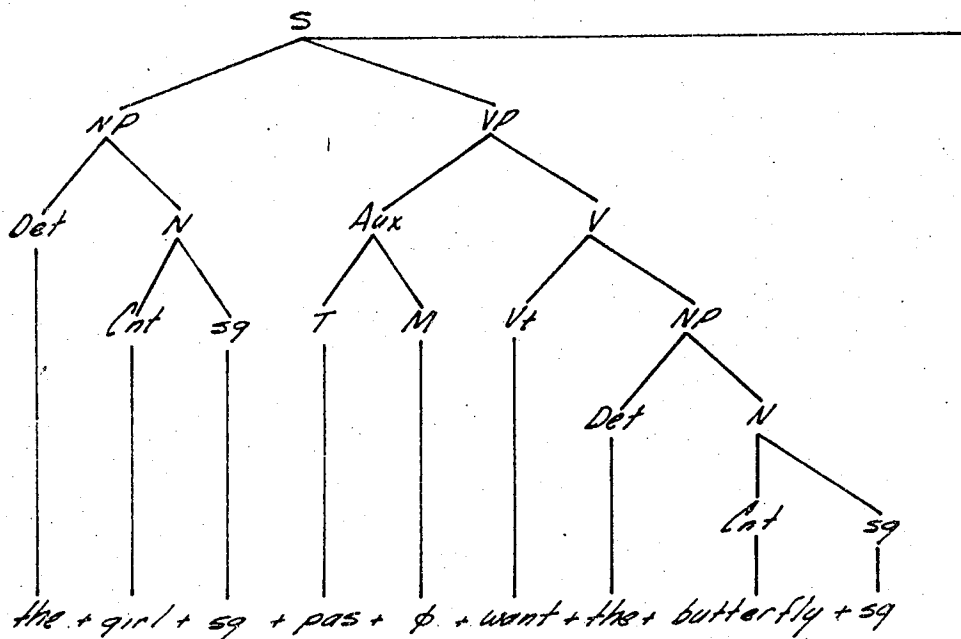
Phonological Rules

- |  |
|--|
| 1. Be + pres-----is / iz/                                |
| 2. Verb + ing -----take + ing / iŋ/-----taking / teykiŋ/ |
| 3. Verb + pas -----want + ed /ɪd/ -----wanted / wantɪd/  |

When the phonological rules are applied to the following total string:

the + boy + sg + pres + be + ing + take + the + butterfly + sg + the + girl +sg +pas +want  
 the following sentence is obtained:

The boy is taking the butterfly the girl wanted.



Phonological Rules:

1. Be + pres
2. Verb + /ɪŋ/
3. Verb + /ɪd/

Phrases:

NP

VP

NP

The boy

is taking

the butterfly the girl wanted

1

2

3

Phoneme: /ɪ/ as in the

Sentence: The boy is taking the butterfly the girl wanted.

Phrase Rules

for: The man left the jam.

- |                              |                   |
|------------------------------|-------------------|
| 1. S -----NP + VP            | 6. T -----Pas     |
| 2. NP ----- Det + N          | 7. V----- Vt + NP |
| 3. V ----- Cnt (sg)<br>N-Cnt | 8. N-----man      |
| 4. VP ----- Aux + V          | 9. Det -----the   |
| 5. Aux ----- T + M           | 10. Vt----- leave |

Transformational Rules

The application of these rules produce the string:

the + man + sg + pas + leave + the + jam

Apply successively the T-Relative, Deletion rules to the same string:

the + jam + the + man + sg + pas + leave

This final string will be included with the following phrase rules.

Phrase Rules

for: The monkeys are eating (the jam the man left.)

- |                     |   |
|---------------------|---|
| 1. S -----NP + VP   | 7. M -----be-ing                                |
| 2. NP ----- Det + N | 8. V----- Vt + NP                               |
| 3. N ----- Cnt (pl) | <i>the + jam + the + man + sg + pas + leave</i> |
| 4. VP----- Aux + V  | 9. N ----- monkey                               |
| 5. Aux ----- T + M  | 10. Det ----- the                               |
| 6. T ----- pres     | 11. Vt ----- eat                                |

Phonological Rules

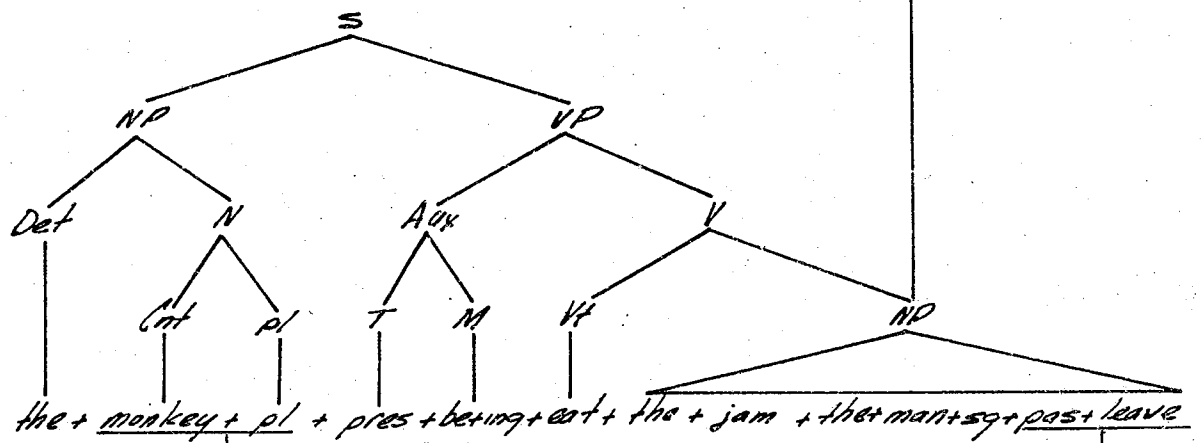
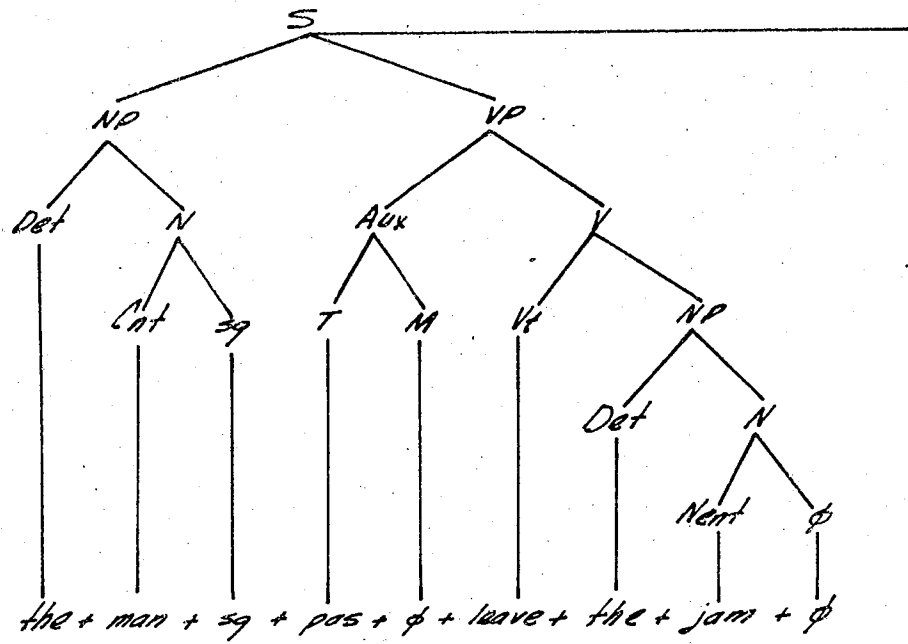
1. Noun + pl -----monkey + s /z/-----monkeys /mənki:z/
2. Be + pres-----are /ər/
3. Verb + pas -----leave + pas ----- left /left/

When the phonological rules are applied to the following total string:

the+ monkey+ pl+ pres + be +ing + eat + the + jam + the + man + sg + pas + leave

the following sentence is obtained:

The monkeys are eating the jam the man left.



Phonological Rules:

1. Noun + /z/
2. Be + pres
3. Verb + pas

Phrases:

NP	VP	NP
<u>The monkeys</u>	<u>are eating</u>	<u>the jam the man left.</u>
1	2	3

Phoneme:

/j/ as in jam

Sentence:

The monkeys are eating the jam the man left.

Phrase Rules

for: The bones are under the ground.

- |                                |                        |
|--------------------------------|------------------------|
| 1. S -----NP + VP              | 6. T -----pres         |
| 2. NP ----- Det +N             | 7. PP ----- Prep + NP  |
| 3. N ----- {Cnt (pl)}<br>N-Cnt | 8. N----- bone, ground |
| 4. VP ----- Aux + be + PP      | 9. Det -----the        |
| 5. Aux ----- T + M             | 10. Prep-----under     |

Transformational Rules

The application of these rules produce the string:

the + bone + pl + pres + be + under + the + ground

Apply successively the T-Relative, Deletion rules to the same string:

the + bone + pl + under + the + ground

This final string will be included with the following phrase rules.

Phrase Rules

for: The dog is going to get (the bones under the ground.)

- |                     |   |
|---------------------|---|
| 1. S -----NP + VP   | 7. M-----be going to                          |
| 2. NP -----Det + N  | 8. V -----Vt + NP                             |
| 3. N -----Cnt (sg)  | <i>the + bone + pl + under + the + ground</i> |
| 4. VP ----- Aux + V | 9. N-----dog                                  |
| 5. Aux ----- T + M  | 10. Det -----the                              |
| 6. T ----- pres     | 11. Vt ----- get                              |

Apply the T-Negative rule to the following total string:

the + dog + sg + pres + be + going + to + get + the + bone + pl + under + the + ground

the following string is obtained:

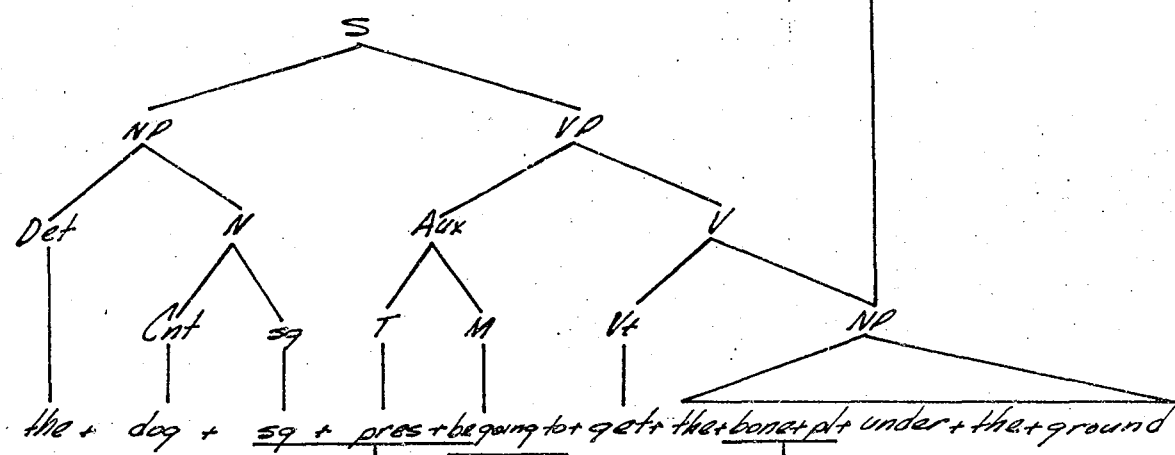
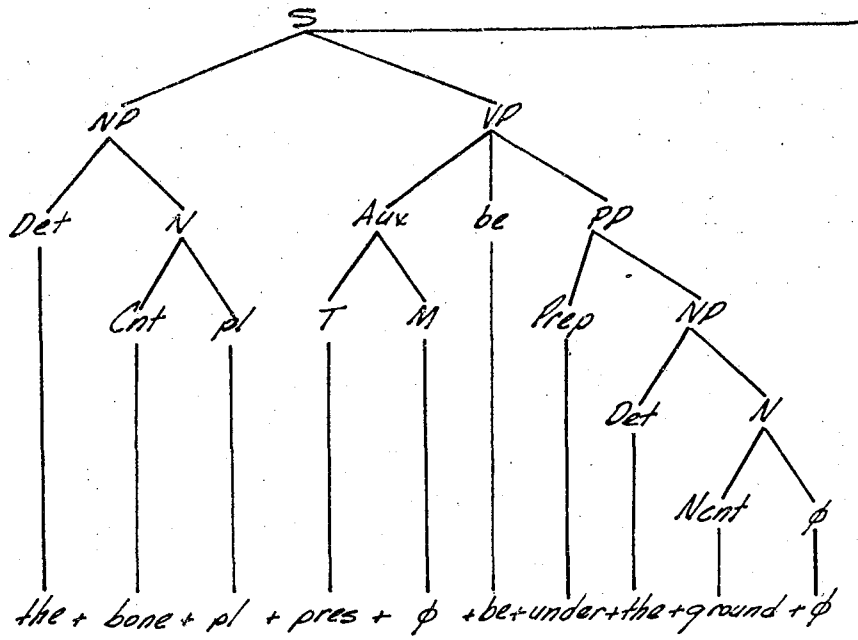
the + dog + sg + pres + be + not + going+ to +get + the+ bone+ pl+ under+ the+ ground

Phonological Rules

1. Be + pres -----is /iz/
2. M + pres -----is going to -----is going to /iz gowiŋ tu/
3. Noun + Pl -----bone + s /z/-----bones /bownz/

When the phonological rules are applied to the above total string, the following sentence is obtained:

The dog is not going to get the bones under the ground.



Phonological Rules:

1. M + pres
2. Be + pres
3. Noun + /z/

Phrases:	NP	VP	NP
	<u>The dog</u>	<u>is not going to get</u>	<u>the bones under the ground</u>
	1	2	3

Phoneme: /z/ as in is

Sentence: The dog is not going to get the bones under the ground.

Phrase Rules

for: The corn is in the dishes.

- |                           |                       |
|---------------------------|-----------------------|
| 1. S ----- NP + VP        | 6. T ----- pres       |
| 2. NP ----- Det + N       | 7. PP ----- prep + NP |
| 3. N ----- Cnt (pl)       | 8. N ----- corn, dish |
| 4. VP ----- Aux + be + PP | 9. Det ----- the      |
| 5. Aux ----- T + M        | 10. Prep ----- in     |

Transformational Rules

The application of these rules produce the string:

the + corn + sg + pres + be + in + the + dish + pl

Apply successively the T-Relative, Deletion rules to the same string:

the + corn + sg + in + the + dish + pl

This final string will be included with the following phrase rules:

Phrase Rules

for: The roosters are going to get ( the corn in the dishes.)

- |                     |                        |
|---------------------|------------------------|
| 1. S ----- NP + VP  | 7. M ----- be going to |
| 2. NP ----- Det + N | 8. V ----- Vt + NP     |
| 3. N ----- Cnt (pl) | 9. N ----- rooster     |
| 4. VP ----- Aux + V | 10. Det ----- the      |
| 5. Aux ----- T + M  | 11. Vt ----- get       |
| 6. T ----- pres     |                        |
- the + corn + sg + in + the + dish + pl*

Phonological Rules

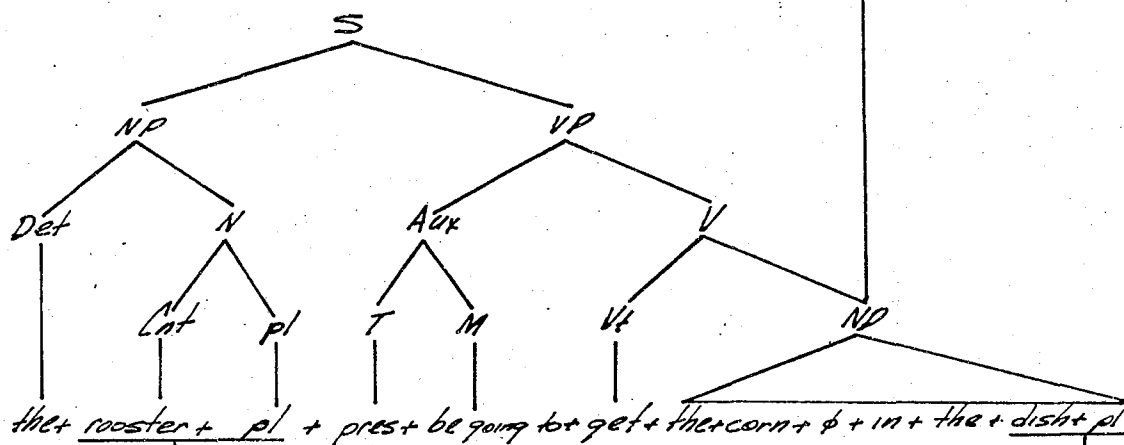
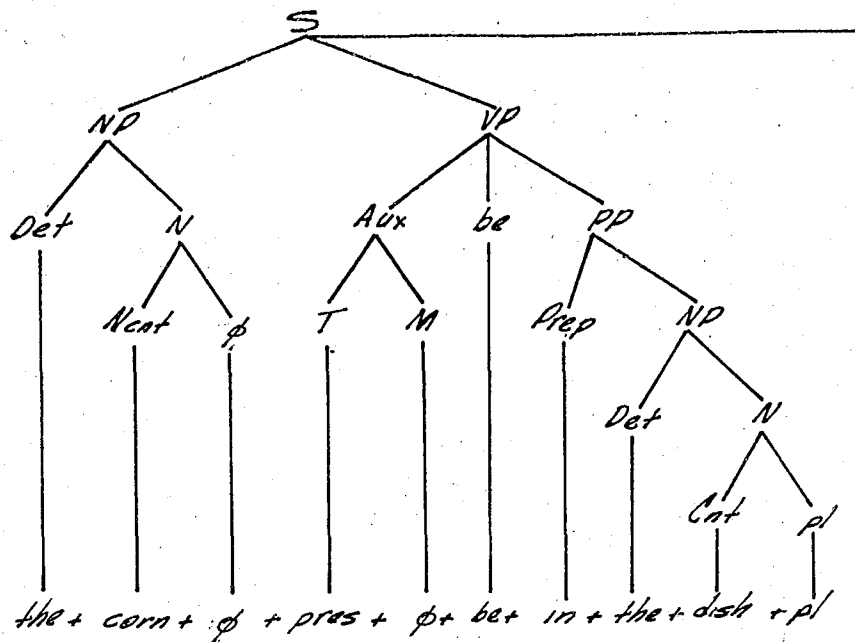
- |   |
|---|
| 1. Noun + pl ----- rooster + s /z/ ----- roosters / ruwstərz/ |
| 2. Be + pres ----- are /ar/                                   |
| 3. Noun + pl ----- dish + s /ɪz/ ----- dishes / dɪʃɪz/        |

When the phonological rules are applied to the following total string:

the + rooster + pl + pres + be + going + to + get + the + corn + sg + in + the + dish + pl

the following sentence is obtained:

The roosters are going to get the corn in the dishes.



Phonological Rules:

1. Noun + /z/
2. Be + pres
3. Noun + /ɪz/

Phrases:

NP	VP	NP
<u>The roosters</u> 1	<u>are going to get</u> 2	<u>the corn in the dishes</u> 3

Phoneme: /ŋ/ as in going

Sentence: The roosters are going to get the corn in the dishes.



Phrase Rules

for: The bird is sitting there.

- |                     |                         |
|---------------------|-------------------------|
| 1. S ----- NP + VP  | 7. M ----- be-ing       |
| 2. NP ----- Det + N | 8. V ----- Vi + Adv - p |
| 3. N ----- Cnt (sg) | 9. N ----- bird         |
| 4. VP ----- Aux + V | 10. Det ----- the       |
| 5. Aux ----- T + M  | 11. Vi ----- sit        |
| 6. T ----- pres     | 12. Adv - p ----- here  |

Transformational Rules

The application of these rules produce the string:

the + bird + sg + pres + be + ing + sit + there

Apply successively the T-Relative, Deletion rules to the same string:

the + bird + sg + pres + ing + sit + there

This final string will be included with the following phrase rules.

Phrase Rules

for: (The bird sitting there) has lost some feathers.

- |  |                     |
|--|---------------------|
| 1. S ----- NP + VP                           | 5. T ----- pres     |
| 2. NP  | 6. V ----- Vt + NP  |
| <p><i>the+bird+sg+pres+ing+sit+there</i></p> | 7. NP ----- Det + N |
|  | 8. N ----- Cnt (pl) |
| 3. VP ----- Aux + V                          | 9. Det ----- some   |
| 4. Aux ----- T + have + part + M             | 10. N ----- feather |
|  | 11. Vt ----- lose   |

Phonological Rules

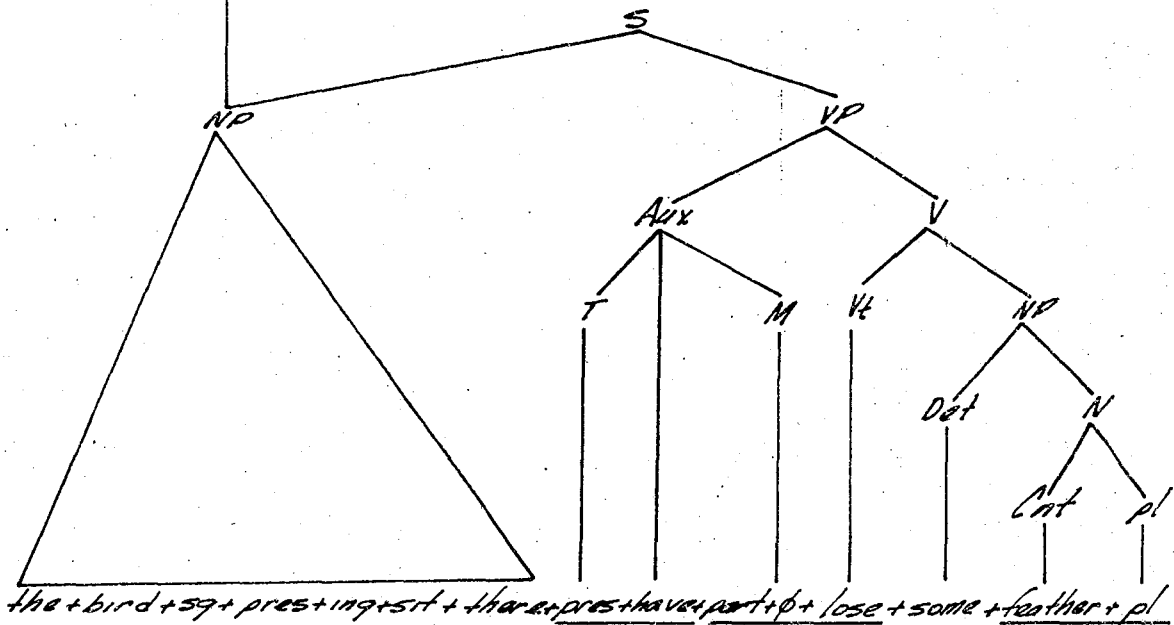
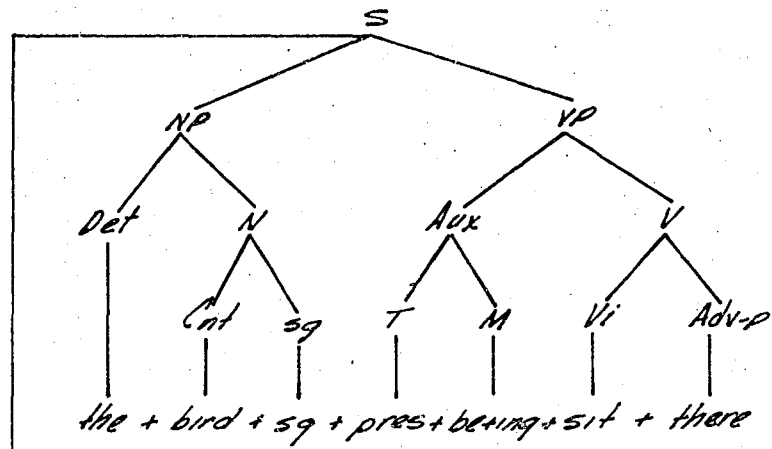
- |   |
|---|
| 1. Have + pres -----has / hæz/                            |
| 2. Verb + part -----lose + part ----- lost / lɒst/        |
| 3. Noun + pl-----feather + s /z/ ----- feathers / feðərz/ |

When the phonological rules are applied to the following total string:

the + bird + sg + pres + ing + sit + there + pres + have + part + lose + some + feather + pl

The following sentence is obtained:

The bird sitting there has lost some feathers.



Phonological Rules:

1. Have + pres
2. Verb + part
3. Noun + /z/

Phrases:

$NP$	$VP$	$NP$
<u>The bird sitting there</u>	<u>has lost</u>	<u>some feathers</u>
1	2	3

Phoneme: /er/ as in there

Sentence: The bird sitting there has lost some feathers.

Phrase Rules

for: The dog is standing here

- |                     |                         |
|---------------------|-------------------------|
| 1. S -----NP + VP   | 7. M ----- be-ing       |
| 2. NP -----Det + N  | 8. V ----- Vi + Adv - p |
| 3. N -----Cnt (sg)  | 9. N ----- dog          |
| 4. VP ----- Aux + V | 10. Det ----- the       |
| 5. Aux ----- T + M  | 11. Vi ----- stand      |
| 6. T ----- pres     | 12. Adv - p -----here   |

Transformational Rules

The application of these rules produce the string:

the + dog + sg + pres + be + ing + stand + here

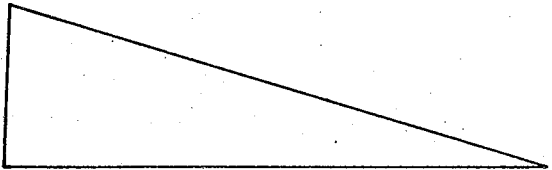
Apply successively the T-Relative, Deletion rules to the same string:

the + dog + sg + pres + ing + stand + here

This final string will be included with the following phrase rules.

Phrase Rules

for: (The dog standing here) has brought three shoes.

- |   |                     |
|---|---------------------|
| 1. S -----NP + VP   | 5. T -----pres      |
| 2. NP   | 6. V----- Vt + NP   |
|  | 7. NP ----- Det + N |
|   | 8. N ----- Cnt (pl) |
| 3. VP -----Aux + V  | 9. Det ----- three  |
| 4. Aux ----- T + have + part + M  | 10. N ----- shoe    |
|   | 11. Vt ----- bring  |

Phonological Rules

- Verb + ing -----stand + ing / ɪŋ/ -----standing / stændɪŋ/
- Noun + pl----- shoe + s /z/-----shoes / ʃuːz/

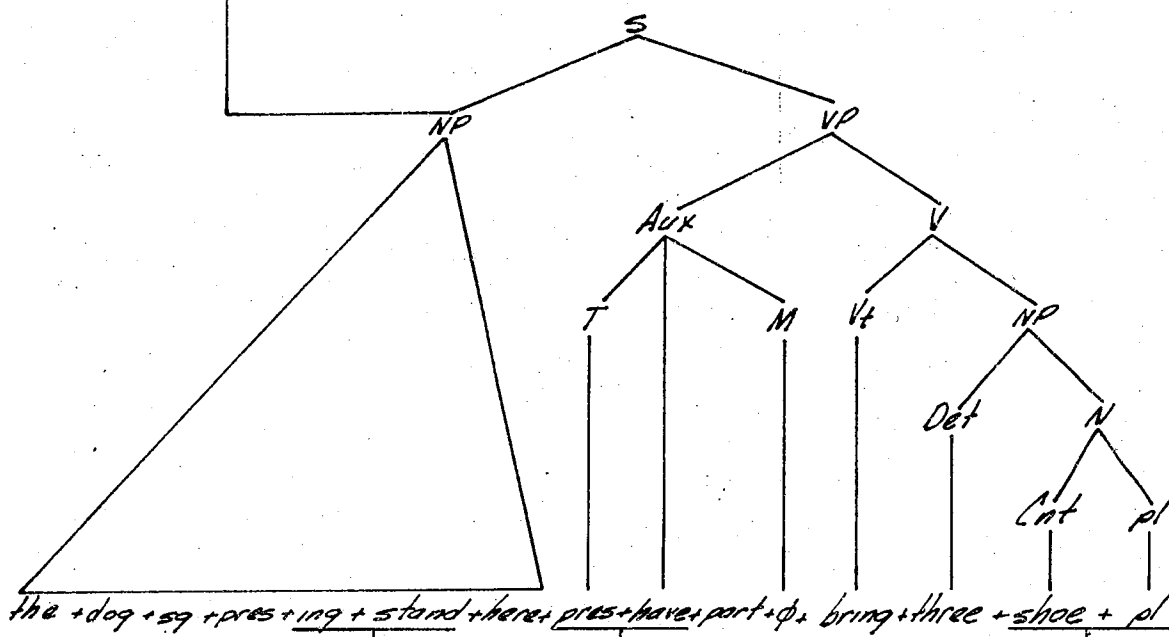
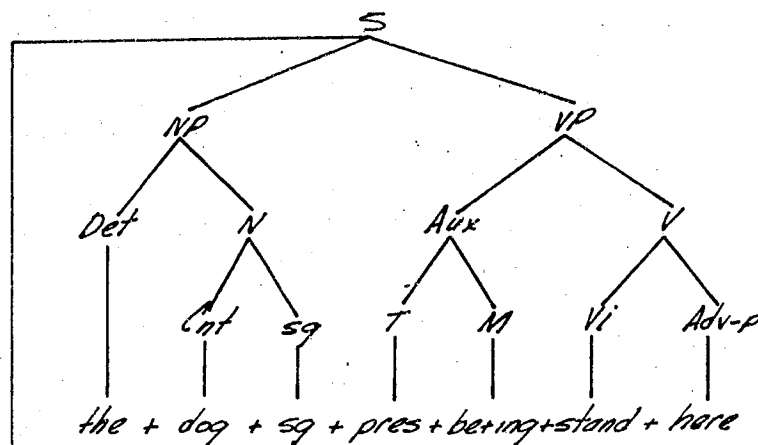
When the phonological rules are applied to the following total string:

the + dog + sg +pres +ing +stand +here +pres +have +part +bring +three +shoe +pl

the following sentence is obtained:

The dog standing here has brought three shoes.

Sentence 15



Phonological Rules:

1. Verb + /iŋ/
2. Have + pres
3. Noun + /z/

Phrases:	NP	VP	NP
	<u>The dog standing here</u>	<u>has brought</u>	<u>three shoes</u>
	1	2	3

Phoneme: /θ/ as in three

Sentence: The dog standing here has brought three shoes.

## Scope

1. Objective evaluation of language competence and language performance.
2. Determination of progress toward language maturity.

## Personnel for Administration

The Inventory can be administered by classroom teachers or by specialists in the educational and medical fields.

## Procedures for Administration

1. The examiner should be thoroughly familiar with the Inventory before attempting to administer it. Directions should be followed carefully so that the results obtained by different examiners will be comparable.
2. Do not say the words in the sentence with any special emphasis or any more loudly than is necessary - use normal conversational tones. Familiarize yourself with the sentences by reading them aloud before giving the Inventory.
3. Examine each child individually.
4. The child should be motivated to "listen carefully."
5. The child should be facing the examiner while receiving the following instructions:

"Show me . . ."  
"Tell me . . ."  
"Show me . . ."  
"Listen!"  
"Say it!"  
"Say . . ."

If the expected response is not given by the child, the original stimulus may be repeated. No further probing should be carried out if the expected response is not given.

## Scoring

Scoring of the Inventory in its first tryout is of provisional nature, and consists of the straight tally and total of the correct responses. Careful comparison of expectancies and results will lead to meaningful implications and assist in finding devices to establish norms for administering the test. Once norms have been established, the Inventory will be adjusted in order to determine the extent of language maturity of a given individual. Each sentence and its component parts will be clearly marked for tallying by using a numeral and a letter to correspond with the data processing card issued with the instrument.

LANGUAGE INVENTORY

TEST ITEMS

Student's Name \_\_\_\_\_  
Grade \_\_\_\_\_

Birthdate \_\_\_\_\_  
Age (Date of test) \_\_\_\_\_  
Sex: M \_\_\_\_\_ F \_\_\_\_\_

Examiner \_\_\_\_\_

Date \_\_\_\_\_

School \_\_\_\_\_  
Teacher \_\_\_\_\_

Ethnic Group \_\_\_\_\_

Language Spoken by Student \_\_\_\_\_  
Pre \_\_\_\_\_ Post \_\_\_\_\_

Sentence 1

Examiner: State the following to the child and record his response in the blanks.

(Directions)

(Responses)

(Mark if correct)

THE WORMS CRAWL OVER THE ROCKS.

Show me what crawls.

A. \_\_\_\_\_ ( )  
                  (the worms)

Tell me what the worms do.

B. \_\_\_\_\_ ( )  
                  (crawl)

Show me where the worms crawl.

C. \_\_\_\_\_ ( )  
                  (over the rocks)

Listen: THE WORMS CRAWL OVER THE ROCKS

Say it !

D. \_\_\_\_\_ ( )  
                  (wormS)

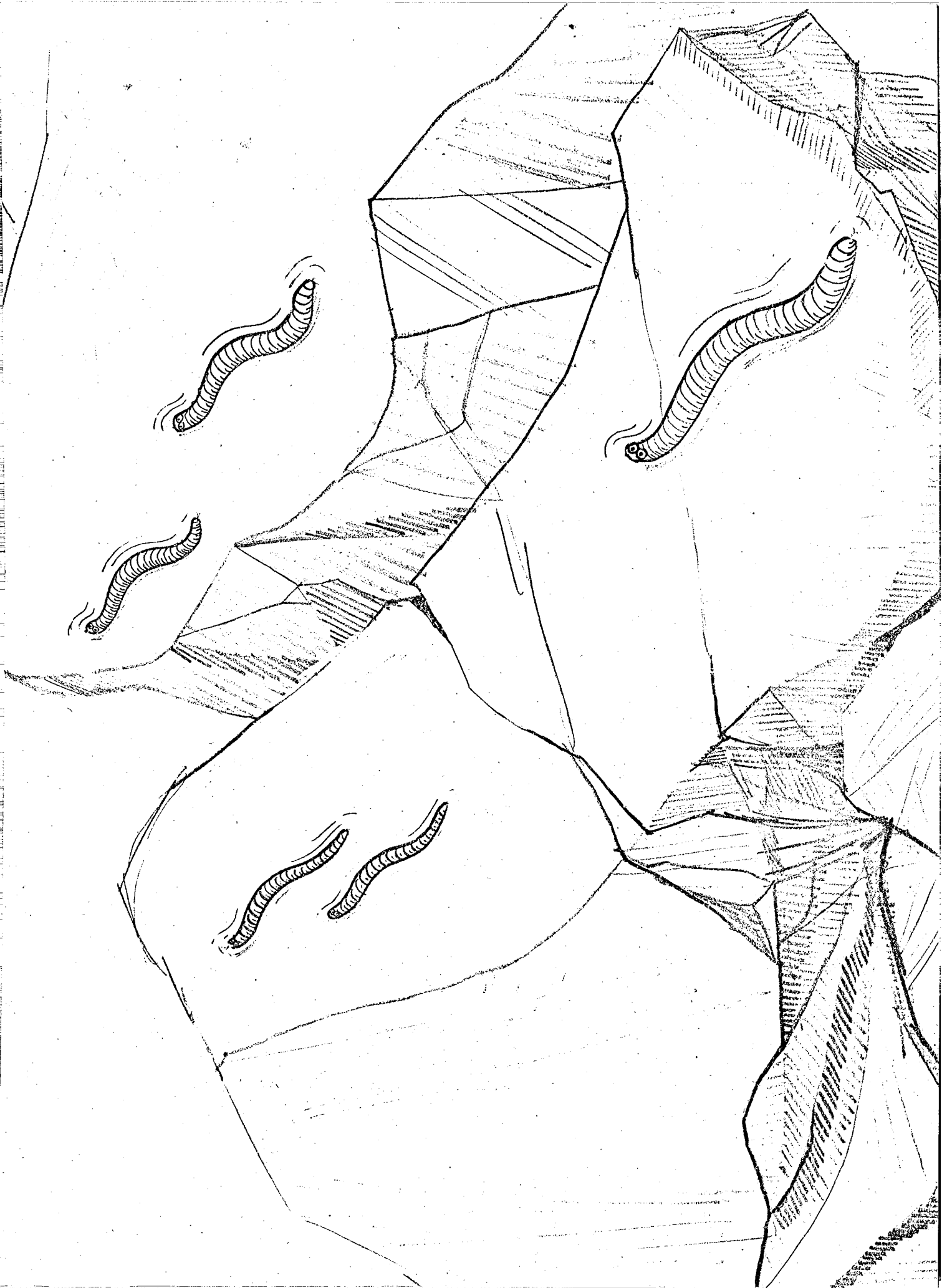
E. \_\_\_\_\_ ( )  
                  (CRAWL)

F. \_\_\_\_\_ ( )  
                  (rockS)

Say: rock

G. \_\_\_\_\_ ( )  
                  (Rock)

1. Vocabulary items that indicate sentence comprehension are under the line.  
(The minimal response is underlined.) A, B, & C.
2. Word components (sounds) expected are capitalized. D, E, F, & G.
3. The numbered brackets correspond with the data processing card.





Sentence 2

Examiner: State the following to the child and record his response in the blanks.

(Directions)

(Responses)

(Mark if correct)

THE DOGS PLAY BEHIND THE BUSHES.

Show me what plays behind the bushes.

A. \_\_\_\_\_ ( )  
                  (the dogs)

8

Tell me what the dogs do.

B. \_\_\_\_\_ ( )  
                  (play)

9

Tell me where the dogs are.

C. \_\_\_\_\_ ( )  
                  (behind the bushes)

10

Listen: THE DOGS PLAY BEHIND THE BUSHES.

Say it!

D. \_\_\_\_\_ ( )  
                  (dogS)

11

E. \_\_\_\_\_ ( )  
                  (PLAY)

12

F. \_\_\_\_\_ ( )  
                  (bushES)

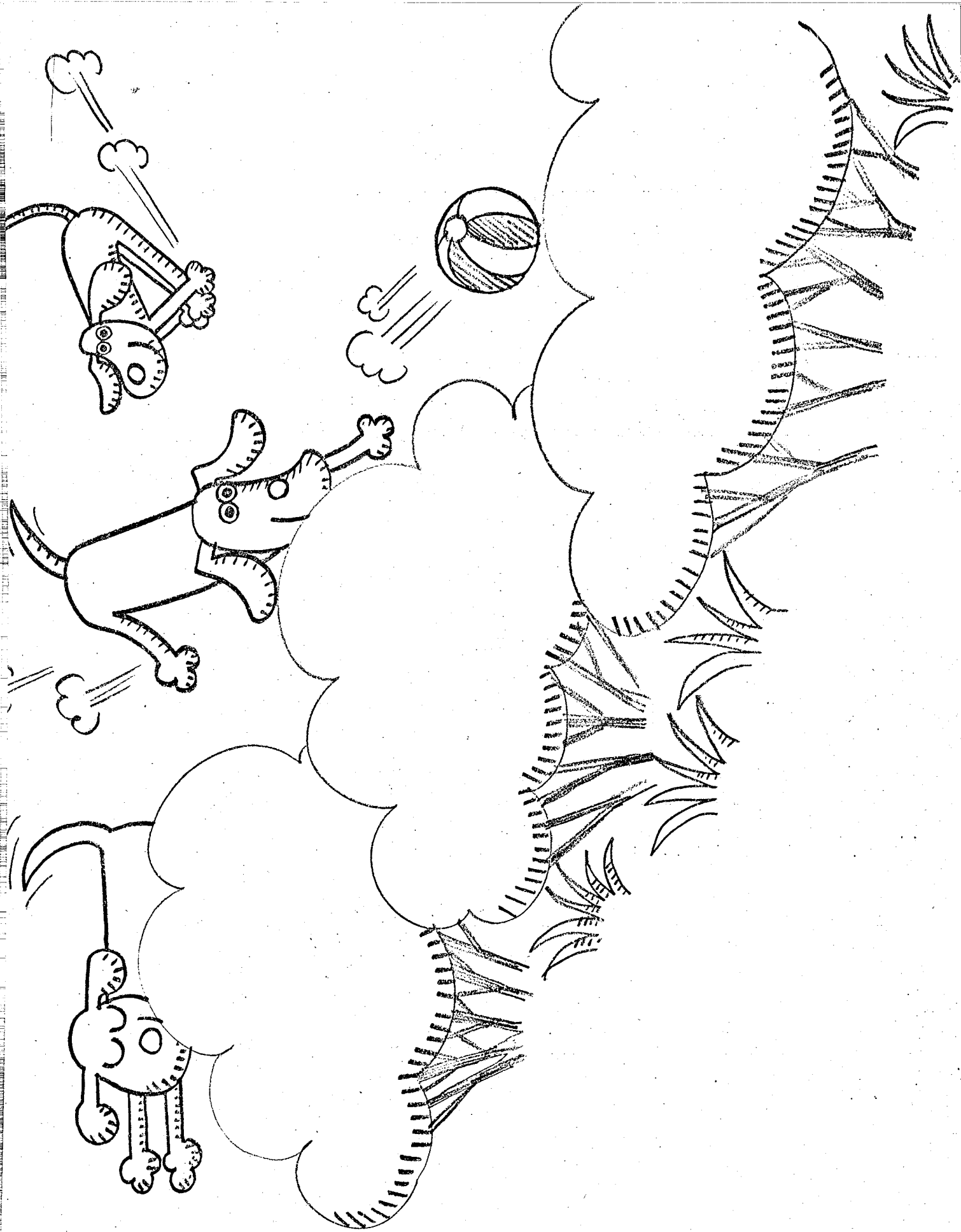
13

Say: bush

G. \_\_\_\_\_ ( )  
                  (bUsh)

14

1. Vocabulary items that indicate sentence comprehension are under the line.  
(The minimal response is underlined.) A.B., & C.
2. Word components (sounds) expected are capitalized. D, E, F, & G.
3. The numbered brackets correspond with the data processing card.



Sentence 3

Examiner: State the following to the child and record his response in the blanks.

(Directions)

(Responses)

(Mark if correct)

THE BOY SEES THE FACES IN THE LEAVES.

Show me who sees the faces.

A. \_\_\_\_\_ 15  
( )  
(the boy)

Tell me what the boy does.

B. \_\_\_\_\_ 16  
( )  
(sees the faces)

Show me where the boy sees the faces.

C. \_\_\_\_\_ 17  
( )  
(in the leaves)

Listen: THE BOY SEES THE FACES IN THE LEAVES.

Say it!

D. \_\_\_\_\_ 18  
( )  
(seeS)

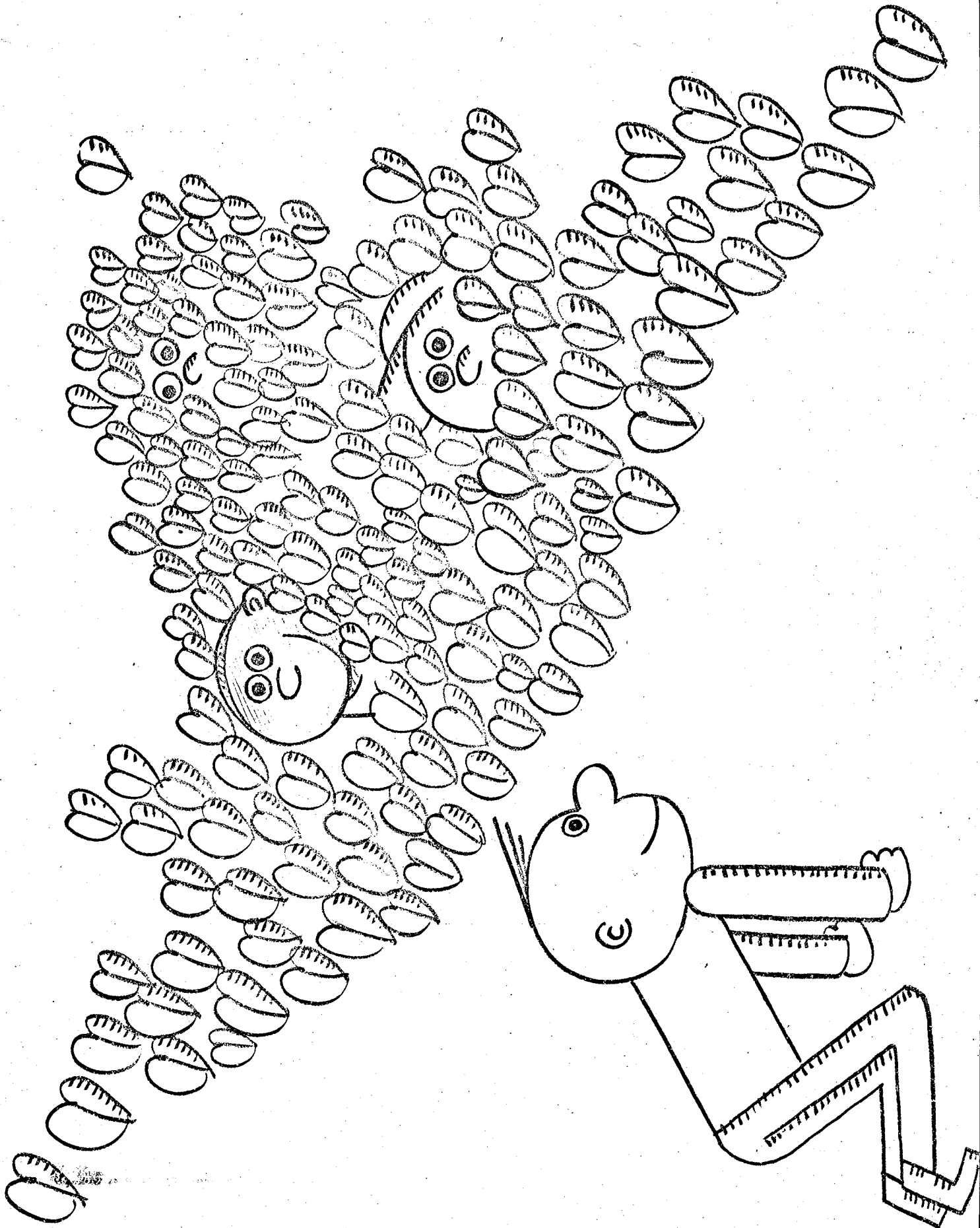
E. \_\_\_\_\_ 19  
( )  
(faceS)

F. \_\_\_\_\_ 20  
( )  
(leaveS)

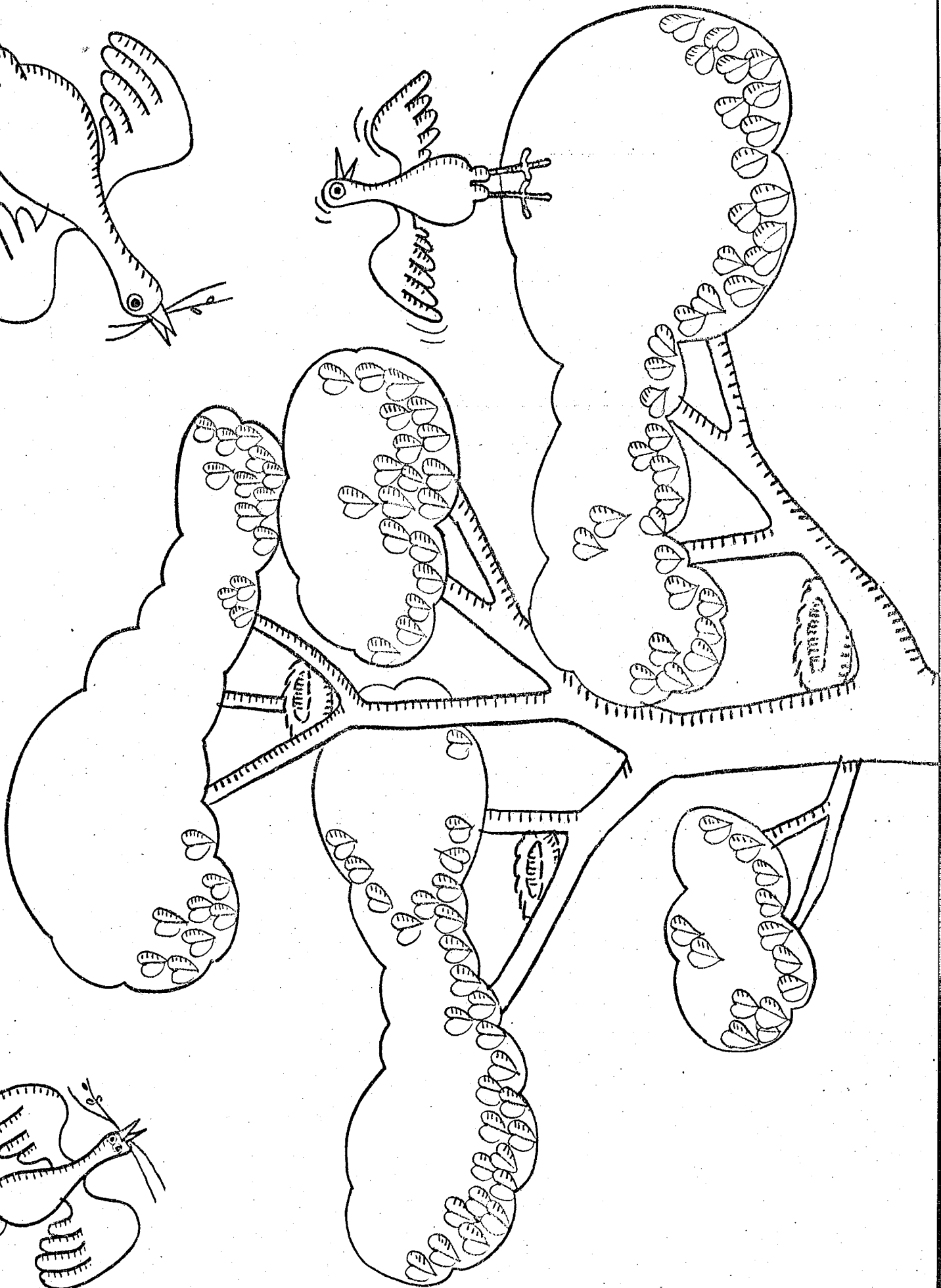
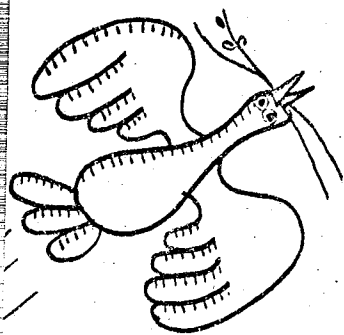
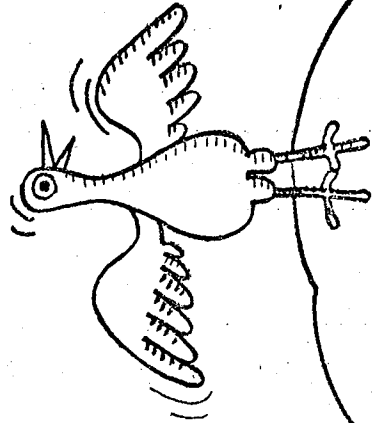
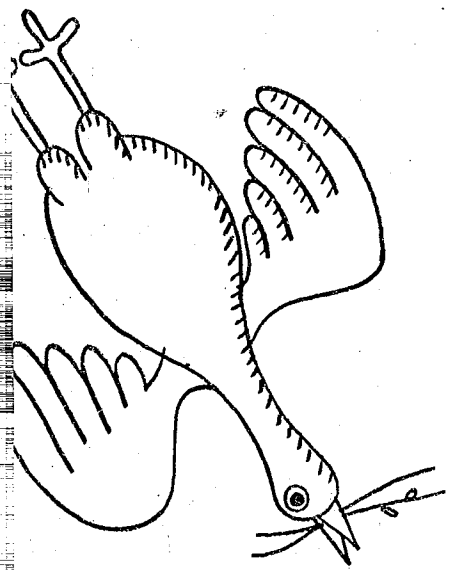
Say: leaves

G. \_\_\_\_\_ 21  
( )  
(leaVes)

1. Vocabulary items that indicate sentence comprehension are under the line.  
(The minimal response is underlined.) A, B, & C.
2. Word components (sounds) expected are capitalized. D, E, F, & G.
3. The numbered brackets correspond with the data processing card.







Sentence 5

Examiner: State the following to the child and record his response in the blanks.

(Directions)

(Responses)

(Mark if correct)

THERE ARE WASPS IN THE SPIDER WEBS.

Show me what there is in the spider webs.

Tell me where the wasps are.

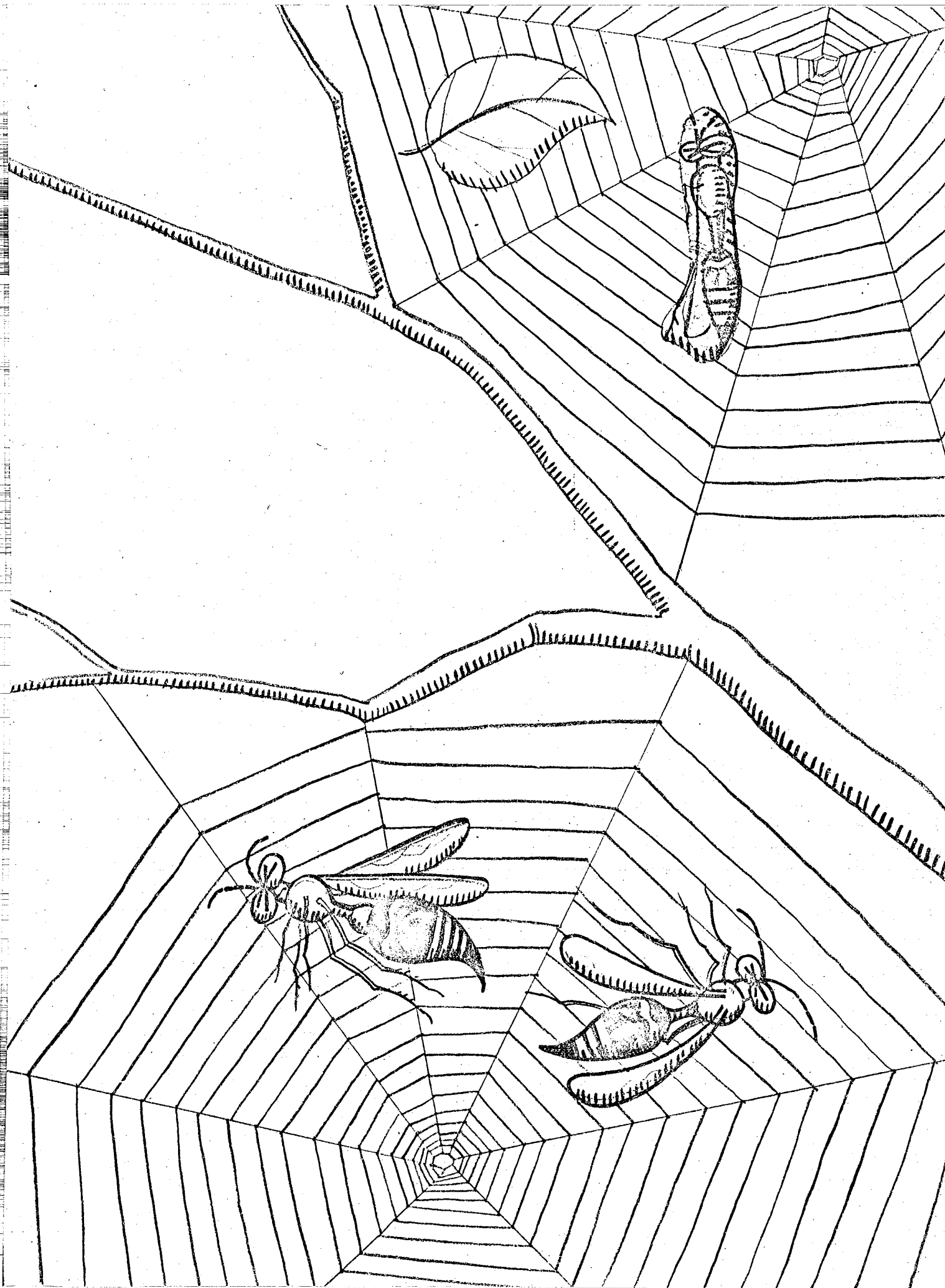
- A. \_\_\_\_\_ ( ) 29  
(wasps)
- B. \_\_\_\_\_ ( ) 30  
(in the spider webs)
- C. \_\_\_\_\_ ( )

Listen: THERE ARE WASPS IN THE SPIDER WEBS.

Say it.!

- D. \_\_\_\_\_ ( ) 31  
(wasps)
- E. \_\_\_\_\_ ( ) 32  
(ARE)
- F. \_\_\_\_\_ ( ) 33  
(spider webs)
- G. \_\_\_\_\_ ( ) 34  
(wEb)

1. Vocabulary items that indicate sentence comprehension are under the line.  
(The minimal response is underlined.) A, B, & C.
2. Word components (sounds) expected are capitalized. D, E, F, & G.
3. The numbered brackets correspond with the data processing card.





Sentence 6

Examiner: State the following to the child and record his response in the blanks.

(Directions)

(Responses)

(Mark if correct)

THE LIZARD TAKES THE BUGS THE TOAD BRINGS.

Show me what takes the bugs.

A. \_\_\_\_\_ 35  
(the lizard) ( )

Tell me what the lizard does.

B. \_\_\_\_\_ 36  
(takes the bugs) ( )

Show me what brought the bugs.

C. \_\_\_\_\_ 37  
(the toad) ( )

Listen: THE LIZARD TAKES THE BUGS THE TOAD BRINGS.

Say it !

D. \_\_\_\_\_ 38  
(takeS) ( )

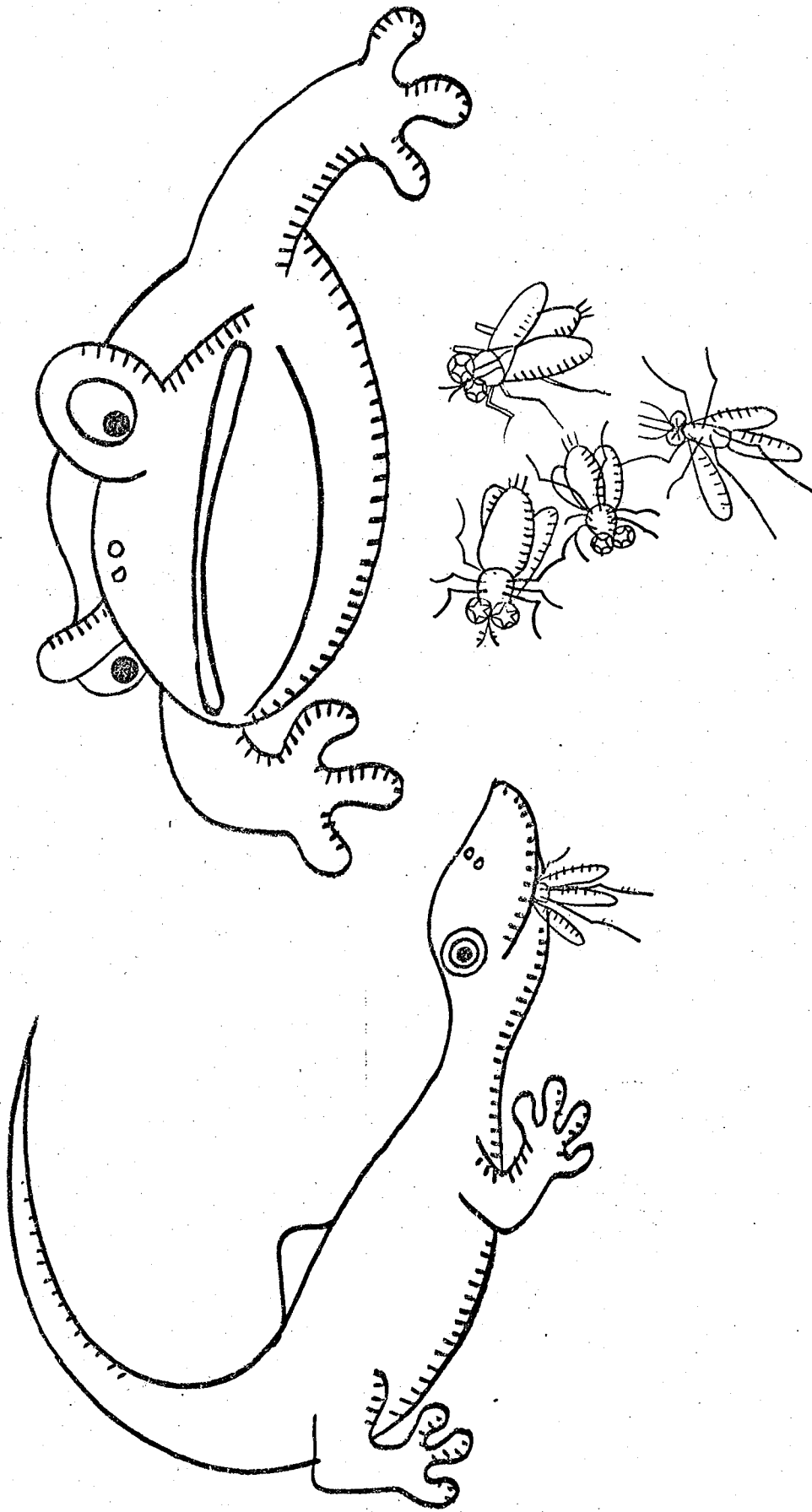
E. \_\_\_\_\_ 39  
(bugS) ( )

F. \_\_\_\_\_ 40  
(bringS) ( )

Say: bug

G. \_\_\_\_\_ 41  
(bUg) ( )

1. Vocabulary items that indicate sentence comprehension are under the line. (The minimal response is underlined.) A, B, & C.
2. Word components (sounds) expected are capitalized. D, E, F, & G.
3. The numbered brackets correspond with the data processing card.



Sentence 7

Examiner: State the following to the child and record his response in the blanks.

(Directions)

(Responses)

(Mark if correct)

THE BOY FINDS THE HOLES THE TURTLE DIGS.

Show me who finds the holes.

A. \_\_\_\_\_ ( ) 42  
(the boy)

Tell me what the boy finds.

B. \_\_\_\_\_ ( ) 43  
(the holes)

Show me what digs the holes.

C. \_\_\_\_\_ ( ) 44  
(the turtle)

Listen: THE BOY FINDS THE HOLES THE TURTLE DIGS.

Say it!

D. \_\_\_\_\_ ( ) 45  
(findS)

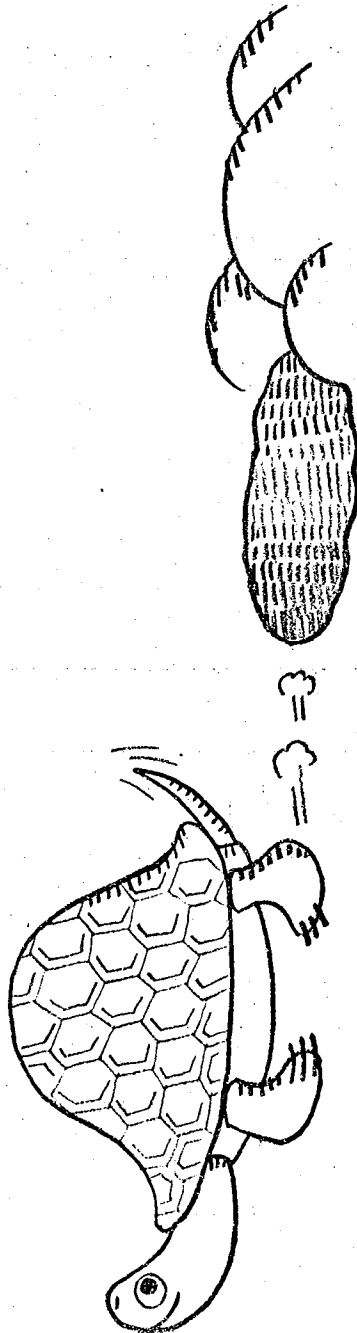
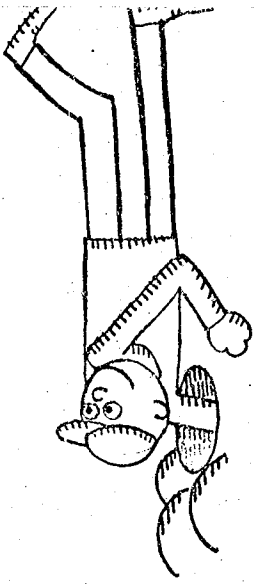
E. \_\_\_\_\_ ( ) 46  
(holeS)

F. \_\_\_\_\_ ( ) 47  
(digS)

G. \_\_\_\_\_ ( ) 48  
(dIg)

Say: dig

1. Vocabulary items that indicate sentence comprehension are under the lines.  
(The minimal response is underlined.) A, B, & C.
2. Word components (sounds) expected are capitalized. D, E, F, & G.
3. The numbered brackets correspond with the data processing card.

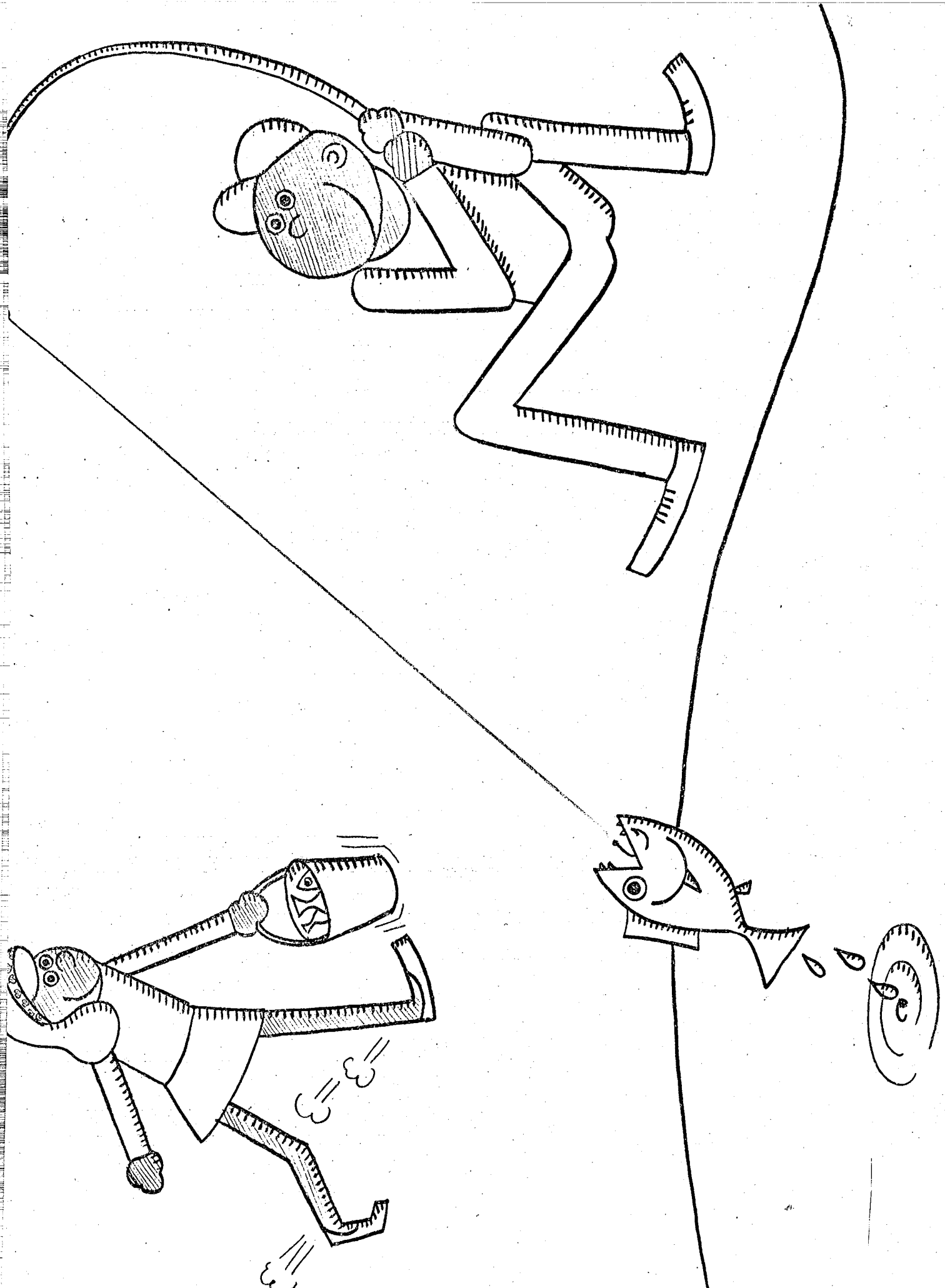


Sentence 8

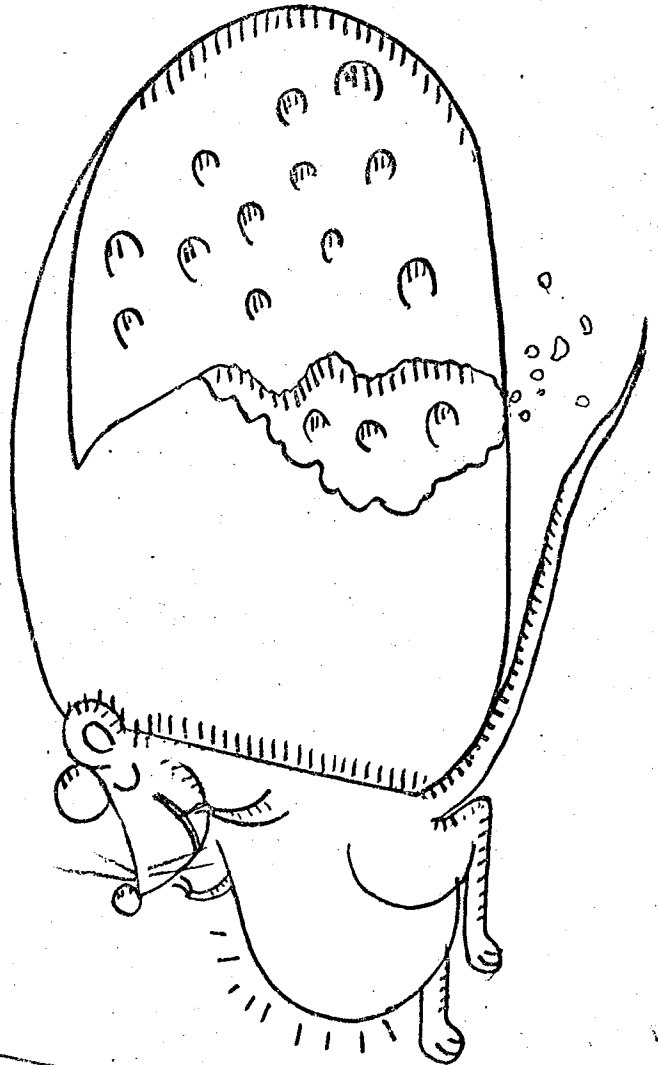
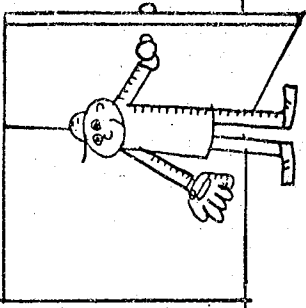
Examiner: State the following to the child and record his response in the blanks.

(Directions)	(Responses)	(Mark if correct)
THE GIRL WANTS THE FISH THE BOY CATCHES.		
Show me who wants the fish.	A. _____ (the <u>girl</u> )	49 ( )
Show me what the girl wants.	B. _____ (the <u>fish</u> )	50 ( )
Tell me how the boy gets the fish.	C. _____ ( <u>catches</u> the fish)	51 ( )
<u>Listen:</u> THE GIRL WANTS THE FISH THE BOY CATCHES.		
<u>Say it!</u>		
	D. _____ (want <u>S</u> )	52 ( )
	E. _____ (F <u>I</u> SH)	53 ( )
	F. _____ (catch <u>e</u> S)	54 ( )
<u>Say:</u> fish	G. _____ (f <u>i</u> SH)	55 ( )

1. Vocabulary items that indicate sentence comprehension are under the line. (The minimal response is underlined.) A, B, & C.
2. Word components (sounds) expected are capitalized. D, E, F, & G.
3. The numbered brackets correspond with the data processing card.









Sentence 10

Examiner: State the following to the child and record his response in the blanks.

(Directions)

(Responses)

(Mark if correct)

THE BOY IS TAKING THE BUTTERFLY THE GIRL WANTED.

Show me who is taking the butterfly.

A. \_\_\_\_\_ ( )  
(the boy)

63

Tell me what the boy is doing.

B. \_\_\_\_\_ ( )  
(taking the butterfly)

64

Show me what the boy is taking.

C. \_\_\_\_\_ ( )  
(the butterfly)

65

Listen: THE BOY IS TAKING THE BUTTERFLY THE GIRL WANTED.

Say it!

D. \_\_\_\_\_ ( )  
(IS)

66

E. \_\_\_\_\_ ( )  
(takING)

67

F. \_\_\_\_\_ ( )  
(wantED)

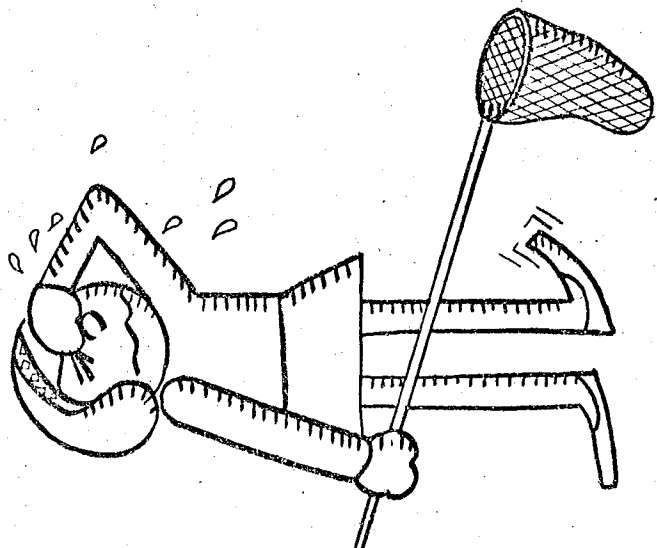
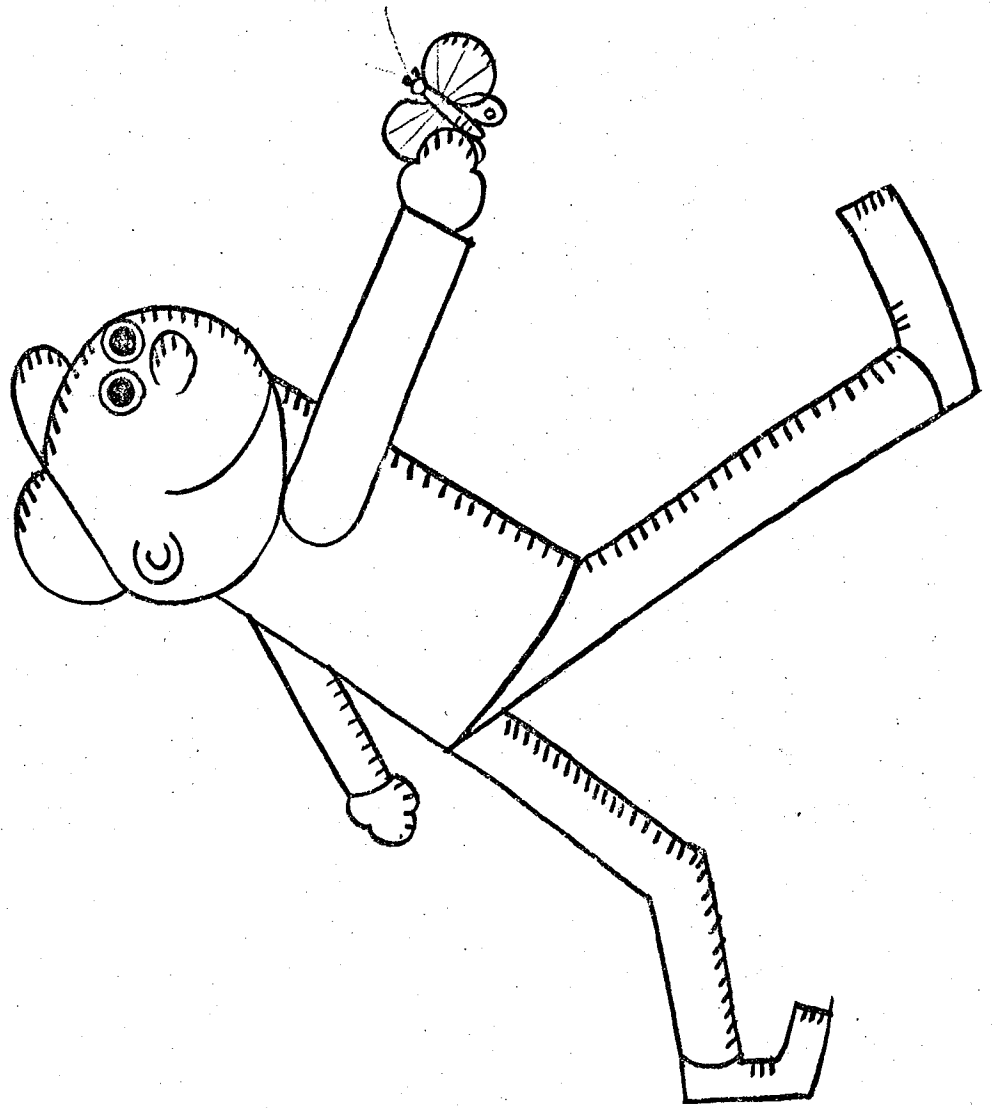
68

Say: the

G. \_\_\_\_\_ ( )  
(The)

69

1. Vocabulary items that indicate sentence comprehension are under the line. (The minimal response is underlined.) A, B, & C.
2. Word components (sounds) expected are capitalized. D, E, F, & G.
3. The numbered brackets correspond with the data processing card.

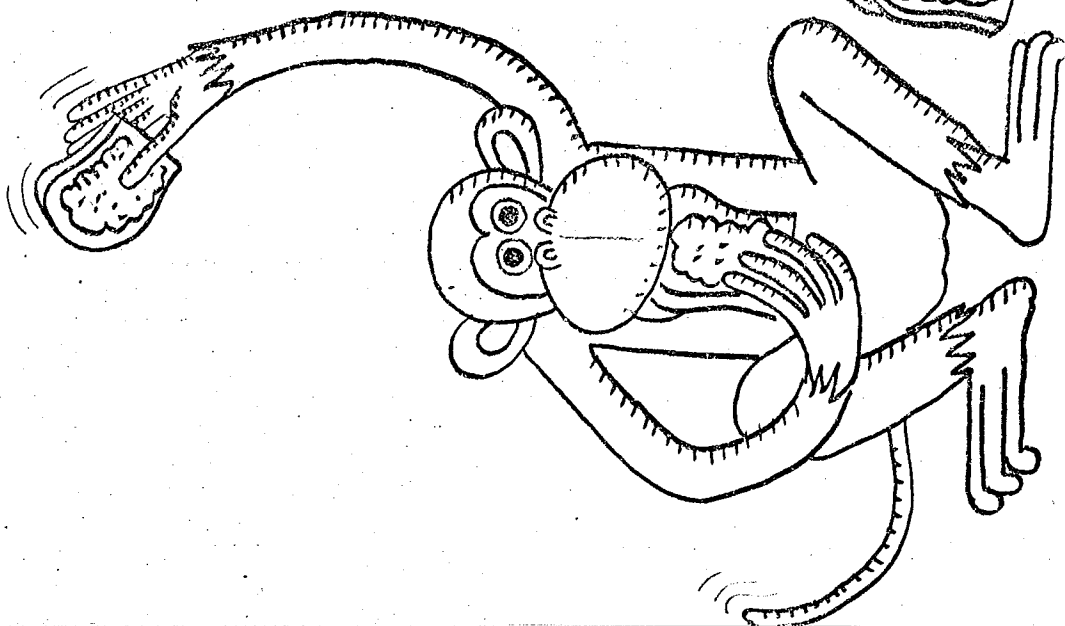
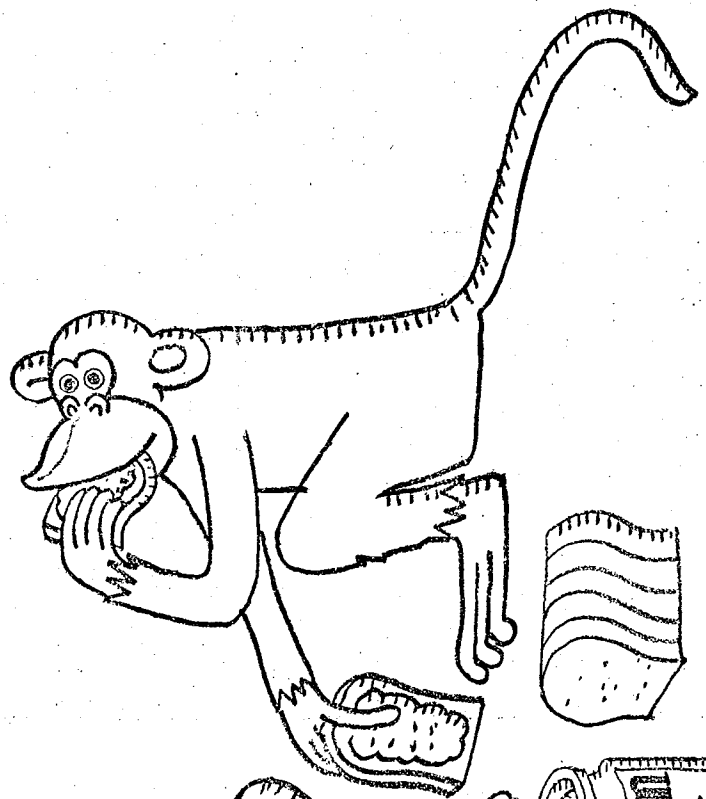
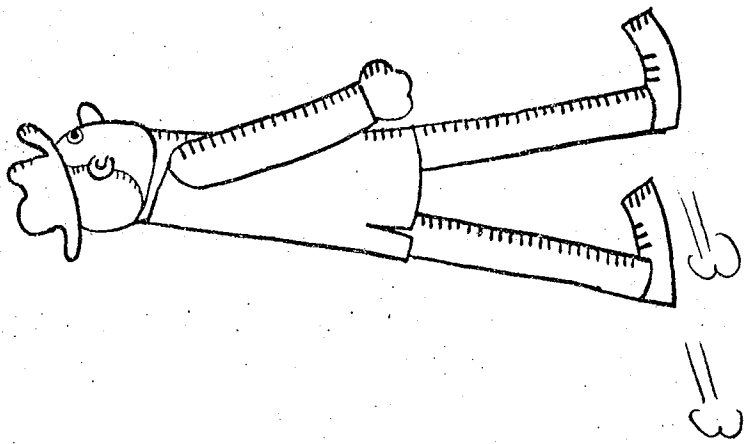


Sentence 11

Examiner: State the following to the child and record his response in the blanks.

(Directions)	(Responses)	(Mark if correct)
THE MONKEYS ARE EATING THE JAM THE MAN LEFT.		
Show me what is eating the jam.	A. _____ (the <u>monkeys</u> )	70 ( )
Tell me what the monkeys are doing.	B. _____ ( <u>are eating</u> the jam)	71 ( )
Show me what the man left.	C. _____ (the <u>jam</u> )	72 ( )
<u>Listen</u> : THE MONKEYS ARE EATING THE JAM THE MAN LEFT.		
<u>Say it</u> !	D. _____ (monkey <u>S</u> )	73 ( )
	E. _____ ( <u>ARE</u> )	74 ( )
	F. _____ ( <u>LEFT</u> )	75 ( )
<u>Say</u> : jam	G. _____ ( <u>Jam</u> )	76 ( )

1. Vocabulary items that indicate sentence comprehension are under the line.  
(The minimal response is underlined.) A, B, & C.
2. Word components (sounds) expected are capitalized. D, E, F, & G.
3. The numbered brackets correspond with the data processing card.



Sentence 12

Examiner: State the following to the child and record his response in the blanks.

(Directions)	(Responses)	(Mark if correct)
THE DOG IS NOT GOING TO GET THE BONES UNDER THE GROUND.		
Show me what is not going to get the bones.	A. _____ (the <u>dog</u> )	77 ( )
Tell me where the bones are.	B. _____ ( <u>under</u> the ground)	78 ( )
Is the dog going to get the bones?	C. _____ ( <u>no</u> )	79 ( )

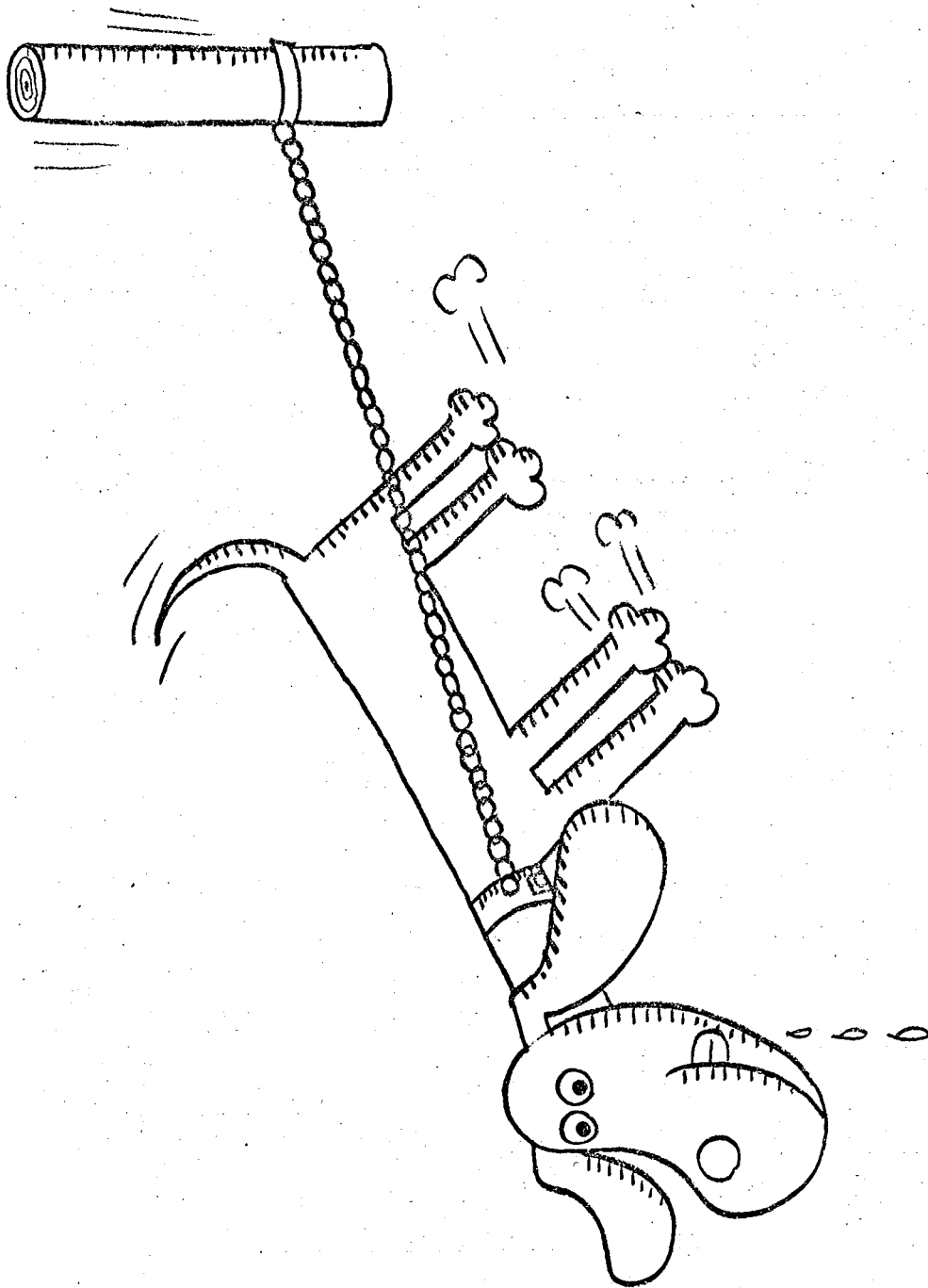
Listen: THE DOG IS NOT GOING TO GET THE BONES UNDER THE GROUND.

Say it!

D. _____ (IS NOT)	80 ( )
E. _____ (goING)	81 ( )
F. _____ (boneS)	82 ( )
G. _____ (is)	83 ( )

Say: is

1. Vocabulary items that indicate sentence comprehension are under the lines.  
(the minimal response is underlined.) A, B, & C.
2. Word components (sounds) expected are capitalized. D, E, F, & G.
3. The numbered brackets correspond with the data processing card.



Sentence 13

Examiner: State the following to the child and record his response in the blanks.

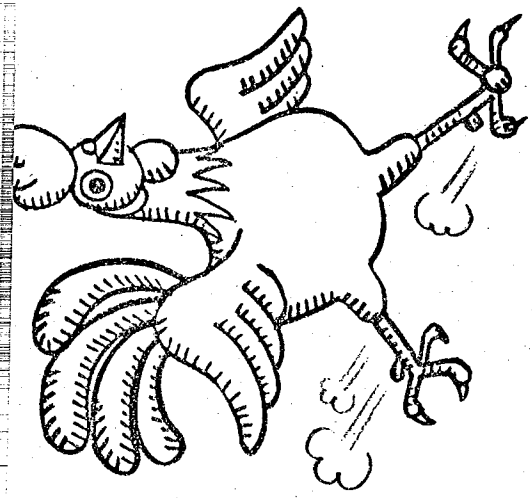
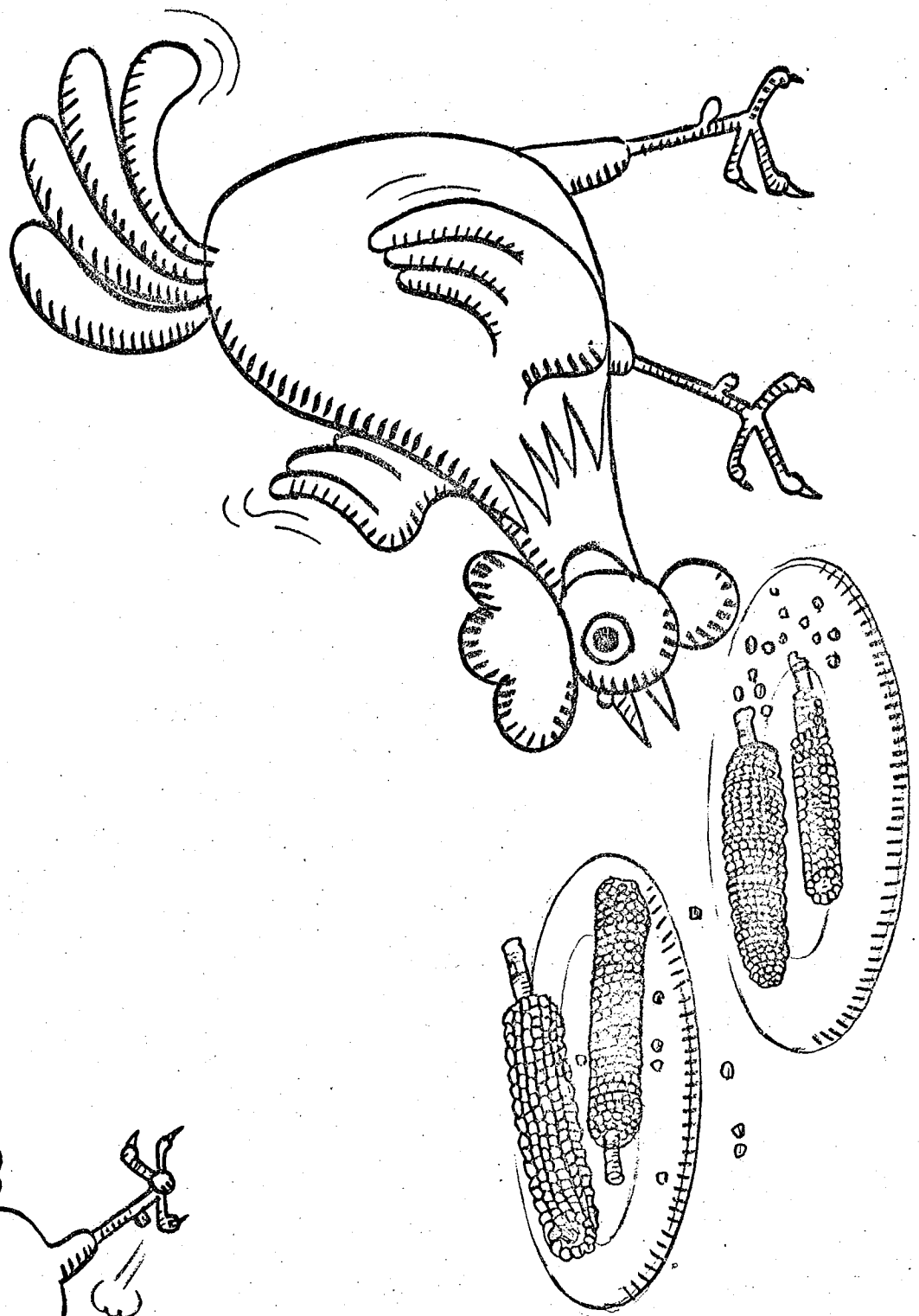
(Directions)	(Responses)	(Mark if correct)
THE ROOSTERS ARE GOING TO GET THE CORN IN THE DISHES.		
Show me what is going to get the corn.	A. _____ (the <u>roosters</u> )	84 ( )
Tell me what the roosters are doing.	B. _____ (are going to)	85 ( )
Show me what the roosters are going to get.	C. _____ (the <u>corn</u> )	86 ( )

Listen: THE ROOSTERS ARE GOING TO GET THE CORN IN THE DISHES.

Say it!

	D. _____ (rooster <u>S</u> )	87 ( )
	E. _____ (ARE)	88 ( )
	F. _____ (dish <u>ES</u> )	89 ( )
<u>Say:</u> going	G. _____ (go <u>ING</u> )	90 ( )

1. Vocabulary items that indicate sentence comprehension are under the line. (The minimal response is underlined.) A, B, & C.
2. Word components (sounds) expected are capitalized. D, E, F, & G.
3. The numbered brackets correspond with the data processing card.



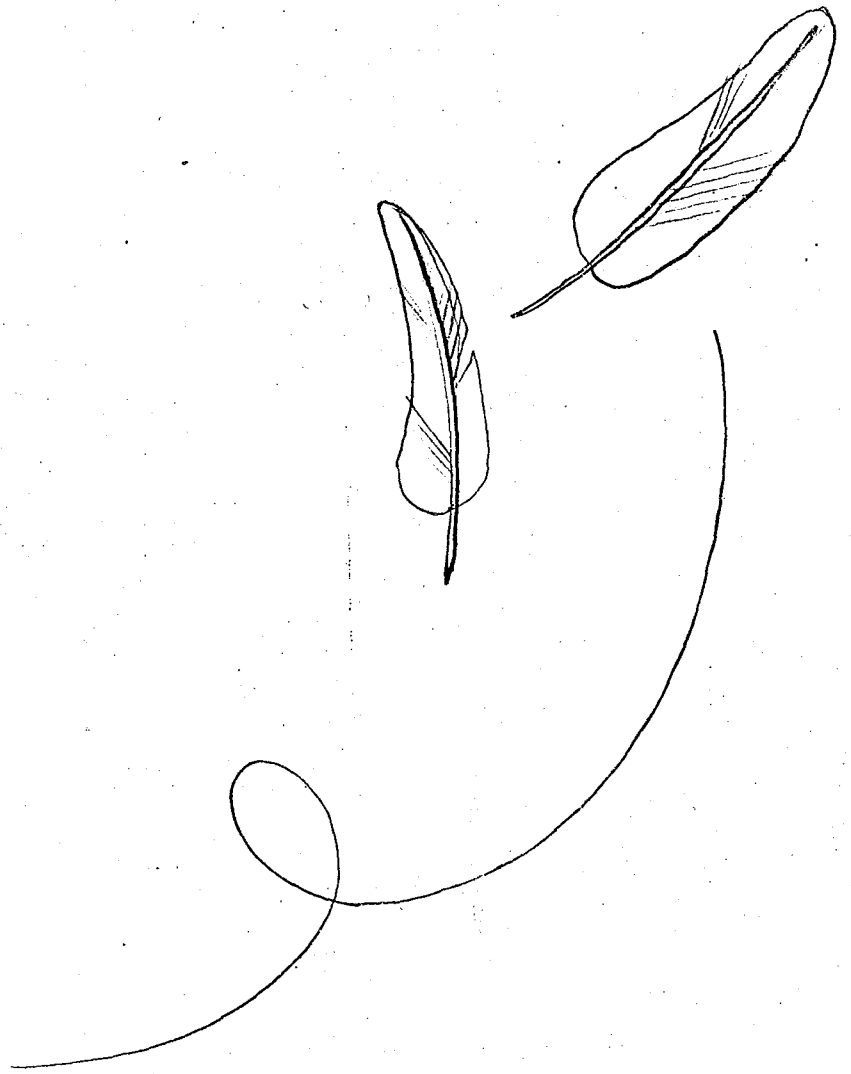
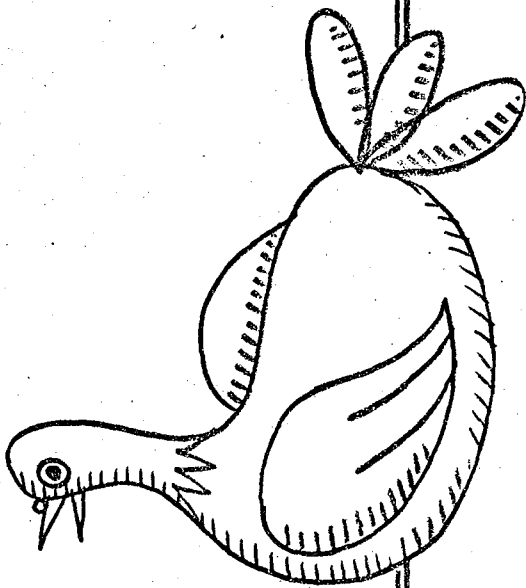


Sentence 14

Examiner: State the following to the child and record his response in the blanks.

(Directions)	(Responses)	(Mark if correct)
THE BIRD SITTING THERE HAS LOST SOME FEATHERS.		
Show me what is sitting there.	A. _____ (the <u>bird</u> )	91 ( )
Tell me if the bird is sitting here or there.	B. _____ ( <u>there</u> )	92 ( )
Tell me what happened to the bird.	C. _____ ( <u>lost</u> some feathers)	93 ( )
 <u>Listen:</u> THE BIRD SITTING THERE HAS LOST SOME FEATHERS		
<u>Say it!</u>		
	D. _____ (sitt <u>ING</u> )	94 ( )
	E. _____ (LO <u>ST</u> )	95 ( )
	F. _____ (feather <u>S</u> )	96 ( )
<u>Say:</u> there	G. _____ (the <u>RE</u> )	97 ( )

1. Vocabulary items that indicate sentence comprehension are under the line. (The minimal response is underlined.) A, B, & C.
2. Word components (sounds) expected are capitalized. D, E, F, & G.
3. The numbered brackets correspond with the data processing card.

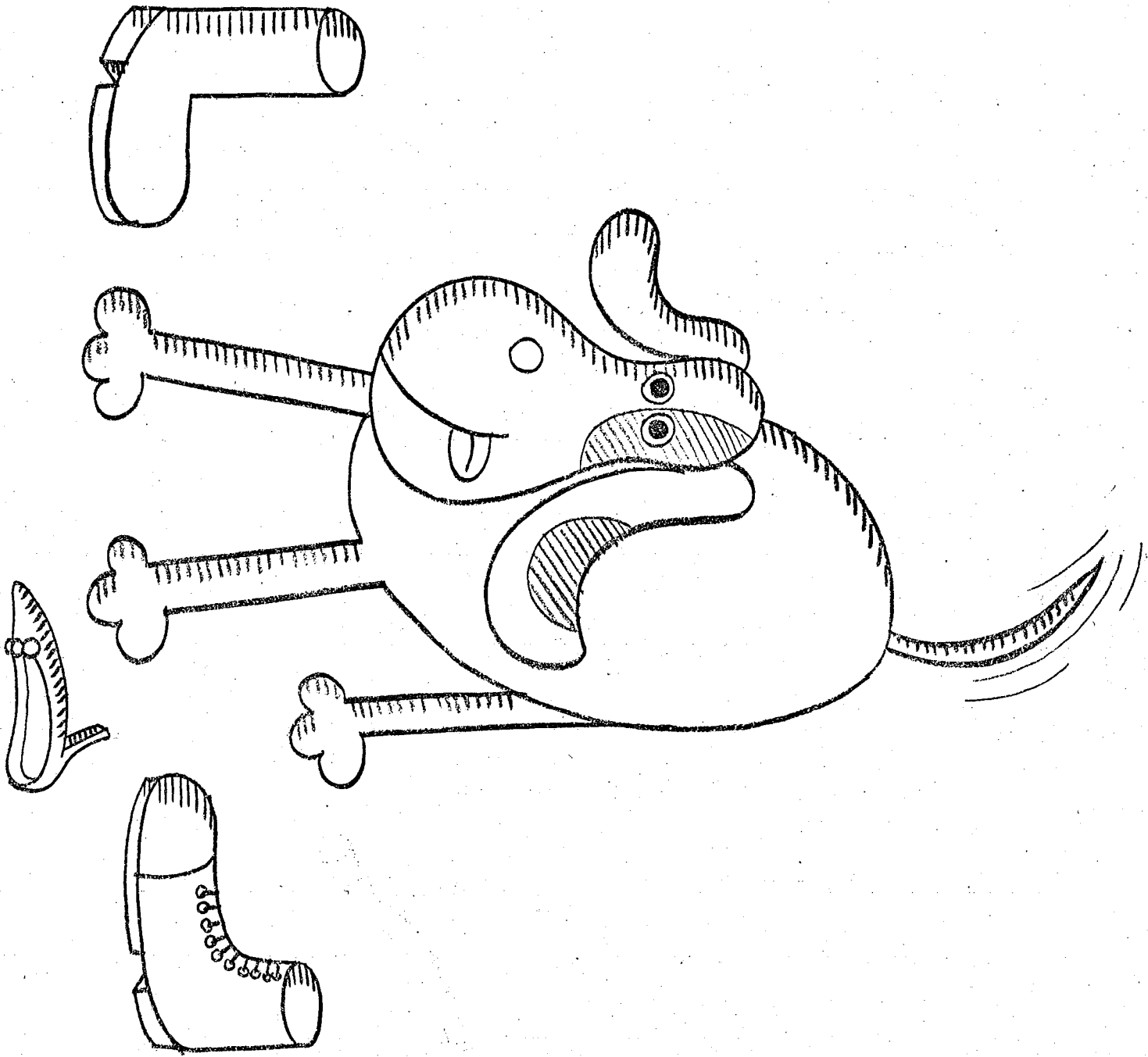


Sentence 15

Examiner: State the following to the child and record his response in the blanks.

(Directions)	(Responses)	(Mark if correct)
THE DOG STANDING HERE HAS BROUGHT THREE SHOES.		98
Tell me what the dog is doing here.	A. _____ (standing)	( )
Tell me what the dog has done.	B. _____ (has brought)	99 ( )
Show me what the dog has brought.	C. _____ (three shoes)	100 ( )
<u>Listen:</u> THE DOG STANDING HERE HAS BROUGHT THREE SHOES.		
<u>Say it!</u>		101
	D. _____ (standing)	( )
	E. _____ (HAS)	102 ( )
	F. _____ (shoeS)	103 ( )
<u>Say:</u> three	G. _____ (THree)	104 ( )

1. Vocabulary items that indicate sentence comprehension are under the line.  
(The minimal response is underlined.) A, B, & C.
2. Word components (sounds) expected are capitalized. D, E, F, & G.
3. The numbered brackets correspond with the data processing card.



SUBJECTIVE EVALUATION

Verbal Command Comprehension

1-10, (alternate for child who does not respond verbally)

	Yes	No
1. Come here	_____	_____
2. Sit down	_____	_____
3. Stand up	_____	_____
4. Go to the door	_____	_____
5. Open the door	_____	_____
6. Point to the light	_____	_____
7. Come back to the chair	_____	_____
8. Walk around the table.	_____	_____
9. Put the toy under the table.	_____	_____
10. Put the toy on the table.	_____	_____

Voice

		1	2	3	4	5
11. Pitch	Low	_____	_____	_____	_____	High
12. Rate	Slow	_____	_____	_____	_____	Fast
13. Volume	Soft	_____	_____	_____	_____	Loud
14. Eye contact	None	_____	_____	_____	_____	Much
15. Gestures	Few	_____	_____	_____	_____	Many

Rating of Intelligibility (check one)

- 16. Readily intelligible \_\_\_\_\_
- Intelligible if listener knows topic \_\_\_\_\_
- Single words intelligible now & then \_\_\_\_\_
- Completely unintelligible \_\_\_\_\_
- No verbal communication \_\_\_\_\_

Dialect Spoken (check one)

- 17. Afro-American \_\_\_\_\_
- Anglo-American \_\_\_\_\_
- Mexican-American \_\_\_\_\_
- Oriental-American \_\_\_\_\_
- Other \_\_\_\_\_

Subjective Evaluation (Con't)

Child's Response to Inventory

	1	2	3	4	5	
18. Ability to repeat items	Good	_____	_____	_____	_____	Poor
19. Attention to test		_____	_____	_____	_____	
20. Willingness to talk		_____	_____	_____	_____	
21. Quickness in repeating		_____	_____	_____	_____	
22. Body control		_____	_____	_____	_____	

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**APPENDIX B**

**Four Areas of Linguistic Skills**

## APPENDIX B

The following are sample presentations based upon the four areas of detecting linguistic skills cited in Jacobs, 1968. Neither age nor grade level have been determined for these presentations, as they are representative only of a possible format.

1. "the ability to distinguish between the grammatical and ungrammatical strings of a potentially infinite set of utterances," (Jacobs, 1968)

**Purpose:** To determine linguistic competence by observing a child's selection of grammatical from ungrammatical sentences.

**Materials:** Tokens, "M and M Candies", paper strips, play money, any symbol of reward.

**Procedure:** Place the reward items on the table by the child, and say, "I am going to tell you a sentence, when it sounds like this:

"The boy ate the cookie."

Tell me that it sounds right.--(Use any word to signify  
You are right. You keep positive response to the  
the \_\_\_\_\_ correctly produced sentence.)  
(reward)

Now, when what I say sounds like this:

"Eating the boy the cookie."

It sounds mixed up. Tell me that it is mixed up.  
You are right! You keep the \_\_\_\_\_."  
(reward)

**Note:** After the child knows the distinction you are making between the sentences, begin the game using other sentences.

If the child makes an incorrect response, take one of the rewards from his stock pile. This gives immediate confirmation on his progress in the activity.

2. "the ability to interpret certain grammatical strings even though elements of the interpretation may not be physically present in the string," (Jacobs, 1968)

Purpose: To determine linguistic competence by observing a child's ability to interpret sentences produced with grammatical deletions.

Materials: Pictures or objects.

Procedure: Teacher: (Place the picture before the child.)

"I am going to tell you about the picture."

"The scissors cut the paper."

Now I am going to tell you again but something is going to be missing.

"The scissors the paper."

"What is missing?"

Child: cut or some utterance with reference to cut.

Teacher: "Good talking!" "You knew what was missing."  
"The missing word was cut."

Note: If the child misses the response, give the complete stimulus sentence again before asking the child to respond.

You may choose to give a tangible reward along with verbal praise for further reinforcement of the verbal praise.

3. "the ability to perceive ambiguity in a grammatical string,"  
(Jacobs, 1968)

**Purpose:** To determine linguistic competence by observing a child's identification of ambiguous sentences.

**Materials:** Pictures or real objects.

**Procedure:** Teacher: (Place the picture before the child).

"I am going to tell you something."

"Birthday cakes are for birthdays."

"Say it."

Child: "Birthday cakes are for birthdays."

Teacher: "What does that mean?"

Response is in narrative form. From the content of the utterance, judgement can be made as to the child's identification of ambiguity.

**Note:** Try the same activity without the pictures to see what additional clues the child is gaining from the visual stimuli.



4. "the ability to perceive when two or more strings are synonymous,"  
(Jacobs, 1968)

**Purpose:** To determine linguistic competence by observing a child's identification of ambiguous sentences.

**Materials:** Pile of chips, tokens or reward symbols.

**Procedure:** Preliminary exploration of the child's skills in discrimination is necessary. He must first of all understand the concepts of "same" and "not the same".

The next step is to explain that two different ways of saying something may carry the same meaning in terms of resulting behavior.

**Teacher:** "I am going to say two sentences." "Tell me if they tell you to do the same thing or two different things."

"Take the big ball."

"Take the ball that is not small."

Guide the child to the discovery that they are synonymous acts. The child keeps his \_\_\_\_\_  
(reward)

(The use of reward gives both immediate confirmation and reward simultaneously.)

**Teacher:** "Mama bought popcorn at the store."

"Mama got some popcorn at the store."

Guide the child to determine the act was the same. Reward for the discovery.

**Teacher:** "Jennifer and Cindy played in the yard."

"Jennifer and Cindy did not go out of the house."

Guide the child to determine the acts were different. Reward.