INFORMATION TO USERS

This material was produced from a microfilm copy of the original document. While the most advanced technological means to photograph and reproduce this document have been used, the quality is heavily dependent upon the quality of the original submitted.

The following explanation of techniques is provided to help you understand markings or patterns which may appear on this reproduction.

1. The sign or “target” for pages apparently lacking from the document photographed is “Missing Page(s)”. If it was possible to obtain the missing page(s) or section, they are spliced into the film along with adjacent pages. This may have necessitated cutting thru an image and duplicating adjacent pages to insure you complete continuity.

2. When an image on the film is obliterated with a large round black mark, it is an indication that the photographer suspected that the copy may have moved during exposure and thus cause a blurred image. You will find a good image of the page in the adjacent frame.

3. When a map, drawing or chart, etc., was part of the material being photographed the photographer followed a definite method in “sectioning” the material. It is customary to begin photoing at the upper left hand corner of a large sheet and to continue photoing from left to right in equal sections with a small overlap. If necessary, sectioning is continued again—beginning below the first row and continuing on until complete.

4. The majority of users indicate that the textual content is of greatest value, however, a somewhat higher quality reproduction could be made from “photographs” if essential to the understanding of the dissertation. Silver prints of “photographs” may be ordered at additional charge by writing the Order Department, giving the catalog number, title, author and specific pages you wish reproduced.

5. PLEASE NOTE: Some pages may have indistinct print. Filmed as received.

Xerox University Microfilms
300 North Zeib Road
Ann Arbor, Michigan 48106
ROGERS, Brenda Gayle, 1949-
AN INVESTIGATION INTO THE EFFECTS OF CONTINGENT AND NONCONTINGENT REINFORCEMENT ON AUDITORY RECEPTIVE LANGUAGE ABILITY OF STUDENTS WITH DEVELOPMENTAL DISABILITIES.

The Ohio State University, Ph.D., 1974
Education, general

Xerox University Microfilms, Ann Arbor, Michigan 48106
AN INVESTIGATION INTO THE EFFECTS OF CONTINGENT AND NONCONTINGENT REINFORCEMENT ON AUDITORY RECEPTIVE LANGUAGE ABILITY OF STUDENTS WITH DEVELOPMENTAL DISABILITIES

DISSERTATION

Presented in Partial Fulfillment of the Requirement for the Degree Doctor of Philosophy in Graduate School of The Ohio State University

By

Brenda Gayle Rogers, B.A., M.A., Ed.S.

The Ohio State University
1974

Reading Committee:

Dr. Thomas Stephens
Dr. Raymond Swassing
Dr. John Cooper

[Signature]
Faculty for Exceptional Children
PLEASE NOTE:

This page not included in material received from the Graduate School. Filmed as received.

UNIVERSITY MICROFILMS
To My Parents...

... For Loving
... For Giving
... For Caring
... For Sharing.....
ACKNOWLEDGEMENTS

Completing a dissertation requires guidance, counsel, assistance and an abundance of reinforcement. I wish to express my gratitude to the professors of my committee for providing these necessities; Dr. Thomas Stephens, my adviser and committee chairman, was a constant source of encouragement and support not only during the duration of this study but throughout the course of my degree program; Dr. Raymond Swassing gave objectivity and invaluable suggestions and was in many ways responsible for directing interest toward the area of study pursued in this paper; Dr. John Cooper provided continuous and immediate positive reinforcement, generous individual assistance and thoughtful and helpful criticism.

Appreciation is also expressed to Mr. Dave Procter, Director of the Childhood League Pre-School Development Center and the Speech Therapist Jane Cecil, without whose assistance the final implementation of the research procedures would have been impossible.

Appreciation is also expressed to the typist, Betty Patterson, whose efforts and skills contributed immensely to the final preparation of this paper.

The writer is especially indebted to Dr. Frank Hale, Associate Dean of the Graduate School, whose encouragement and example was a source of inspiration throughout the course of study at Ohio State University.
Sincere appreciation and gratitude is also expressed to my dearest friend Jim, for providing needed strength, advise, and encouragement, during the final stages of this study, and to Gwen for offering a generous amount of time and a faithful ear.

Finally, the writer wishes to express sincere gratitude and an abundance of love to her parents, Mr. and Mrs. Claude Todd, who provided, across hundreds of miles, the continual love, support and encouragement that made what once seemed like an impossible endeavor, a reality.
VITA

July 27, 1949...................................................... Born, Atlanta, Georgia

1970................................................................. B.A., Spelman College

Atlanta, Georgia

1970-1971........................................................ M.A., Atlanta University,

Atlanta, Georgia

1971-72............................................................ Ed.S., Atlanta University

Atlanta, Georgia

1968................................................................. Teacher, Head Start

Washington, D.C.

1971................................................................. Teacher and Co-Director At

Atlanta University Learning

Center, Atlanta, Georgia

1972................................................................. Program Development

Specialist Department of

Health, Education, and

Welfare, Atlanta, Georgia

1973-74........................................................... Research Associate,

Faculty for Exceptional

Children, The Ohio State

University, Columbus, Ohio

FIELDS OF STUDY

Major Field: Learning and Behavior Disorders

Collateral Area: Education Research and Development
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEDICATION</td>
<td>iii</td>
</tr>
<tr>
<td>ACKNOWLEDGEMENTS</td>
<td>iv</td>
</tr>
<tr>
<td>VITA</td>
<td>vi</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>ix</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>x</td>
</tr>
</tbody>
</table>

## CHAPTER

### I. INTRODUCTION

- Background ........................................ 1
- Statement of the Problem ....................... 8
- Scope of the Study ................................ 8
- Limitations of the Study ....................... 10
- Objectives and Questions of the Study ....... 11
- Definition of Terms ................................ 12

### II. REVIEW OF THE LITERATURE

- Definitions of Language ....................... 14
- Importance of Language in Education .......... 19
- Incidence of Language Impairments .......... 24
- Behavioral Strategies in the Study of Language ........ 38

### III. METHOD AND PROCEDURES

- Population ...................................... 55
- Setting ......................................... 56
- Design of the Study ............................ 59
- Procedures ...................................... 63
- Data Collection and Analysis ................... 70

### IV. PRESENTATION, ANALYSIS AND DISCUSSION OF DATA

- DATA .............................................. 73
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inter-observer Agreements</td>
<td>73</td>
</tr>
<tr>
<td>Presentation and Analysis of Data</td>
<td>74</td>
</tr>
<tr>
<td>Individual Findings</td>
<td>74</td>
</tr>
<tr>
<td>Statistical Analysis</td>
<td>95</td>
</tr>
<tr>
<td>Discussion of Data</td>
<td>95</td>
</tr>
<tr>
<td>V. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS</td>
<td>99</td>
</tr>
<tr>
<td>Summary and Conclusions</td>
<td>99</td>
</tr>
<tr>
<td>VI. REFERENCES</td>
<td>104</td>
</tr>
<tr>
<td>Appendix A</td>
<td>105</td>
</tr>
<tr>
<td>Appendix B</td>
<td>133</td>
</tr>
<tr>
<td>Appendix C</td>
<td>135</td>
</tr>
<tr>
<td>Appendix D</td>
<td>137</td>
</tr>
<tr>
<td>Appendix E</td>
<td>139</td>
</tr>
<tr>
<td>BIBLIOGRAPHY</td>
<td>140</td>
</tr>
</tbody>
</table>
# LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sex, Chronological Age and Auditory Discrimination Scores of Subject</td>
<td>57</td>
</tr>
<tr>
<td>2</td>
<td>Auditory Comprehension Age As Measured by the Illinois Test of Psycholinguistic Abilities</td>
<td>58</td>
</tr>
<tr>
<td>3</td>
<td>Number, Range and Average Inter-observer Agreement Measures</td>
<td>74</td>
</tr>
<tr>
<td>4</td>
<td>Mean Percentage and Number of Correct Responses on the Daily Language Quiz for Eight Subjects</td>
<td>94</td>
</tr>
<tr>
<td>5</td>
<td>Pre and Post test Scores of Auditory Receptive Language Abilities of Seven Subjects as Measured by the Illinois Test of Psycholinguistic Abilities</td>
<td>95</td>
</tr>
</tbody>
</table>
## LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Representation of the Reversal Design Employed in the Study</td>
<td>62</td>
</tr>
<tr>
<td>2</td>
<td>Number and Mean Percentages of Correct Responses on the Daily Language Quiz for Subject One</td>
<td>77</td>
</tr>
<tr>
<td>3</td>
<td>Number and Mean Percentage of Correct Responses on the Daily Language Quiz for Subject Two</td>
<td>79</td>
</tr>
<tr>
<td>4</td>
<td>Number and Mean Percentage of Correct Responses on the Daily Language Quiz for Subject Three</td>
<td>81</td>
</tr>
<tr>
<td>5</td>
<td>Number and Mean Percentage of Correct Responses on the Daily Language Quiz for Subject Four</td>
<td>83</td>
</tr>
<tr>
<td>6</td>
<td>Number and Mean Percentage of Correct Responses on the Daily Language Quiz for Subject Five</td>
<td>86</td>
</tr>
<tr>
<td>7</td>
<td>Number and Mean Percentage of Correct Responses on the Daily Language Quiz for Subject Six</td>
<td>88</td>
</tr>
<tr>
<td>8</td>
<td>Number and Mean Percentage of Correct Responses on the Daily Language Quiz for Subject Seven</td>
<td>90</td>
</tr>
</tbody>
</table>

**Plate**

<table>
<thead>
<tr>
<th>Plate</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Number and Mean Percentages of Correct Responses on the Daily Language Quiz for Subject One</td>
<td>77</td>
</tr>
<tr>
<td>2</td>
<td>Number and Mean Percentage of Correct Responses on the Daily Language Quiz for Subject Two</td>
<td>79</td>
</tr>
<tr>
<td>3</td>
<td>Number and Mean Percentage of Correct Responses on the Daily Language Quiz for Subject Three</td>
<td>81</td>
</tr>
<tr>
<td>4</td>
<td>Number and Mean Percentage of Correct Responses on the Daily Language Quiz for Subject Four</td>
<td>83</td>
</tr>
<tr>
<td>5</td>
<td>Number and Mean Percentage of Correct Responses on the Daily Language Quiz for Subject Five</td>
<td>86</td>
</tr>
<tr>
<td>6</td>
<td>Number and Mean Percentage of Correct Responses on the Daily Language Quiz for Subject Six</td>
<td>88</td>
</tr>
<tr>
<td>7</td>
<td>Number and Mean Percentage of Correct Responses on the Daily Language Quiz for Subject Seven</td>
<td>90</td>
</tr>
<tr>
<td>8</td>
<td>Number and Mean Percentage of Correct Responses on the Daily Language Quiz for Subject Eight</td>
<td>92</td>
</tr>
</tbody>
</table>
CHAPTER I
INTRODUCTION

Language according to the first definition in Webster’s New International Dictionary is "audible articulate human speech as produced by the action of the tongue and adjacent vocal organs". This is a very limited concept of language and hardly an adequate one for the purpose of this discussion, primarily due to the fact that it restricts language expression to audible, hence oral expression. Since there are obviously many worthwhile definitions of language, one is literally able to select one that is functionally valuable for him. One way to secure a better understanding of the various approaches is to consider the language models they employ. According to Schiefelbusch (1967) the three useful systems that can be represented are linguistic, psycholinguistic, and interpersonal.

Using the interpersonal approach, Carroll (1953) defined language as an instructed system of arbitrary vocal sounds and sequences of sounds which is used or can be used in interpersonal communication by an aggregation of human beings and which rather exhaustively catalogs the things, events, and process in the human environment. The term interpersonal refers to a representation of language which includes the input and output channels together with a concept of the reciprocal nature of the process which one may term a two person system. Carroll, in defining language was referring to the system including sounds,
words, and grammatical patterns that is employed in speech communica-
tion. He contrasts this definition with a definition of speech as the
actual behavior of people in using language.

Language Development attracted research efforts in the past
few years for appropriately important reasons. At the descriptive
level, it must be recognized as a frequently used response systems in
man. At a more analytical level, it is apparent that language is a
highly developed system serving symbolic capabilities of man and these
symbolic skills underlie a great deal of man's competence. (Guess,

Furthermore, language is a vital part of every activity. It is
the means by which ideas, thoughts, feelings and emotions are created.
Each of us talks with many people in the course of a day, in addition
to reading letters, newspapers, books, one is constantly obliged to
read street signs, billboards, menus and directions. We regularly
listen to oral language in public gatherings, we fill out applications,
write checks, make notes and keep diaries. We ask questions, relate
stories, discuss news, jobs, politics. In short, language in some
form is an essential part of everything we do.

For children the need for language is just as real as it is for
the adults. Very young children, even before they talk, listen and
comprehend much of what is heard. Preschool children face many situa-
tions in which talking and listening are necessary. All children
ask questions and make statements prompted by experiences, things
that have happened to them, things they have seen, heard, or read, as well as things that have happened to their families or their friends. School itself confronts the child with additional situations in which talking, writing, reading, and listening are necessary. In fact, practically all learning depends upon his success in meeting these language situations.

Language plays an important role in all aspects of the school program. Every activity of the school requires some form of reception and expression of facts, ideas, thoughts and feelings. Preparation of almost every lesson in school require first that an idea be understood and comprehended and then that they be assimilated and used in expressional situations. It is difficult to think of any phase in the educational program in which language does not play a vital part.

John (1965) also noted the importance of language in education. According to John "a child's test performance at the end of the second year of school is highly correlated with both reading and arithmetic achievement three years later" indicating that early mastery of reading is crucial to success in school (p. 39).

Schuh (1970) commented on the power of language in education. The author contends that significance of language is obvious. It is the vehicle of most instruction, carrier of traditions, technique for organizing information, medium of communication and primary tool in the thinking process. Schuh further concludes that language actually controls both quality and quantity of roles that an individual can
appropriately perform.

Herrick (1972) states similarly that our schools are fundamentally language schools. Most classroom instruction takes place in the form of language. According to Herrick the great social and educational importance of language appears to justify a heavy instructional emphasis on the receptive and expressional skills.

Several studies focusing on the time allotments to elementary subjects in Iowa (Anderson, 1965) and Illinois (Smith, 1970) reveal a large percentage of time devoted to language arts areas. The Iowa and Illinois studies also show close agreement concerning the amount of instructional time given to language arts. Results also indicate that on the average, time allotment to language arts runs a close second to the time allotted to reading.

Increasingly, research has pointed to the importance of auditory receptive language ability in the acquisition of language. Dunn (1973) noted that in the development of language there is a natural sequence of receiving and expressing and each language skill is dependent upon mastery of the one preceding it. Mastery of auditory receptive language is necessary before the child is expected to reach higher levels of language functioning.

Similarly Johnson and Myklebust (1970) noted that deficiencies in auditory behavior, receptive or expressive, produce the inability to relate sounds to experience. Consequently responses are inconsistent and inappropriate and as a result of this condition the ability
to understand the spoken word is not possible thereby prohibiting the acquisition of language. Myklebust (1954) further emphasized that input precedes output and that children who fail to understand do not use meaningful spoken language. It is therefore apparent, according to Myklebust, why a major emphasis is placed on the receptive language in educational programs. This instructional emphasis on language is not a recent development. A classic study by Mann (1928) revealed that a major portion of the language arts program was allotted to receptive language skills in the elementary schools.

Only recently has man studied and treated his own behavior as a natural phenomenon. The systematic relationships between behavior and antecedent (Pavlov) and consequent (Thorndike) stimulus conditions are recent landmarks. It has been only recently that man's language has been considered part of that behavior. Until the writings of Kantor (1935), Eisenson (1938), and Skinner (1957) the exclusive conception of language was that of the expressive and receptive medium of the mind. Ideas were transmitted from the mind via language. Because the mind was considered to operate with a free will, its medium was likewise not considered subject to environmental control (Lahey, 1973).

Applying behavioral approaches to the study of language is a relatively new principle and more research is needed. One of the few studies investigating auditory receptive language behavior by Guess (1969) used differential reinforcement to establish the receptive identification of singular and plural items in two severely retarded boys.
Each subject was trained to an errorless criterion of correct performance. Unreinforced probe trials measuring productive use of singulars and plurals were given at the end of the training sequence for each subject to measure generalization from receptive training to productive speech. During these sessions, the subjects were trained to respond on a VR3 schedule of reinforcement. Chips were used as reinforcers for correct responses and these were redeemed at the end of each session for a variety of sweets and toys.

Particular interest has been given to the effectiveness of contingent reinforcement in increasing behaviors. For example Hamblin and Hamblin (1972) found that students who received tokens contingent upon correct reading responses read more books to criterion and learned more words to criterion than students who received tokens not contingent upon correct reading but merely for attending. This condition was prevalent regardless of the peer or adult tutor variable also studied by the authors.

Similar findings were reported by Klein, Roden and Gentile (1972) in examining the effects of a systematic manipulation of contingencies upon overt work behavior in a primary classroom and by Hart, Reynolds, Baer, Brawley, and Harris (1968) concerning the effects of contingent and noncontingent social reinforcement on cooperative play of a preschool child. However, limited research has investigated the effects of contingent and noncontingent reinforcement on academic behaviors.

Several authors have analyzed the area of language development. Nevertheless, the bulk of that analysis has been less than experimental.
(Guess, Baer, 1973). This trend is interesting since some theory has suggested that language follows the same laws as any other example of human behavior (Skinner, 1957; Staats and Staats, 1963).

As previously noted, the principle of applying behavioral strategies to the study of language is a new one. Consequently, to date few, if any, researchers have investigated the effects of contingent and noncontingent reinforcement procedures on auditory receptive language behavior. Research in this area is particularly warranted due to 1) the importance of language in the school and 2) the importance of auditory receptive language ability to the overall acquisition of language.

The following study therefore investigated the effects of contingent and noncontingent reinforcement on auditory receptive language ability of preschool children with developmental disabilities.
STATEMENT OF THE PROBLEM

This experiment studied the effect of contingent and non-contingent reinforcement on auditory receptive language ability to determine if auditory receptive language ability could be increased as a result of reinforcement. This study also attempted to determine if a functional relationship exists between the two reinforcement variables and correct responses on a daily language quiz.

The study had five purposes. A) To assess the auditory receptive language ability of preschool children with learning disabilities. B) To introduce language instruction aimed toward improving auditory receptive language ability. C) To record the number of correct responses on the daily language quiz under the five experimental conditions. D) To assess auditory receptive language ability following intervention in order to determine the effect of intervention on auditory receptive language ability. E) To determine if a functional relationship exists between the two reinforcement variables and correct responses on a daily language quiz.

Scope of the Study

The study investigated the effects of contingent and noncontingent reinforcement on auditory receptive language ability of preschool children. The study also investigated the effects of contingent and noncontingent reinforcement on subject's performance on a daily
language quiz. The study involved five phases. Phase I consisted of Baseline in which auditory receptive language training was introduced and followed by a daily language quiz. Subjects' performances on the daily quiz were recorded and graphed daily until stabilization occurred. Phase II followed with the introduction of the noncontingent reinforcement in which tokens were given to subjects on a noncontingent basis following a Fixed Interval schedule. Subjects' performances on the daily language quiz were graphed. Following stabilization of the scores on the language quiz in Phase II the contingent reinforcement variable was introduced in Phase III. During contingent reinforcement tokens were earned by the subjects for correct responses and redeemed, as in Phase II, for rewards following each session. Phase IV consisted of the reintroduction of noncontingent reinforcement following the same procedures as in Phase II. Contingent reinforcement was reintroduced in Phase V.

Eight six year old students were selected for the experimental population. These subjects were randomly selected from a population of students with no physical, visual or auditory impairments that might prohibit performance during language training.

Subjects were seen in individual daily sessions. During each 20 minute session subjects received auditory receptive language training. During the noncontingent condition the subjects were given tokens on a noncontingent basis. During contingent reinforcement tokens were earned for correct responses. All tokens were paired with verbal praise.
Measures of training included pre and post test scores and the number of correct responses on the daily language quiz. Pre test measures were collected at the beginning of the study prior to any language training sessions. Post test measures were collected following Phase V. Responses on the daily language quiz were recorded and graphed daily.

Experimental analysis of reinforcement and training effects was the reversal design incorporating two different contingencies of reinforcement. In this design the performance of subjects during each experimental condition was recorded. Each experimental condition was maintained until stabilization occurred during that condition. In addition to the reversal design analysis, measures of pre and post test scores were submitted to statistical analysis for effects of the experimental condition.

Limitations of the Study

The study was designed to test the effects of contingent and noncontingent reinforcement on auditory receptive language ability of eight preschool children. The definition of auditory receptive language ability was limited to those behaviors measured by the Illinois Test of Psycholinguistic Abilities: Auditory Receptive Language Ability Subtest.

Finally, due to the limited number of subjects employed in this study no generalization of results can be made to the sample population. However, replication of the experiment is suggested in order
Objectives and Questions of the Study

This study investigated the effects of two forms of reinforcement, contingent and noncontingent reinforcement, on auditory receptive language ability of eight students.

First, auditory receptive language training was introduced individually and under five experimental conditions. Condition one consisted of Baseline and no reinforcement was programmed. Condition two consisted of noncontingent reinforcement and reinforcement was programmed on a noncontingent basis. Condition three consisted of contingent reinforcement and reinforcement was presented contingent upon correct responses. Experimental conditions four and five consisted of the reversal conditions.

The study investigated the following null hypothesis:

1) There will be no significant difference between the performance of subjects on pretest measures of auditory receptive language ability and the performance of subjects on post test measures of auditory receptive language ability following intervention.

Questions to which the study was addressed are listed:

1) Will auditory receptive language ability be significantly increased as a result of treatment?

2) Will there be a change in the subjects' responses on the daily language quiz under the five experimental conditions?

3) Will there be a functional relationship between the reinforcement variable and correct responses on the daily language quiz?
to determine generality of treatment.

Objectives and Question of the Study

This study investigated the effects of two forms of reinforcement, contingent reinforcement and noncontingent reinforcement, on auditory receptive language ability.

First auditory receptive language training was introduced to each subject individually and under five experimental conditions. The first experimental condition consisted of baseline and no reinforcement. The second experimental condition consisted of noncontingent reinforcement and reinforcement was presented on a noncontingent basis. The third condition represented the contingent variable and reinforcement was presented contingent upon correct responses during the language sessions. Experimental conditions four and five consisted of the reversal conditions.

Analysis was derived from three measures: Pre and post test scores of auditory receptive language ability and scores on a daily language quiz. Questions to which the study was addressed are listed:

1) Will auditory receptive language ability be significantly increased through the use of reinforcement?

2) Will there be a change in the subjects' responses on the daily language quiz under the five experimental conditions?

3) Will there be a functional relationship between the reinforcement variables and correct responses on the daily language quiz.
DEFINITIONS OF TERMS


2. Contingent Reinforcement - Tokens dispensed subsequent to correct responses to questions given by examiner.

3. Noncontingent Reinforcement - Tokens dispensed on a fixed interval schedule regardless of the behavior being exhibited at that time.

4. No Reinforcement - No tokens dispensed during entire instructional period.


6. Functional Relationship - The dependent variable and a given procedure are functionally related if the behavior systematically varies as a function of the application of the procedure.

7. Significant Change - A change in topography and/or rate of response to a more acceptable level.

8. Statistically Significant Difference - Scores subjected to statistical analysis at .02 level of confidence and found to be significant.

9. Stabilization - Data are neither increasing nor decreasing or varies regularly within fifty percent above or below the mean.

10. Token Reinforcer - An object that can be exchanged at a later time for another reinforcing item or activity.

11. Noncontingent Fixed Interval Schedule - When reinforcers are scheduled to be delivered following the passage of a specific amount of time, and that time is held constant.

12. Reversal Procedure - A technique that involves the removal of a procedure in order to test the effectiveness of that procedure. The reversal procedure is used to demonstrate a functional relationship between the independent and dependent variable.
13. **Single Subject Experimental Design** - Research design developed for analyzing the effects of the independent variable on the behavior of a single organism.
CHAPTER II
REVIEW OF RELEVANT LITERATURE

The area of language has received much attention in the literature. Several authors have attempted to define and study language while others have pointed to the importance of language in the educational setting. A considerable amount of literature has been devoted to the study of language impairments in exceptional children with particular emphasis on children with learning disabilities and mental retardation. However, somewhat less literature is available regarding the application of behavioral strategies to language behaviors and the effects of contingent and noncontingent reinforcement on language behaviors. To date (1974), however, a growing body of literature concerning contingent and noncontingent reinforcement suggests direction for further investigation and research. (Reynolds and Hart, 1968; Cotter and Spradlin, 1969; Masters and Morris, 1971; Jeffrey, Hartmann, and Gelfand, 1972; Redd 1972; Ingram and Andrews, 1973). A review of relevant literature pertaining to each of these cited areas may clarify issues in the present study.

Definitions

A review of the literature in the area of language immediately reveals the diversity of opinion pertaining to the definition of language.
Glucksberg, Kruass, and Weisberg (1967) define language as a term applied to certain aspects of behavior and that its determinants are the same as those which operate within behavior development in general. Glucksberg, et al. (1967) further define language as the interpersonal behavior that includes: 1) a message (speaker), 2) a discrimination (listener), 3) feedback (by the listener to the original speaker), and 4) a revised speaker response.

Green (1969) provides another definition of language as any means vocal or other of expressing or communicating feeling or thought. This definition implies that expressing or communicating is not an instinctive but a conscious act, a distinction of considerable importance in defining language. In a general sense, Greene views language as the intentional or conscious use of any sound, sign, or symbol to transmit a fact, an idea, feeling or emotion from one individual to another.

Spradlin (1963, pp. 512-56) also views language from an interpersonal approach. Spradlin defines language as the speech and gestures of a speaker and the responses to speech and gestures made by a listener. Interpersonal language may be referred to as communication or "communication behavior". A similar definition is offered by Cruickshank (1961). According to this definition, language is the ability to comprehend and use symbols (words, pictures, numbers, letters) as the accepted means of communication in society. He further explains that oral speech is "merely the uttering of the articulate sound, the mechanism or tool used to serve a function of language, whereas total language includes..."
such functions as reading and writing).

Artley (1948, p. 110) maintains that "speaking and reading comprise two sides of a square known as communication or language, the other two sides being writing and listening"

Kattmeyer (1947, p. 28) states "attention has often been called to the fact that although reading is one facet of language its close relationships to other areas must always be borne in mind."

Another approach to defining language is from a linguistic approach. The primary interest of the linguist is to develop a theory of language. The linguist defines language as an internalized set of rules which govern the use of arbitrary vocal symbols used to catalogue and describe persons, things, and events in the environment. (Lynch and Bricker, 1972). This definition implies that the linguist is directly interested in describing the content and form of language and less interested in describing the communication behavior or the events as they may be influenced by the process of exchange.

Linguistic studies have traditionally focused on the analysis of the symbol system of language. This approach, however, does not explain how language is learned and understood by the individual. Studies focusing on relationships between messages and the characteristics of those persons who receive and interpret them are called psycholinguistics.

Frostig and Maslow (1973, p. 20) suggests that the definition of psycholinguistics is broader than that of linguistics. "It includes the purposes of language and all aspects of communication as well as the
Communication involves both verbal and nonverbal forms, due to the fact that people express ideas and feelings not only through words but also through vocal intonations, facial expressions and body movements. Information is thus received both by hearing the spoken word and by observation. Therefore gestures and perception are among the concern of the psycholinguist (Seboek, 1965). The psycholinguist also approaches language as a form of human behavior and in this regard is interested in language as a form of human behavior and the effects of language upon human behavior (Schiefelbusch, Copeland, and Smith 1963).

In summarizing definitional issues three useful approaches to language were presented. These systems were represented as interpersonal, linguistic and psycholinguistic.

The interpersonal language processes refers to a representation of language which includes the input and output channel together with a concept of the reciprocal nature of the process, termed a two-person or dyadic system (communication).

Second approach to language was noted in the linguistic approach. The main concern of the linguistic approach was viewed as the description of the content and form of language or in the analysis of the symbol system of language.

A third approach to language was defined as the psycholinguistic approach. This approach primarily focuses on language as a form of human behavior and in this regard is interested in the effects of language upon human behavior.
As previously stated, there are countless definitions of language and various approaches to consider. While some may be more valuable than others it is suggested that the most appropriate definition can be found only in considering it's functional value. Considering the varied approaches that may be taken in understanding language the first category of literature will examine the importance of this complex language system in education.
Schooling is notoriously verbal. Although the highly verbal nature of education is frequently aspersed, competence in the modern world demands a high level of ability in language and similar symbolic skills. In large measure, the verbal nature of education reflects necessity. Stern (1971) suggests that it is instructive that tests of verbal ability are prime predictors of academic achievement. Academic aptitude tests that are not obviously verbal usually involve considerable use of language internally. The dependence of school achievement on verbal ability not only substantiates the importance of language in school but makes clear the school's vital responsibility to foster the development of language skills.

John (1965, p. 221) also noted the importance of language in education. According to John, "A child's reading test performance at the end of the second year is highly correlated with both reading and arithmetic achievement three years later", indicating that the early mastery of reading is certainly crucial to success in school as school now functions.

Schuh (1970) commented on the power of language in the schools. The author contends that the significance of language is obvious. It is the vehicle of most instruction, the carrier of traditions, the technique for organizing information, the medium of communication and the primary tool in the thinking process. Schuh concludes that language actually controls both the quantity and quality of roles that an individual can appropriately perform.
Every activity of the school requires some form of reception and expression of facts, ideas, thoughts, and feelings. When a child tells about a story that he has read, makes a report on a unit in social studies, prepares his arithmetic paper, or meets in a committee to plan a project he is using language. On the playground language is necessary for giving directions, for explaining rules, and often for playing of the game itself. It is difficult to think of any phase of education which does not involve language. "Certainly language is a tool of significance, comparable to that of reading and arithmetic (Greene, 1969, p. 45)."

Herrick (1972) states similarly that our schools are fundamentally language schools; most instruction in the classroom takes place through the medium of some form of language. According to Herrick the great social and educational importance of language appears to justify a heavy instructional emphasis on the expressional language skills.

The educational and social importance of a specific school subject is difficult to determine objectively. One index to educators' estimate of the importance of a subject may be found in the amount of instructional time and emphasis allotted to the subject in the school program. Unfortunately research reveals that few, if any, nationwide surveys of time allotments to elementary school subjects in regular classrooms have been made since the classic study by Mann (1928) and no studies were found relating specifically to special classes. However, results from a number of state studies of time allotments have indicated a trend toward the reduction in the number of minutes per week devoted to instruction in the three R's (Otto, 1971).
Fewer conclusions can be made concerning the amount of time devoted to language arts for the exceptional student. Few if any studies concerning time allotment for language arts in the special class have been published. However, there is a consensus of opinion in the literature concerning the importance of language for the child with learning disabilities as well as other exceptional children.

Dunn (1973) concluded that increased knowledge concerning normal language acquisition and concern with the effects of language deficits on educational success are bringing up a new direction for the speech therapist in the schools.

Reger (1971) pointed to the importance of language skills for the exceptional child. The author maintains that to plan a curriculum program for children in special education programs it is necessary to take a look at the mechanisms a child needs to acquire the skills of speaking, reading, and writing. These skills make up the overall picture of language and these different but interrelated aspects of communication all involve the use of language.

Concerning the importance of language in the curriculum of the retarded child Dunn (1963) pointed out that while the speech and hearing therapists have an important instructional role to play in helping the retarded hear and speak better, the teacher has an equally, if not more, important one in the overall field of language development. Dunn further explained that the teacher needs to provide a comprehensive language development program as a major part of the curriculum which goes far
beyond the development and correction of speech sounds. It is not surprising to note that Dunn concludes that "oral language instruction is probably even more important than instruction in reading and writing for the mentally retarded.

Wiseman (1965) comments similarly on the importance of language training in the special classroom. Wiseman contends that language is an integral part of the complex process that leads to the development of higher mental abilities that later affect learning, a defective area within language structure may disrupt the normal development of the language process, thereby affecting development. Consequently, Wiseman concludes that language training is an integral part of the special class curriculum.

Concerning language in the curriculum of the child with learning disabilities McCarthy (1972) stated "since language defects or lags are often characteristic of children with learning disabilities, it could be expected that certain remedial procedures that put the primary stress on ameliorating language problems would be involved (p. 24)."

A similar opinion is shared by Frostig and Maslow (1968) concerning the child with learning disabilities. Without adequate language the child is grossly handicapped as an individual and as a social being. The authors stated that "In relation to human development we can say with conviction in the beginning was the word and an educational program without language training would be incomplete and restricted in its effectiveness (p. 94)."

Although no objective data is available concerning the amount of time actually devoted to language training in the special class, there
seems to be a consensus of opinion in the literature pertaining to the importance of language training in the special class. This opinion appears to be the result of the high incidence of language impairments that have been found to exist in exceptional children. The next category of literature will examine the incidence of language disorders found in children in special classes with emphasis on children with learning disabilities and mental retardation.
Incidence of Language Impairments in Exceptional Children

Perhaps no single label connotes a greater variety of seemingly unrelated conditions than the term learning disabilities. Conditions classified as learning disabilities include among others dysgraphia, perceptual handicap, neurological impairment and autism. (McCarthy and McCarthy, 1972). Because they form a heterogeneous group thereby causing problems with definition as well as interpretation of objective data such as incidence figures.

Examples of this diverse assortment of behavior is probably best reflected in the numerous definitions that have been presented defining the term learning disabilities. One such definition is that given by the National Advisory Committee for the Handicapped (May, 1968). After studying the problem the following widely accepted definition was formulated.

"Children with specific (special) learning disabilities exhibit a disorder in one or more of the basic psychological processes that are involved in understanding or in using spoken or written language. These learning disabilities may be manifested in disorders of listening, thinking, talking, reading, writing, spelling, or arithmetic. They include conditions which have been referred to as perceptual handicaps, brain injury, minimal brain dysfunction, dyslexia, developmental aphasia, etc. They do not include learning problems which are due primarily to visual, hearing, or motor handicaps, to mental retardation, emotional disturbance or to environmental dis-advantage.
The committee's definition implies that disorders in one of the basic psychological processes involved in understanding or using language is characteristic of many children with learning disabilities. This definition in itself implies a high incidence of language impairment in the learning disabled.

Kirk and Bateman (1962), also refer to disorders in language processes in their definition of learning disabilities. According to the authors the term learning disabilities is defined as

"...a disorder... in one or more of the processes of speech, language, reading, writing or arithmetic or other school subjects resulting from a psychological handicap caused by a possible cerebral dysfunction and/or emotional or behavioral disturbances. It is not the result of mental retardation, sensory deprivation or instructional factors (p. 73)."

A similar definition of learning disabilities is given by Bateman (1965). According to Bateman children who have specific learning disabilities are those who....,

- manifest an educationally significant discrepancy between their estimated intellectual potential and actual level of performances...

- related to basic disorders in the learning processes...

- which may or may not be accompanied by demonstratable central nervous system dysfunction and...

- which are not secondary to generalized mental retardation, educational or cultural deprivation, severe emotional disturbance or sensory loss"

(Bateman, 1965, p. 220)
On the other hand, Clements (1966) does not directly adhere to disorders in language processes in his definition. Clements refers to children with learning disabilities as "near average or above average in general intelligence with learning and/or certain behavioral abnormalities ranging from mild to severe which are associated with deviant functions of the central nervous system (p. 188)."

Telford (1972) attempted to evaluate the present definitions of learning disabilities and concluded that the term learning disabilities would be maximally useful if used to refer to a marked discrepancy between the child's apparent potential and his performance level as he is engaged in essential learning processes.

While Telford's evaluation is logically sound and for this reason quite warranted, its impact has not reached the area of research. Empirical data is in a sense biased for comparative purposes because in many instances research involving children with learning disabilities refers to a group of children exhibiting different learning and/or behavioral characteristics. One can see that there could be some problem in drawing conclusions from a comparison of the data based on the child with a learning disability such as developmental aphasia and another with perceptual difficulties. Professional reaction to this heterogeneous group has been characterized by Capobianco (1964). "Perhaps the one irrefutable characteristic attributal to children with learning disabilities is their wide variety of behavior (p. 187)."
While there are numerous problems inherent in the identification diagnosis and remediation of learning disabilities, the investigator is not completely limited as a result of the heterogeneity of the group. Although children with learning disabilities form a diverse grouping and fail to learn for several reasons they have one common characteristic, the discrepancies in abilities. Telford (1972) maintains "the term learning disability will be maximally useful to researchers and practitioners if used to refer to a marked discrepancy between the child's apparent potential and his performance level as he is engaged in essential learning processes. (p. 279)." Generally children are categorized as learning disabled with this important distinction recognized.

Objective data regarding the incidence of language impairment across the broad spectrum of learning disabilities is minimal. Authoritative opinion is more prevalent.

An example of this opinion is Bernstein's (1961) comment pertaining to children with learning difficulties. According to Bernstein, a characteristic of many children with learning difficulties is their restricted language code. This conclusion is based on an evaluation of children who were characterized as neurologically handicapped, economically deprived or emotionally disturbed.

As previously cited most definitions of learning disabilities do not provide for children whose primary problems are severe emotional disturbances or cultural deprivation therefore lending some question to Bernstein's conclusion as it refers to learning disabilities.
Regarding linguistic performance of children with learning disabilities McCarthy and McCarthy (1972) wrote that linguistic performance is often affected in children with learning disabilities. On tests like the Peabody Picture Vocabulary Test (1959) the Illinois Test of Psycholinguistic Ability (1961; 1968) and on classic measures of language ability such as sentence completion children with learning disabilities not only tend to score lower than normal children but are often discrepant in their performance on tests of various abilities that contribute to overall language performance. Such children, for example, might be average for their age on test of receptive language ability but below average on tests of expressive language ability.

Hammill and Myers (1969, p. 176-185) provide a different opinion concerning the oral language of children with learning disabilities. These authors point to the clinical experiences as the foundation for their conclusion. Hammill and Myers noted that clinical experience with children with learning disorders has demonstrated that there is a group of children who manifest no detectable disorders of oral language. In vocal encoding they make no detectable syntactical or structure errors, sentence length is adequate and there are no indications of word finding problems or circumlocution. On the receptive language model no difficulties arise in the comprehension or oral language. They may be however, minimal problems of a visual perceptual nature on test items found at the integration level particularly in the area of short-term sequential visual memory. The authors further conclude that these children with adequate oral language manifest serious problems when confronted with tasks involving the
graphic system. In attempting to spell, they may exhibit signs of poor visualization or poor auditorization of graphic symbols. Their sentence structure and syntax in written language may be disordered, and indications of what has been termed dyslexia may be prevalent. It is interesting to note that the authors provide no concrete data to support these impressive conclusions in the text reviewed.

Johnson and Myklebust (1967, pp. 74-90) found that children with learning disabilities present many types of deficiencies in auditory behavior both verbal and nonverbal because of their inability to relate sounds to experience, responses are inconsistent and inappropriate. As a result of this condition the ability to understand the spoken word is not possible thereby prohibiting the acquisition of language. Myklebust (1954) emphasizes that input precedes output and that children who fail to understand do not use meaningful spoken language. It is apparent that this class of children with learning disabilities clearly exhibit language impairments.

Myklebust (1971) provides objective data concerning the incidence of reading and written language disorders in children with learning disabilities. From the data obtained Myklebust concluded that language disabilities may be verbal or nonverbal. Deficiencies in verbal language seem to be most prevalent. (This observation is open to speculation since verbal language is the most readily measured and closely related to school success.) Nevertheless, language disorders are common to children with learning disabilities, according to Myklebust, and involve all the verbal systems: spoken, read, and written.
The initial population for Myklebust's study consisted of 2767 children, all third and fourth graders in four participating schools. Screening tests were used to identify underachievers. Using a learning quotient (LQ) to represent the ratio between learning potential and achievement, pass-fail criteria were established. Children having sensory impairment, mental retardation, emotional disturbance, or obvious motor disorders were excluded.

Two experimental groups were selected, differing on the severity of the learning disability. Separate control groups of normal children were obtained for each of the populations. To serve as a control, the child passed all the selective test criteria and was of the same sex and from the same classroom as the experimental subject with whom he was paired. The Severe Learning Disabilities group consisted of 112 children with severe learning problem and 112 normal children. The Moderate Learning Disabilities Group consisted of 116 children with moderate learning disabilities and 116 normal children.

Picture Story Language Test (PLST) was administered, except for the number of sentences written, all the scores revealed significant differences in favor of the control; children with moderate deficits in learning, as shown by other measures, were inferior in written language. Furthermore, on the two scales syntax and abstract-concrete, the Moderate Learning Disabilities children were one year retarded and on the other three scales they were three-fourth to nine-tenth year behind the control. Though all three factors of written language were affected in the pupils with learning disabilities, expression of meaning and correct use of
syntax were most impaired.

The children classified as having a severe learning disabilities were given the PSLT as were the Moderate Learning Disabilities group. As with the Moderate Learning Disabilities group this test was given to study the incidence of written language impairment in pupils with learning disabilities.

It is significant that the pattern of these findings is similar to the one for the children with moderate learning disabilities. In the Severe Learning Disabilities group the greatest deficit was in syntax; the retardation was over 2.5 years. The second most extensive limitation was in communication of abstract learning. These two facets were also lowest for the Moderate Learning Disabilities group.

Nyklebust concluded "that these findings clarify the cognitive disturbances found in learning disability children (p. 126)." They were all inferior on all aspects of written language, irrespective of the extent of the deficit in learning. The author further concluded "The PSLT differentiated the learning disabilities children from normal and, in addition, revealed differences on the basis of the severity of the deficiency in learning (p. 129)."

The above mentioned study provides objective data concerning the incidence of language impairment, specifically read and written language in children characterized as learning disabled. The role of read and written language in learning disabilities, even when the involvement is moderate is illustrated by the results of this study and has vast implications for remedial instruction.
A summary of the literature reviewed to this point indicates the following:

1. Literature reveals that language training is an important part of the curriculum in the regular class as well as the special class. This contention is supported by data that reveals a significant portion of time allotted to language arts in the school curriculum.

2. There is a diversity of opinion concerning the definition of learning disabilities. There is however a consensus of opinion concerning the fact that the term learning disabilities can be used to describe that group of children who manifest an educationally significant discrepancy between their estimated intellectual potential and actual level of performance.

3. Little objective data is available concerning the incidence of language impairment across the broad spectrum of learning disabilities. However, there is some consensus of opinion in literature that there exists a significant amount of language impairment in the learning disabled population to warrant concern of educators.

The following category of literature will examine the incidence of language impairments in other exceptional children with emphasis on the mentally retarded child.
Incidence of Language Impairments
In Other Exceptional Children

Not only is there a high incidence of language impairment in children classified as learning disabled, but there are also similar characteristics found in the mentally retarded. Myers and Hammill (1969) pointed to the similarities that sometimes exists between the retarded child and children diagnosed as learning disabled. However, the authors further emphasize "although there are mentally retarded children who can satisfy all the provisions of the definitions of specific learning disabilities, because their learning difficulties are secondary to the more serious handicap of mental subnormality they are placed in program for the mentally retarded rather than the learning disabled." (Myers and Hammill, 1969, p. 28) Due to the similarities that exist in the learning characteristics of these two groups a discussion of incidence of language impairments in the mentally retarded is justifiable.

Vincent Keane (1972) presented an extensive review of the literature concerning the incidence of speech and language problems of the mentally retarded. Some of the major conclusions of Keane's report were:

1. The one undisputed fact that has been well documented is that there is a higher than normal incidence of communication (speech, language, and learning) disorders found in the retarded. Keane noted that research indicates that non-institutionalized retardates manifest high incidence of language disorders. Studies have cited ten to ninety percent incidence of language impairments in noninstitutionalized retardates.
2. A higher incidence of speech and language problems appears to be present in institutionalized retardates than in non-institutionalized retardates. Studies cited by Keane noted forty to ninety percent of institutionalized retardates manifest language disorders.

3. Although research data has yet to demonstrate consistently a high positive correlation between intelligence and communication skills it appears that the lower one proceeds on the IQ scale the more frequent and more severe communication difficulties.

4. No unique configuration of pattern of speech and language problems has been demonstrated in the mentally retarded as a group of within any subcategory or syndrome under the aegis of mental retardation.

5. Further research in this area might be directed toward delineating the incidence and precise nature of language problems found in the retarded. (Keane, 1972, p. 16)

It is interesting to note that Keane pointed to the same problems inherent in interpreting incidence figures in the retarded as cited earlier in this paper. Keane also maintained that "some danger exists in relying too heavily on the data of any one or many incidence studies because by their inherent nature, it is almost impossible to control all the variables involved (p. 14)." The most outstanding restriction that Keane adhered to is the lack of uniform criteria and standards for identifying a speech problem. Also of considerable interest to Keane was exactly what constitutes a speech problem within a retarded population.

There is also a consensus of opinion prevalent in the literature pertaining to the high incidence of speech and language disorders in the mentally retarded. Jordan (1967) stated that language behavior and mental
retardation have been explicitly related since the time of Mead (1913). According to Jordan, Binet and Simon defined idiocy and imbecility in terms of communication.

Cruickshank (1967) further supports the contention of high incidence of language impairment in the retarded. Cruickshank revealed that educable retarded children are often deficient in speech and language development and that specific language experiences should also be provided to stimulate growth of speech and language.

Another group of children that manifest high incidences of language disorders is the deaf. Stephens (1970, p. 79) pointed to the problems of the deaf child in the acquisition of language. Regarding language problems of the deaf the author wrote, "language is learned chiefly through the auditory channel and because high orders of thinking are dependent upon language symbols deafness is considered to be a debilitating handicap."

A similar view is shared by Dunn (1973). Dunn noted that in the development of language there is a natural sequence of receiving and expressing and each language skill is dependent upon mastery of the one preceding it. Mastery of receptive auditory language and expressive oral is necessary before the child is expected to reach higher levels of language functioning. Dunn contends that the hearing impaired child who lags far behind in receptive auditory skills finds the tasks of learning to speak, read, and write infinitely more complex.

Studies on the overall language age of the hearing impaired are not available primarily because instruments to measure this complex
phenomenon in the deaf are not available (Dunn, 1973). In many instances it was found that reading achievement levels are frequently used to assess the language abilities of the deaf child. This indeed is unfortunate because reading achievement provides only a small aspect of total language competence. However, it does provide some measure of language ability.

A rationale for using reading scores to evaluate language of the deaf is cited in the literature (Hanson, Hancock, Kopra, 1969). Although written language test reveal much of the linguistic skills of hearing impaired, research (Myklebust, 1964; Stuckless and Marks, 1966) has shown a delay in the use of written language by deaf children prior to nine years of age. "The relation of reading to the use of verbal symbols by the deaf and the high correlation between the expressive and receptive verbal functions, plus the realization that input must precede output substantiates reading scores as a measure of language acquisition (p. 5)."

Studies using written language in assessing older children are often cited. Harrison (1972) in a follow-up study of 50 deaf children used sentence completion techniques to assess errors in written language. In comparing the performance of the partially hearing children with that of a normal hearing group both in special classes, the mean number of errors for the partially hearing group was 42.7 as compared with 9.1 for the normal hearing; the mean number of oral language errors was 30.7 versus 3.8 for the normal hearing group.
In the area of overall educational achievement Dunn (1973) reported the findings of the Office of Demographic Studies Annual Survey for Hearing Impaired Children and Youth (1972). While all the results of the survey are too extensive and somewhat unrelated to present here, some related findings are warranted. Results of academic achievement tests administered to approximately 19,000 hearing impaired students indicated that in the area of language, the reading and vocabulary of many deaf students at eighteen upon completion of their schooling may be as much eight to nine years retarded. The author concluded that although the overall achievement is not behind to that extent, the importance of reading as a tool subject for all other learning is reflected in most of the other areas.

To this point language has been defined in its broadest sense as the system including sounds, words and grammatical patterns that is employed in speech communication. The term speech has been defined as the actual behavior of people using language. Reading has been viewed as primarily a language receptive process.

A case has been drawn concerning the importance of language in the school with particular interest given to language in the special class. The literature presented by (Stern, 1970) John (1965), Herrick (1972), Dunn (1973) supported this view.

The incidence of language disorders in the learning disabled the mentally retarded and other exceptional children was presented. The incidence of language impairment supported the view that special attention should be given to language by special educators.
Behavioral Strategies in the Study of Language

The literature reveals that much emphasis has been given to the study and analysis of language behavior. However, the bulk of that analysis has been less than experimental. Until the pioneering writings of Kantor (1935) Eisenson (1938) and Skinner (1957) the exclusive conception of language was that of the experience and receptive medium of the mind. Because the mind was then considered to operate and function with a free will, its medium was not considered subject to environmental control (Lahey, 1973, p. 9).

According to Guess and Baer (1973) research in the area of language has been primarily descriptive of the changing content and structure of language, indicating the various stages of development, and has noted some of the gross environmental circumstances correlated with those changes. Instead of demonstrating cause and effect of language growth there has occurred instead an occasional use of experimental techniques to display the current characteristics of language as it exists in subjects of a given status and an abundant flowering of theory. The research of Skinner (1957) and Staats (1963) suggests that language follows the same laws as any other example of human behavior. This approach immediately implies experimental analysis of language and of language development as an environmentally controlled process perhaps similar to environmentally controlled non language developments.

Some research pertaining to the use of behavioral strategies in the study of language development is available. Several studies have been conducted in which the variable of imitation has been investigated.
The concept of imitation is critical for an understanding of the socialization process and in the acquisition of language.

A study by Burgess, Burgess, and Esveldt (1970) explored the occurrence of nonreinforced imitation responses of three intermediate level children. The experimental manipulation consisted of reinforcement of accurate English imitations with Spanish words interspersed with English words; Reinforcement of English imitations with Spanish words interspersed with English words; Reinforcement of English words in an English-Spanish-English sequence; Reinforcement of English words in a Spanish-English-Spanish sequence; presentation of Spanish words only; presentation of one Spanish word; Reinforcement of behavior other than imitation. Differential Reinforcement (DRO) 5-20 sec schedule; Reinforcement of behavior other than imitation (DRO) 60-90 sec. Results revealed that when reinforcement was delivered for responses other than imitation all imitation eventually ceased. When reinforcement was reintroduced for English imitations there was immediate resumption of these responses to their previous 100 percent level.

Garcia, Guess, and Byrnes (1973) used procedures of imitation, reinforcement, and modeling to demonstrate the development of generalized use of a singular and plural declarative sentences in a retarded girl initially lacking sentence form response. Experimental sessions consisted of both imitation training and probe trials. During training sessions the experimenter displayed an object to the model and the subject and directed to the model the question "What do you see?" After a response
from the model the experimenter directed the same question to the subject. Sweets and verbal praise were delivered on a Variable Ratio schedule. Generalization was assessed by a number of probe trials that were interpersed among training trials. Using these procedures generalized use of singular sentences resulted as well as the generalized use of plural sentence.

Training of generative verb usage by imitation and reinforcement procedures was investigated by Schumaker and Sherman (1970). In the investigation three institutionalized patients from the Kansas Neurological Institute served as subjects in the experiment. The generative production of the past tense and the present progressive tense of regular verbs was selected as the task to be taught. Two types of experimental sessions were utilized; training sessions and probe sessions.

During training sessions the subject was trained through the use of modeling to produce one verb in both the present and past tense. Correct responses were followed by verbal praise and a poker chip which was later traded in for prizes. Incorrect responses were followed by "No". During probe sessions generalizations of this training was tested by presenting to the subject a series on untrained verbs interspersed with trained verbs. The results showed that as past and present tense forms within an inflection class were trained the subjects correctly produced past and present tense forms of untrained verbs within the class. Thus, imitation and reinforcement procedures were effective in teaching generative use of verb inflections in three institutionalized patients.
Garcia (1974) also used the techniques of imitation and differential reinforcement in training three sequential verbal responses associated with the display of a picture and questions related to that picture.

The subjects utilized were one male age 18 and one female age 12 who were residents of the Kansas Neurological Institute and considered by the psychological testers as non-verbal. The verbal behavior trained was a conversational unit divided into three segments. Segment I: Display picture. Segment II: "This is a ____". Segment III: "Do you want the ____". The subjects were taught three distinct responses. Segment I "What is that?" Segment II: "It's a ____". Segment III: "Yes, I do". Modeling and reinforcement were used to train responses. Investigators measured the use of each sentence in a setting different than the one in which training took place and with a different picture to ascertain if generalization took place. During generalization sessions reinforcement was delivered on a noncontingent basis. During the training sessions reinforcement was delivered following a Variable Interval schedule. Results of the Garcia study revealed that the use of imitation and reinforcement was successful in teaching sentences being trained, however, little generalization was evidenced from this training. It would have been interesting to note the effects of generalization using contingent rather than noncontingent reinforcement. A similar study by Guess and Baer (1971) used the technique of differential reinforcement and reported successful results in teaching mental retardates the usages of productive noun suffixes, when labeling stimuli exemplifying the verb form of an action or activity were presented.
Through the use of token reinforcement and imitation two severely retarded adolescents were trained to ask questions concerning items they did not know. (Twardosz and Baer, 1973).

In the study cited the two subjects were taught to discriminate items they knew how to label from those that they did not know; to respond appropriately by naming items they knew; and to ask questions about any items that they did not know. Through the use of the token reinforcement and modeling procedures both subjects were trained to ask questions concerning items they did not know ("What Letter"). The authors noted that this study demonstrated the emergence of a response class in a highly structured setting.

Sailor (1971) sought to determine the extent of which differential reinforcement from an echoic model could control the acquisition of plural allomorphs in previously a plural mentally retarded subjects. Evaluation of the dependent variable was conducted by having sound tapes of the probe responses for each condition, rated independently by two speech pathologists for the audible presence of either (-s) or (-z) plural allomorphs. During training procedures correct responses were differentially reinforced following a Variable Ratio.3 schedule. Data revealed supported the expectation that allomorphs of the plural class can be taught, using techniques of differential reinforcement and imitation.

Token systems have also been successfully applied in the study of language development. The effectiveness of a token system in producing improvements in the language and arithmetic performance of children
with Downs Syndrome was tested over an eight week period by Dalton, Rubin and Hislop (1973). In this study thirteen children with Down Syndrome were randomly assigned (with constraints that overall, the I.Q. scores, age, and academic achievement scores at the start of the program have similar distributions and means) to the Token Group or the No Token Group. Children in the Experimental (Token) Group received instruction in Arithmetic and Language identical to that received by the Control group. Children in the Token Group earned poker chips accompanied by verbal praise from the classroom instructor contingent upon giving a correct answer to questions orally presented by the instructor. (Questions were drawn exclusively from the Distar arithmetic and language teaching materials;) Children in the No Token Group received no tokens at any time during instruction, however, social reinforcement in the form of verbal praise was given on a continuous basis to each child in the no token group.

Results of the study indicated that the children in the Experimental Group showed significant improvement both in arithmetic and language. The No Token Group receiving verbal praise only showed significant gains in Language but failed to show significant gains in math. An interesting note to the Dalton and Rubino study is that a retest one year later revealed that the Token Group maintained gains in both subjects whereas the language performance of the No Token Group showed a significant decline. It can be speculated from these findings that even a relatively brief exposure to a token economy system can have a relatively long lasting effect on the achievement scores of retarded children.
In a different setting Bailey, Timber and Wolf (1971) demonstrated the successful application of a token reinforcement system combined with peer tutoring in the modification of articulation errors of predelinquents by their peers. The procedures outlined included the delivery of tokens to two boys. The tutors used speech correction procedures such as modeling, peer approval, contingent points and feedback. Two interesting results were noted: First, the token reinforcement procedure was effective in decreasing articulation errors as well as in maintaining appropriate behaviors of the tutors. (Example: detection of correct articulation). Secondly, results of the study indicated that peers can function as speech therapists without instruction, feedback, or presence of the instruction. This finding has vast implication for future remediation programs.

Literature is also available pertaining to the application of reinforcement procedures to stuttering behaviors.

Shames (1969) attempted to modify a stutter's verbal content by reinforcing (good, right, etc.) desired statements and presumably punishing (silence of clinician) undesired statements. The results of the study revealed a marked increase in desired responses across the seventeen therapy sessions. Also noted was a decrease in certain stuttering behaviors across sessions, although these stuttering behaviors were not the focus of any response contingent stimuli.

In another study by Shames (1969) the effect of verbal praise in eliminating overt stuttering behavior of a male stutter was explored. In this study the subject's baserate was determined. The subject was then
trained to determine his stutterings at 80% accuracy. Following this training the subject was trained in eight types of stuttering modification programs. Appropriate responses were followed by verbal praise; inappropriate responses were followed by no. Stuttering frequency reduced steadily across sessions and was at zero by the end of the treatment. With regard to follow-up Shames reported that "In school, at home, and with friends, this client's stuttering has remained at a very low, if not non-existent frequency level."

Browning (1967) also reported the successful application of behavior modification techniques in the elimination of stuttering in a nine year old schizophrenic child. The rational of Browning's study was to reverse the reinforcement contingencies of S's stuttering. Whereas anxiety reduction was previously contingent upon completion of a stuttered response, and whereas attention from a listener was elicited by stuttering, such attention would be commanded only by correct speech.

The program developed and reported by Browning consisted by the following steps; (1) correct speech was made available to the subject by a procedure of successive approximations while simultaneously counter conditioning the anxiety associated with speech tasks; (2) correct speech was available in E's presence and the subject practiced speaking under conditions which were increasingly comparable to his daily environment. Through the study all the staff at the Treatment Center were used as social reinforcers, whose attention and verbal praise were contingent only on correct speech. However, through training sessions verbal praise was paired with token rewards. Data reported by Browning
revealed that as a result of the treatment program described the subjects percentages of words stuttered declined from 22 percent to 2 percent in reading and 4 percent in conversation.

Risley and Wolf (1967) used operant behavior modification techniques in the development of functional speech in echolalic children. The subjects in the study were four echolalic children ranging from seven to twelve years old. Although, these subjects did imitate some words and phrases usually this imitation was sporadic and could not be consistently evoked. Consequently, the purpose of the procedure outlined by Risley and Wolf was designed to establish functional speech in the four subjects.

Techniques outlined by the investigators included shaping and imitation training in the training sessions; fading in of new stimuli and fading out of verbal prompts to transfer the speech from imitative to control by appropriate stimulus conditions; and extinction and time out from reinforcement for the reduction of inappropriate behavior in conjunction with the differential reinforcement of appropriate responses which are incompatible with the inappropriate behavior. Data revealed indicated that these techniques were successful in producing functional speech in the four subjects.

The authors reported that the results of the study indicated that functional verbal behavior can be developed from rudimentary imitative behavior by established behavioral techniques such as shaping, fading, and differential reinforcement.
Reinforcement procedures have been successfully applied in the modification of language behavior of preschool children. For example, Risley and Hart (1968) used reinforcement procedures in developing correspondence between the non-verbal and verbal behavior of preschool children. The primary purpose of the study was to develop training procedures which would be sufficient to produce generalized correspondence verbal and non-verbal behavior in preschool children, such that non-verbal behavior might be modified by reinforcing behavior alone.

In Risley and Hart's study two groups of six children each were given food snack at the end of the day for reporting interaction with specific preschool material during free play (Procedure A); and then only for reporting actual use of material earlier that day (Procedure B).

Results revealed that initially Procedure A alone had little or no effect on the children's use of material. Procedure B resulted in all of the children in one group actually using the material, and after repeating procedures A and B with this group across a series of different materials Procedure A alone was sufficient to significantly increase use of a specific material.

Stimulus fading and contingency management technique were applied in the treatment of elective mutism of a preschool child. (Wulbert, Nyman, Snow, and Owen, 1973). The cited study specifically sought to establish whether stimulus fading was a necessary condition to instating verbal behavior.

The subject in the study was a six year old electively mute girl. Experimental periods consisted on two alternative conditions.
In one condition (experimental) the child received reinforcement for responding to mands for verbal and motor responses in the presence of someone else who already had stimulus control of such behavior, while a stranger was faded into stimulus control. In the second condition (the control condition) another stranger made the same mands for verbal and motor responses, under the same condition but no fading procedures were used. A time out contingency for non response was also employed. Results of the data revealed that the stimulus fading procedure was a necessary component of the treatment process. While the time out contingency for non-response was found to facilitate treatment if combined with stimulus fading it was completely ineffective without the stimulus fading.

Mann and Baer (1971) examined the effects of receptive language training and reinforcement on articulation of two preschool children. Specifically the purpose of the study was to ascertain whether exposure to specific words that had stimulus control over a subject's non verbal behavior, could facilitate later articulation of these same words.

The experimental procedures consisted of two phases. During Phase I the subjects were exposed to the experimental words (nonsense words). In Phase II the effects of this treatment on articulation of those words was assessed by presenting subjects with previously trained nonsense words interpersed with words not previously trained. Correct responses for the easily pronounced words were followed by verbal praise and a token chip.
Data indicated that words to which the subjects were previously exposed were pronounced with greater accuracy than those to which he was not exposed (control words).

Specifically, results revealed that words that have stimulus control over a subject's nonverbal behavior can facilitate later articulation of those same words. According to the authors, data obtained draws attention to the fact that at least some classes of operants can be affected not only by their consequences but by related antecedent events. However, it would have been interesting to examine the effects of the application of reinforcement procedures in the articulation sessions. Since the investigators failed to introduce reinforcement for pronunciation of experimental or control words it is impossible to determine if a higher level of accuracy could have been attained by simply applying reinforcement contingencies for articulation.

Although research is available pertaining to the successful application of reinforcement procedures to language behavior, somewhat less literature was found which specifically investigated the effect of contingent and noncontingent reinforcement on language behavior. One such study is reported by Ingham and Andrews (1973). In this study subjects were treated in groups of ten for two weeks under outpatient conditions in a hospital. This was followed by once a week follow up treatment sessions over a period of nine months. Subsequently, this program was modified to an inpatient program for groups of four adult stutters who lived together under controlled token economy conditions for three weeks. The outcome of the therapy was then evaluated over the
following nine month period.

A number of experiments were conducted within the three stages of the treatment process. In one experiment approximately half of the subjects were treated by a modification of the Curlee and Perkins' graded delay auditory feedback (G.D.A.F.) therapy procedure. The G.D.A.F. schedule varied from Curlee and Perkins' in that subjects were required only to obtain fluency within each delay level before passing to the next level. Also, ranges of speaking rate were prescribed for each delay level and integrated within a token schedule. In the contingent token schedule subjects were penalized for departures from the prescribed syllables per minute rate and for moments of stuttering. Then to shape fluency prolongations were penalized. In the noncontingent token schedule (which was used with half of the G.D.A.F. treated subjects) tokens were given on a noncontingent basis.

An analysis of the data obtained for the two groups revealed that the contingent group took significantly fewer sessions to complete the program than did the noncontingent group.

A growing body of literature pertaining to the successful application of contingent and noncontingent reinforcement in areas other than language also suggests directions for further investigation and research. Masters and Morris (1971) studied the effects of contingent and noncontingent reinforcement on generalized imitation. In the study each subject was exposed to a female model who exhibited aggressive behaviors and the instructed to imitate each aspect of the sequence displayed by the female model. During the treatment phase the female model either
(a) contingently rewarded subjects for imitation, (b) provided no reward for imitation, or (c) gave subjects rewards on a noncontingent prepayment basis before instructing him to imitate. In a fourth condition the subjects were contingently rewarded by mechanical dispensers in order to control for the acquisition by the model of additional secondary reinforcing characteristics.

Results of the study indicated that contingent rewards dispensed by the model can produce generalized imitation of highly divergent behavior. The investigation also revealed that subjects who were contingently rewarded by the female model showed greater subsequent generalized imitation than did the subjects who received noncontingent prepayment.

Jeffrey, Hartmann, and Gelfand (1972) compared the effects of contingent reinforcement, nurturance (noncontingent reinforcement) and non reinforcement, on imitative learning (The acquisition and maintenance of matching behaviors). In this study 45 subjects were randomly assigned to one of three conditions: contingent reinforcement for matching, non reinforcement or nurturance (noncontingent reinforcement). Subjects in the latter condition experienced a 7.7 minute noncontingent interaction with the model. Results reported revealed a significant difference in the picture matching across the three groups. The subjects that received contingent reinforcement for matching displayed significantly more matching than did children who received either nurturance or nonreinforcement. Subjects in the nurturance condition displayed more matching than did subjects in the non reinforcement group indicating that some
reinforcement was better than no reinforcement at all.

Attention span in relation to various schedules of regimes of reinforcement was investigated by Redd (1972). The research also sought to examine the stimulus control of tasks that were systematically associated with different reinforcement regimes.

In the Redd study two retarded children were presented three tasks (pegs, blocks, or chips) each associated with a different training regime (non reinforcement, contingent reinforcement or noncontingent reinforcement). The results indicated that the contingent task acquired discriminative properties whereas the other two tasks did not. During the choice probes the three tasks were presented simultaneously; the subjects chose the contingent tasks and the noncontingent task almost equally and never chose the task associated with nonreinforcement.

The effects of reinforcement contingencies on academic behaviors have also been investigated and reported in the literature. For example, Cotter and Spradlin (1969A) studied the effects of noncontingent preferred music on rate and accuracy of addition performance of thirty-eight retarded subjects. A match to sample apparatus presented addition computations and four multiple choice answers. Noncontingent music was presented to each of the thirty-eight subjects via headphones for four sessions. During each session five minute periods of preferred music were alternated with five minutes of silence. Data collected were the number of correct computations and number of errors during music and silence. Analysis indicated significantly better performance during silence compared to noncontingent music across the four sessions. Twenty-seven subjects solved
more addition problems during silence than during music; ten subjects solved more addition problems during silence than during music; and one worked more problems during silence as during music. The authors concluded that a contingent schedule of music presentation, in addition to the type of music played may have different effects on academic performance. Cotter and Spradlin also noted that investigations of contingencies on non machine academic tasks is needed.

In another study by Cotter and Spradlin (1969 B) the effects of contingent music on retarded children's performance of addition computations was studied. The computational level, music preference, contingent music time interval, and inter-response time (IRT) was determined individually for 54 retarded students. Each subject was randomly assigned to AB or BA treatment conditions of three experiments. In each experiment treatment AB was contingent music for the first 10 sessions and a control condition during the last ten sessions; treatment BA was a control for the first ten sessions and contingent music during the last ten sessions. During contingent music sessions each subject obtained preferred music through earphones after pressing the key associated with the correct response to a machine produced addition problem. Each time a correct response was obtained, the duration of music presentation was extended for the number of seconds equal to the subjects predetermined median IRT; however, music was terminated if (a) an error was made, or (b) a correct response was not written within the IRT. The control condition was silence, (Experiment I) noncontingent music (Experiment 2) and contingent white noise (Experiment 3). The results
obtained indicated a greater increase in computation rates per session during contingent music than control sessions. This was true whether contingent music sessions preceded or followed control sessions.

A review of the literature presented indicates that while there is a diversity of opinions pertaining to the definition of language, authors are generally in agreement concerning the importance of language in the educational programs of children. The literature also reveals that while there is considerable time devoted to language arts in the special class, there is still a high incidence of language impairment in exceptional children. Disorders in the auditory receptive language processes were also noted and the importance of auditory receptive language in the overall acquisition of language was established.

The review of the literature also revealed that while there is considerable attention given to language development in the literature, the bulk of that analysis is not experimental in nature. Although some research is reported that employs behavioral strategies more research in the area is needed.

In conclusion, the review of the literature supports the assumption that more research pertaining to the application of behavioral principles to the study of language behavior is warranted.
CHAPTER III

METHODS AND PROCEDURES

Many aspects of the research design were derived directly from the points listed in the preceding pages on rationale. For example, the interest in seeing more studies that relate reinforcement procedures to academic learning led to the task herein described; the knowledge concerning the importance of language to the school environment of the exceptional child resulted in the topic described here.

Population

The sample population consisted of 8 students 6 years of age. The sample population was selected from a population of 6 years old pupils enrolled at the Childhood League located in Columbus, Ohio. The Childhood League serves a population of preschool students identified by the psychologists as having developmental disabilities. The students served by the League are channeled into public school programs for the learning disabled or educable mentally retarded. For example upon completion of the program last year, 24 of the 28 students were placed in classes for students with learning disabilities.

The experimental population consisted of students who were randomly selected, using a table of random numbers, from a population of students 6 years of age at the League who had no physical, visual or hearing impairments that would prohibit performance during assessment.
and instruction. This judgement was made by consulting the speech therapists, teachers, and medical files of the students. The students comprising the experimental population also had no impairments in auditory discrimination as measured by the Templin Test of Auditory Discrimination (1957). The Templin, administered by the speech therapist and again by the experimenter before entry into the language program yields a criterion score indicating no impairment. The experimental population described above consisted of those students who also received a criterion score or above on the Templin. Descriptions of subjects are summarized on Table 1. Auditory comprehension of subjects are summarized Table 2.

The eight students comprising the experimental population attended school at the Childhood League for approximately five mornings a week for four hours. The educational program in which these children were involved consisted of one period of academics, one period of art, one period of outside and gym activities and one period of pretend activities. The children in the experimental population were also seen on a regular basis by the speech therapist, psychologist, and other consulting personnel.

**Setting**

Language training sessions were conducted in individual daily sessions in a quiet enclosed room in the preschool, not being used for instruction. Equipment in the room included two student desks and a reward center. Subjects were seated to the left of the experimenter at a desk void of objects other than instructional materials that were used during the lesson.
<table>
<thead>
<tr>
<th>Subject Number</th>
<th>Sex</th>
<th>C.A. in months</th>
<th>Templin Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>M</td>
<td>73</td>
<td>58</td>
</tr>
<tr>
<td>2</td>
<td>M</td>
<td>73</td>
<td>59</td>
</tr>
<tr>
<td>3</td>
<td>F</td>
<td>73</td>
<td>57</td>
</tr>
<tr>
<td>4</td>
<td>M</td>
<td>73</td>
<td>58</td>
</tr>
<tr>
<td>5</td>
<td>M</td>
<td>73</td>
<td>58</td>
</tr>
<tr>
<td>6</td>
<td>M</td>
<td>72</td>
<td>58</td>
</tr>
<tr>
<td>7</td>
<td>F</td>
<td>74</td>
<td>56</td>
</tr>
<tr>
<td>8</td>
<td>F</td>
<td>81</td>
<td>57</td>
</tr>
</tbody>
</table>

Mean 65 58

Range 73-81 56-59
Table 2
Auditory Comprehension Age (ACA)
As Measured by ITPA and Zimmerman

<table>
<thead>
<tr>
<th>Subject</th>
<th>ACA Pretest Score</th>
<th>ACA Pretest Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ITPA</td>
<td>Zimmerman</td>
</tr>
<tr>
<td>1</td>
<td>5-0</td>
<td>4-8</td>
</tr>
<tr>
<td>2</td>
<td>4-3</td>
<td>4-6</td>
</tr>
<tr>
<td>3</td>
<td>4-9</td>
<td>4-9</td>
</tr>
<tr>
<td>4</td>
<td>5-0</td>
<td>4-9</td>
</tr>
<tr>
<td>5</td>
<td>4-9</td>
<td>4-7</td>
</tr>
<tr>
<td>6</td>
<td>4-10</td>
<td>4-9</td>
</tr>
<tr>
<td>7</td>
<td>4-1</td>
<td>4-0</td>
</tr>
<tr>
<td>8</td>
<td>4-5</td>
<td>4-3</td>
</tr>
</tbody>
</table>

Mean   4-7     4-5
Range  4-1 5-0  4-0 4-9
DESIGN OF THE STUDY

The general plan of the study was built upon a "reversal" design incorporating two different contingencies of reinforcement. The replication involved in the reversal design was used to determine if functional relationships exist between the independent variable (reinforcement) and the dependent variable (correct responses on the daily language quiz). Furthermore, the reversal design permitted clear evidence of experimental control of the behavioral change, thus validating the functional nature of the variables being studied.

The design of the study followed an applied behavioral analysis approach. Applied Behavioral Analysis has received an increasing amount of interest in the literature over the past few years. (Journal of Applied Behavioral Analysis, 1968-1974). Recent interest in the behavior of the individual and in individual differences may be cited as one of the primary reasons for the evolution of interest in behavior modification research.

Several advantages can be noted for the researcher using the single organism design. Unlike the traditional group design, the single organism design permits a researcher to analyze the behavior of the individual and provides an excellent structure for a data collection system which would evaluate the effectiveness of environmental change (Kazdin, 1973). Another advantage of the single organism design is that it permits the use of a small number of subjects. Also as opposed to the group design approach, the single organism design uses the subject as his own control rather than using a control group.
It is an often held misconception that behavioral research implies that the problem of treatment generalization to the sample population is or can be determined by investigating only a small number of subjects. Kadzin (1973) noted this in stating "also various elements of the experimental design may delimit generalization of the results." It must be emphasized here that the single organism design utilizing a small number of subjects does not purport to be generalizable to the sample population. Similarly Sidman (1960) questions the generality of group designs and suggests alternatives in analyzing group data. The single organism type designs also allow for the use of flexible treatment models to permit needed change in intervention, as individual subjects differ, thus indicating how the intervention must be modified, instead of indicating the range of effects of a single treatment across subjects.

**Replication**

Replication, or the repetition of an experiment, can be used for two purposes in the experimental analysis of behavior. First, in an intra-subject sense to determine functional relationship between variables, and secondly, in an inter-subject sense to determine generality of treatment. It should also be noted that while intra-subject replication is indicative of functional relationships, nothing is empirically offered concerning the generality of treatment. This is only accomplished by inter-subject replication.
It is therefore possible to establish generality of treatment when using an experimental analysis of behavior approach. If, after the data supports the notion that a functional relationship exists between the independent and dependent variables, and the researcher is concerned with generality of treatment, repetitions of the experiment of subjects of the same characteristics will provide this. Successful inter-subject replication determines a treatment as generalizable to the sample population.

The above discussion was undertaken as a rationale for using an experimental analysis of behavior approach to study language behavior. The general plan of this study was built upon a "reversal" design incorporating two different contingencies of reinforcement and outlined in Figure 1.
Figure 1. Represents the reversal design employed in the study.

$S^+$ = Reinforcement
PROCEDURES

Pre-Test Stage

Pre test measures were given to the sample population. Pre test measures consisted of the Illinois Test of Psycholinguistic Abilities (ITPA). Sub Test Auditory Receptive Ability and the Zimmerman Pre School Language Test: Auditory Comprehension Subtest.

Pre testing took place in the room described under Setting. The subject was seated to the left of the experimenter.

The first pre test measure administered was the ITPA. The experimenter read the following directions to subject's according to the test procedure outlined in the manual.

"We are going to play a game.
I am going to ask you some questions. And I want you to answer yes or no. Listen to this question and answer yes or no. Do boys play? After subject responds experimenter says "Yes," Boys Play."

The experimenter read each question clearly in a conversational manner. Subjects responded "Yes" or "No" but need not give a verbal response; any discriminable indication of "Yes" or "No" was acceptable.
Experimenter circled subject's response (Y or N) on the Record Form provided. The Test continued until 3 items were failed in any block of 7 consecutive items (ceiling). No reinforcement (verbal or social) was programmed for subject during pre test.

The Pre School Auditory Comprehension Checklist was also administered during Pre Testing. The Auditory Comprehension Checklist was given as a supplementary test in order to assist the experimenter in developing the daily language instruction program. This rationale for using supplementary testing procedures to assist in developing language instruction program was also held by Myer and Hammill (1969). The authors stated:

...The auditory decoding subtest of the ITPA consists of a series of graded questions requiring a "Yes" or "No" response. The subtest purports to measure the child's ability to understand the spoken word without demanding more than minimal expressive ability on the part of the subject. If the child performs poorly on the subtest the examiner knows only that when compared with other children his age, the subject does not comprehend adequately what is said to him; and yet auditory language is a highly complex system. ... The examiner knows that the child does not understand what he hears on the subtest, but exactly what the child does not comprehend in terms of the complexity of auditory language is unknown, one cannot assume that the child does not comprehend such things as color names, directions etc... because, he does poorly on the auditory decoding
subtest. At this point the examiner's clinical curiosity should lead him to other informal assessment ... These assist later in the development of the remediation program.

The setting and conditions for pre testing were identical to those utilized with ITPA. The experimenter proceeded down the checklist asking appropriate questions according to checklist until all questions at one level were missed. No verbal or social reinforcement was given to subjects.

The Potential Reinforcement System of each subject in the experimental population was also assessed during the Pre Test stage.

According to Stephens (1970) one method for assessing the potential reinforcement system of an individual is through observational techniques, another method mentioned by Stephens is Interview Procedures.

Observations of the 8 subjects was held for 2 days during class period and play in order to discover what was viewed as reinforcing to each subject. Experimenter visited the classroom during free time, play period and class period. During free time experimenter made record of the kind of activities and items that each individual subject chose. The same method was employed during the subjects play period. A record was taken during that time of the activities that each subject engaged in most often over the observation period. During class time a record was also be kept of any activity that each subject might independently select. An interview was also held with each individual subject. At that time the experimenter asked subject what some things the he/she
liked to do. This information assisted the experimenter in identifying potential reinforcers.

**Language Program**

The language program utilized was based on Kirk and Kirk's (1972) "Specific Guidelines for Remediation" (Based on Assessment Information from ITPA) and Vollett's (1970) "The Remediation of Learning Disabilities: Auditory Reception Educational Resource Program."

While the specific language program utilized is too extensive to report here, it can be noted that each lesson was based on a group needs assessment determined by the Zimmerman Auditory Comprehension Test administered during pretest. It can also be noted that each lesson was outlined following the procedures outlined by Stephens (1970) in the *Directive Teaching Kit*, and placed on the "Instructional Strategy Form" found in that kit. Language lessons can be found in the Appendix A.

The lessons were designed in order to permit subjects to make responses throughout. During Contingent Reinforcement Conditions correct responses were reinforced with tokens paired with verbal praise.

**Baseline**

The subjects were placed under five conditions during the experiment. The first condition was baseline. During this condition each subject received the language instruction program. However, no reinforcement was programmed for correct responses during the twenty
minute language program and no reinforcement was given for correct responses on the eight item daily quiz. Data was collected on the number of correct responses on the eight item language quiz and the number of correct responses was graphed daily. Baseline continued until stabilization occurred. Stabilization was defined as the state when the observable data points vary regularly within a range of 50% of the mean. Specifically the extreme data points vary not more or less than 50% above or below the mean. (Ohio State University Faculty for Exceptional Children Learning Disabilities Project, 1973)

**Treatment 1: Noncontingent Reinforcement**

Treatment 1 was introduced after stabilization occurred during Baseline. Treatment 1 consisted of noncontingent reinforcement. On a Fixed Interval (FI) schedule a token (blue chip) was given to the subject regardless of the behavior being emitted at the time. Tokens were presented on a FI 75 second schedule. Specifically, one token was given to the subject every 75 seconds. The Fixed Interval schedule was established by determining the number of possible opportunities to earn tokens during the noncontingent phase and dividing those opportunities into the amount of time possible for reinforcement to occur. A tape recorder with a tape programmed with music beeps on a 75 second interval schedule was used for timing the presentation of the non-contingent tokens.

At the end of each session the tokens were traded for tangible rewards or high interest activities at the Reward Center.

The number of correct responses on the eight item daily language quiz (administered at the end of each session) were recorded as in
Baseline. Treatment 1 was continued until stabilization occurred on the daily language quiz score.

**Treatment 11: Contingent Reinforcement**

Treatment 11 consisted of the introduction of the Contingent Reinforcement Variable. During this condition, blue chip tokens were given only for correct responses. Each time that the subject emitted a correct response during the language session the Experimenter gave a blue chip token paired with verbal praise. To equate the amount of reinforcement per condition the experimenter designed each session in order that the subjects would have approximately 16 (including responses on the quiz) opportunities to earn token reinforcement during Treatment 11. This token was traded in for tangible rewards on high interest activities. Treatment 11 continued until stabilization occurred on the Daily Language Quiz Score.

**Treatment 111: Reintroduction of Noncontingent Reinforcement**

Following the reversal design, the experimental procedures returned to those followed during Treatment 1. The procedures were identical to those followed in Treatment 1 and was continued until stabilization occurred on the daily language quiz score. In this condition the Fixed Interval schedule was established by dividing the number of tokens actually delivered in Treatment 11 (Contingent Reinforcement) into a actual time available for reinforcement to occur. The Fixed Interval schedule varied among subjects during this phase.
**Treatment IV: Reintroduction of Contingent Reinforcement**

During Treatment IV the contingent reinforcement variable was reintroduced following the same procedures outlined in Treatment II (Contingent Reinforcement). Treatment IV condition continued until stabilization occurred on the daily language quiz score.

**POST TEST STAGE**

Following Treatment IV the post test measure was administered using the Illinois Test of Psycholinguistic Abilities. The setting and procedures were identical to those employed during pre test. The Post Test Measure on ITPA was used in order to determine what changes, if any, occurred in Subject's Auditory Receptive Language Ability as a result of Treatment. The Zimmerman Pre School Language Test was not administered during Post Testing as its primary function was to aid in the development of the language program.

**Presentation of Reinforcers**

The procedures for presentation of the token reinforcers in this study followed those procedures outlined by Masters and Morris (1971). Specifically, for all conditions the experimenter explained that she would play some games with the subject. For conditions involving reinforcement the experimenter explained to the subject that he/she would receive some chips that they could trade in for some prizes. It was stressed that the more chips that were received the better the prizes or activities he/she would eventually gain, and thus he would want to acquire as many chips as he/she could. During initial sessions
subjects were taken to the Reward Center and shown prizes and activities available. In the condition involving no reinforcement, the experimenter went through the typical session but with no mention of chips or prizes. In the noncontingent condition the experimenter introduced the game and chips as described for reinforcement conditions. Subjects were given the tokens on a Fixed Interval schedule. No mention was made concerning a possible contingency between the receipt of the reward and the subjects behavior during the language session. Chips were traded in at the Reward Center for prizes or activities.

During the Contingent Reward Condition, the experimenter explained the chips as described above. After each response the experimenter turned to the child and said "That was a very good answer, job, etc..." and placed the chip in the subjects hand. The subject then deposited it at a bank which was provided with his name on the front. At the end of each session during the contingent phase the experimenter said "Let's see how many chips you have. You certainly do have alot. You know what? Because you did such a good job today, you can go over and choose a prize." The subject was then allowed to select a prize from the Reward Center.

**Data Collection and Analysis**

Data for responses to the pre and post test measures were recorded on forms shown in Appendix B. Data for responses on the daily language quiz were recorded using forms presented in Appendix C. Forms
permitted the recording of individual responses on the language quiz as well as the condition in which the responding occurred.

Inter-observer agreement on data collection was assessed by one of two reliability observers in the Baseline, Contingent, and Noncontingent Conditions. The reliability observers independently recorded the number of correct and incorrect responses of the subjects. Specifically, the reliability observer was presented a form for each subject and instructed to record whether the responses to the questions on the daily language quiz were correct or incorrect. Forms for observations of the reliability observer are presented in Appendix D. Inter-observer agreement was computed by dividing total number of agreement by total number of recorded responses.

Measures collected included (a) scores on the pre and post test measures and (b) the number of correct responses on the daily language quiz.

Functional relationships between the reinforcement variable and correct responses were evaluated using the reversal design. For each subject the number of correct responses on the daily language quiz was recorded during each Baseline, Contingent, and Noncontingent Condition and graphically represented. The percentage of correct responses for each condition was also calculated.

Gains in Auditory Receptive Language Ability was determined by analyzing the responses made on the Illinois Test of Psycholinguistic Abilities Auditory Receptive Language Ability Subtest, during pre and post test
conditions. Pre and post test measures were tested by application of a Wilcoxin Matched Pairs Rank Sum Test.

**Instruments**

a) The Illinois Test of Psycholinguistic Abilities - The ITPA Auditory Receptive Ability Subtest was used to gather pre and post test measures. The ITPA was developed specifically to diagnose abilities or disabilities in language of young children. Osgood's theory of language (Osgood, 1957) furnished the psycholinguistic model from which the test was developed. The ITPA has nine subtests, which allow the measurement of linguistic abilities in three processes of communication. The 1961 edition was standardized on 800 children between the ages of 2½ years and nine years. Individual scores may be obtained from each subtest.

b) The Zimmerman Preschool Language Scale (1969) - The Preschool Language Scale (LS) was used during pretesting to gather supplementary information for development of the language program. The Preschool Language Scale provides normative developmental data on language skills. The PLS dichotomized auditory comprehension ability and verbal ability. The first part of the scale, Auditory Comprehension Checklist (See Appendix E) consists of a number of subtests which require only nonverbal responses such as pointing to a picture which the examiner named.

The Preschool Language Scale is designed for ages two through nine. The test yield three scores auditory comprehension, verbal ability and a total language age score. (I. R. Zimmerman and Violette Steiner)
CHAPTER IV
PRESENTATION, ANALYSIS, AND DISCUSSION OF DATA

Effects of treatment were measured by two kinds of data. First pre and post test measures were recorded for each subject. The pre test was given immediately before treatment began and post test was administered following stabilization in Contingent Reinforcement II stage. In addition to pre and post test measures, the correct responses on a daily language quiz were recorded and graphed for each subject. From this record two kinds of data were available: auditory receptive language ability of each subject before and after intervention, and graphic representation of the relationship between correct responses on the daily language quiz and contingent and noncontingent reinforcement.

Inter-observer Agreement

Inter-observer agreement of data recording was determined during Baseline, Contingent and Noncontingent conditions. In each of these sessions one of two people served as a second observer. The reliability observer recorded data independently from the experimenter. The two records for a subject were then compared to determine number of responses scored the same (agreements) and number of responses scored differently (disagreements). Inter-observer agreement was then calculated using the formula given below.

\[
\text{Percent of agreement} = \frac{\text{No. of agreements}}{\text{No. of agreements} + \text{No. disagreement}} \times 100
\]
The condition in which inter-observer reliability measures were gathered and the percentage of agreement are given in Table 3.

Table 3
Condition in Which Inter-Observer Observations Occurred Range and Average Percentage of Agreement

<table>
<thead>
<tr>
<th>Condition</th>
<th>No. of Sessions with Inter-observer</th>
<th>Highest Agreement</th>
<th>Lowest Agreement</th>
<th>Avg. Percentage of agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>1</td>
<td>88%</td>
<td>88%</td>
<td>88%</td>
</tr>
<tr>
<td>Noncontingent I</td>
<td>2</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Contingent I</td>
<td>2</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Noncontingent II</td>
<td>1</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Contingent II</td>
<td>1</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Presentation and Analysis of Data

The two measures as recorded by the experimenter (pre and post test scores and number of correct responses on the daily language quiz) were analyzed to determine effects of treatment in general and the effects of the independent variable (contingent and noncontingent reinforcement).

Individual Findings

To determine if a functional relationship exists between the dependent variable and contingent and noncontingent reinforcement, correct responses on the daily language quiz were recorded under five conditions and analyzed.
**Subject 1**

**Baseline:** During baseline Subject One had thirty-four percent correct responses on the daily language quiz. The mean number of correct responses over 4 sessions of baseline was 2.7.

**Noncontingent Reinforcement 1:** Subject One's percentage of correct responses increased from 34% during Baseline to fifty-two percent when noncontingent reinforcement was applied. The mean percentage of correct responses over the five sessions also increased from 2.7 during Baseline to 4.2 correct responses during Noncontingent Reinforcement 1.

**Contingent Reinforcement 1:** When reinforcement was made contingent on correct responses the number of correct responses on the daily language quiz increased from fifty-two percent during Noncontingent Reinforcement 1 to ninety percent correct responses in Contingent Reinforcement. The mean number of correct responses also increased over the five sessions to 7.2 correct responses on the daily language quiz.

**Noncontingent Reinforcement II:** During reversal condition the mean score for the five sessions of non-contingent reinforcement decreased from 7.2 correct responses during contingent reinforcement to 6 correct responses in Noncontingent Reinforcement II. The percentage of correct responses also decreased to seventy-five percent.

**Contingent Reinforcement II:** When reinforcement was again made contingent upon correct responses the percentages of correct responses increased to eighty-seven percent.
Plate 1 represents the number and mean percentage of correct responses made by Subject One. Figure a represents the number of correct responses per session. Figure b represents the mean percentage of correct responses.

Subject Two

Baseline: During Baseline Subject Two had a mean of twenty percent correct responses on the daily language quiz. The mean number of correct responses over the four sessions on the daily quiz was 1.5.

Noncontingent Reinforcement I: Subject Two had a mean percentage of thirty-eight percent correct responses on the quiz. In Noncontingent Reinforcement I the mean number of correct responses increased from 1.5 during Baseline to three.

Contingent Reinforcement I: When reinforcement was contingent upon correct responses the mean percentage of correct responses increased from thirty-eight in Noncontingent Reinforcement I to eighty-one percent in Contingent Reinforcement I. The mean number of correct responses made by Subject two in the six sessions also increased to 6.5.

Noncontingent Reinforcement II: In the reinforcement condition reinforcement was programmed on a contingent basis. During this condition the mean percentage of correct responses decreased to fifty percent. The mean number of correct responses over the four sessions also decreased on the daily language quiz.

Contingent Reinforcement II: During Contingent Reinforcement II reinforcement was contingent upon correct responses. During this condition
the number of correct responses on the language quiz again increased. The mean percentage of correct responses increased to 90 percent. The mean number of responses also increased to from 4 correct responses on the daily quiz to 7.2 correct responses.

Plate 2 represents the number and mean percent of correct responses made by Subject Two on the quiz.

Figure a represents the number of correct responses obtained by Subject two for all conditions. Figure b represents the mean percentage of correct responses on the quiz for all conditions.

**Subject Three**

**Baseline:** The mean percentage of correct responses on the language quiz for Subject Three during Baseline was thirty-three percent. The mean number of correct responses on the daily language quiz was three over the four sessions of Baseline.

**Noncontingent Reinforcement I:** During Noncontingent Reinforcement I the percentage of correct responses on the daily quiz increased from thirty-three percent in Baseline to a mean of fifty-two percent. The mean number of correct responses also increased from a mean of three in Baseline to a mean of four correct responses on the daily language quiz during Noncontingent Reinforcement I.

**Contingent Reinforcement I:** When the reinforcement was contingent upon correct responses the mean percentage of correct responses on the daily language quiz increased to eighty-seven percent. The mean number of correct responses on the daily language quiz was seven during Contingent Reinforcement I.
Figure b. Represents the number of correct responses on the Daily Language Quiz per session.

Figure a. Represents the mean percentage of correct responses on the Daily Language Quiz per session.
**Noncontingent Reinforcement II:** The reversal condition consisted of presenting reinforcement on a noncontingent basis. The mean percentage of correct responses on the daily language quiz decreased to 4.2 responses.

**Contingent Reinforcement II:** The mean percentage of correct responses on the daily language quiz increased from fifty-six percent during Noncontingent Reinforcement II to ninety-one percent responses on the daily language also increased to 7.2 during Contingent Reinforcement II.

Plate 3 represents the number and mean percentage of correct responses made by Subject Three. Figure a represents the scores obtained on the daily quiz by Subject Three for all conditions. Figure b represents the mean percentage of correct responses for the five conditions made by Subject Three on the daily quiz.

**Subject Four**

**Baseline:** The mean percentage of correct responses on the daily quiz for Subject four during Baseline conditions was twenty-one percent. The mean number of correct responses on the quiz over four sessions was 2.2.

**Noncontingent Reinforcement I:** During this condition the mean percentage of correct responses on the quiz also increased from twenty one percent during Baseline to twenty-four percent. The mean number of correct responses on the quiz also increased during the seven sessions from 1.7 to 2 during Noncontingent Reinforcement I.
Figure 1. Represents the mean percentage of correct responses on the Daily Language Quiz per session for Subject A.

- Baseline
- Contingent
- Noncontingent
- Contingent
- Noncontingent
- Contingent
- Noncontingent
- Contingent
- Noncontingent

The bar graph shows the percentage of correct responses across different conditions. The x-axis represents the session number, while the y-axis shows the mean percentage of correct responses ranging from 0 to 100.

Additional notes:
- Baseline: No intervention
- Contingent: Immediate feedback
- Noncontingent: No feedback
Contingent Reinforcement I: During this condition the mean percentage of correct responses on the daily language quiz increased from twenty-four percent during Noncontingent Reinforcement I to eighty-five percent in Contingent Reinforcement I. During the five sessions of contingent reinforcement the mean percentage of correct responses on the daily quiz increased from two during the Noncontingent Reinforcement I condition to 6.8 during four sessions of Contingent Reinforcement I.

Noncontingent Reinforcement II: During the reversal condition the mean percentage of correct responses on the daily language quiz decreased from eighty-five percent to sixty percent. The mean number of correct responses on the quiz also decreased from 6.8 to four during the four sessions of noncontingent reinforcement.

Contingent Reinforcement II: When reinforcement was again contingent on correct responses the mean percentage of correct responses increased to one hundred percent on the daily quiz. The mean number of correct responses on the daily quiz also increased to eight during the three sessions of Contingent Reinforcement II.

Plate 4 represents the number and mean percentage of correct responses made by Subject Four on the quiz. Figure a represents the number of correct responses on the daily language quiz made by Subject Four during all conditions. Figure b represents the mean percentage of correct responses made by Subject Four on the daily language quiz during the five conditions.
Subject Five

**Baseline:** During Baseline conditions the mean percentage of correct responses on the daily quiz for Subject Five was thirteen percent. The mean number of correct responses on the daily quiz was one during Baseline.

**Noncontingent Reinforcement I:** The percentage of correct responses of correct responses on the daily quiz during noncontingent reinforcement was thirty-one percent. The mean number of correct responses increased from one during Baseline conditions to three during Noncontingent Reinforcement I.

**Contingent Reinforcement I:** When reinforcement was contingent upon correct responses the mean percentage of correct responses on the daily quiz increased to eighty-three percent. The mean number of correct responses on the quiz also increased to 6.6 during four sessions.

**Noncontingent Reinforcement II:** During the reversal condition the mean percentage of correct responses on the daily quiz decreased to sixty-six percent. The mean number of correct responses on the daily language quiz also decreased to 5.2 during the four sessions of noncontingent reinforcement.

**Contingent Reinforcement II:** Due to illness only three sessions were conducted during Contingent Reinforcement II with Subject Five. At the end of the sessions an increase in the percentage of correct responses on the daily language quiz to eighty-eight percent was noted. The mean number of correct responses on the daily quiz at the end of two sessions was seven.
Plate 5 represents the number and mean percentage of correct responses made by Subject Five on the quiz. The scores obtained by Subject Five on the daily language quiz are represented in Figure a. The mean percentage of correct responses on the daily language quiz are represented in Figure b.

Subject Six

Baseline: Subject Six obtained a mean of eighteen percent correct responses on the daily language quiz during Baseline conditions. The mean number of correct responses on the daily language quiz 1.5 during Baseline.

Noncontingent Reinforcement I: The mean percentage of correct responses on the daily language quiz made by Subject Six increased to thirty-eight percent during this condition. The mean number of correct responses on the quiz also increased to three during five sessions of Noncontingent Reinforcement I.

Contingent Reinforcement I: When reinforcement was contingent on correct responses the mean percentage of correct responses increased to seventy-nine percent. The mean number of correct responses on the quiz also increased to 6.3 percent.

Noncontingent Reinforcement II: During the reversal condition reinforcement was again programmed on a noncontingent basis. During this condition the mean percentage of correct responses on the daily quiz decreased to fifty-three percent. During the five sessions of noncontingent reinforcement the mean number of correct responses on the daily quiz also decreased to 4.2.
PLATE 5
NUMBER AND MEAN PERCENTAGE
OF CORRECT RESPONSES ON THE
DAILY LANGUAGE QUIZ
FOR SUBJECT 5

Figure a. Represents the Number of Correct Responses on the
Daily Language Quiz per session

Figure b. Represents the mean percentage of correct responses on the
daily language quiz per condition
Contingent Reinforcement II: When reinforcement was reinstated for correct responses the mean percentage of correct responses on the daily quiz increased to eighty-eight percent. The mean number of correct responses on the daily quiz also increased to seven during the four sessions of contingent reinforcement.

Plate 6 represents the number and mean percentage of correct responses made by Subject Six on the daily quiz. Figure a represents the scores obtained by Subject Six on the daily language quiz. Figure b represents the mean percentage of correct responses on the daily quiz made by Subject Six for the five conditions.

Subject Seven

Baseline: During Baseline conditions Subject Seven refused to respond to questions asked by the experimenter. During session three of Baseline the subject did answer one question. The mean percentage of correct responses on the daily language quiz was .3 percent. The mean number of correct responses on the daily quiz was .25 during Baseline conditions.

Noncontingent Reinforcement I: During this condition Subject Seven showed an increase in the number of correct responses made on the daily quiz. The mean percentage of correct responses on the quiz increased to twenty-two percent. The mean number of correct responses on the daily quiz was 1.7 during the four sessions of noncontingent reinforcement.

Contingent Reinforcement I: Subject Seven obtained sixty-six percent correct responses on the daily quiz during this condition. The
PLATE 6
NUMBER AND MEAN PERCENTAGE OF CORRECT RESPONSES ON THE DAILY LANGUAGE QUIZ FOR SUBJECT 6

Figure a. Represents the Number of Correct Responses on the Daily Language Quiz per session.

Figure b. Represents the mean percentage of correct responses on the daily language quiz per condition.
mean number of correct responses during the six sessions was 6.1.

**Noncontingent Reinforcement II:** During reversal condition the mean percentage of correct responses on the daily quiz decreased to thirty-two percent. The mean number of correct responses also decreased during the four sessions to 3.2 correct responses on the daily quiz.

**Contingent Reinforcement II:** When reinforcement was contingent on correct responses the percentage of correct responses on the daily quiz increased to eighty-five percent. The mean number of correct responses on the daily quiz also increased to 6.8 during this condition.

Plate 7 represents the number and mean percentage of correct responses made by Subject Seven on the daily quiz. Figure a represents the scores obtained by Subject Seven on the daily quiz during all conditions. Figure b represents the mean percentage of correct responses on the quiz for all conditions.

**Subject Eight**

**Baseline:** During Baseline conditions Subject Eight obtained a mean percentage of twenty-five correct responses on the daily language quiz. The mean number of correct response on the daily quiz was two during the four sessions.

**Noncontingent Reinforcement I:** The mean percentage of correct response on the quiz increased to forty-three percent in this condition. The mean number of correct response on the daily quiz was four.

**Contingent Reinforcement I:** When reinforcement was contingent on correct responses the percentage of correct responses on the daily
PLATE 7
NUMBER AND MEAN PERCENTAGE
OF CORRECT RESPONSES ON THE
DAILY LANGUAGE QUIZ
FOR SUBJECT 7

Figure a. Represents the Number of Correct Responses on the Daily Language Quiz per session

Figure b. Represents the mean percentage of correct responses on the daily language quiz per condition
language quiz increased to eighty-eight percent. The mean number of correct responses on the daily quiz also increased to seven correct responses during this condition.

Noncontingent Reinforcement II: In this condition the mean percentage of correct responses on the daily language quiz decreased to sixty-three percent. The mean number of correct responses on the daily quiz also decreased to five.

Contingent Reinforcement II: When reinforcement was again contingent upon correct responses the mean percentage of correct responses on the daily quiz increased to ninety-five percent. The mean number of correct responses also increased on the daily quiz to 7.6.

Plate 8 represents the number and mean percentage of correct responses made by Subject Eight on the quiz. Figure a represents the scores obtained on the daily language quiz. Figure b represents the mean percentage of correct responses on the daily language quiz per condition.
Figure a. Represents the number of correct responses on the daily language quiz per condition.

Figure b. Represents the mean percentage of correct responses on the daily language quiz per condition.
Group Data

The effects of intervention were analyzed by examination of pre and post test scores for seven of the eight subjects receiving auditory receptive language training. Pre and post test scores and gains during intervention for the seven subjects on which data were available are presented in Table 5.

Table 5

Pre and Post test Scores of Auditory Receptive Language Ability of Seven Subjects as measured by the Illinois Test of Psycholinguistic Ability Subtest: Auditory Receptive Ability

<table>
<thead>
<tr>
<th>Subject</th>
<th>Post test</th>
<th>Pre Test</th>
<th>Gains in months</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5-8</td>
<td>5-0</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>5-2</td>
<td>4-3</td>
<td>11</td>
</tr>
<tr>
<td>3</td>
<td>5-5</td>
<td>4-7</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>5-11</td>
<td>5-0</td>
<td>11</td>
</tr>
<tr>
<td>5</td>
<td>No Post test</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>5-8</td>
<td>4-10</td>
<td>10</td>
</tr>
<tr>
<td>7</td>
<td>4-10</td>
<td>4-1</td>
<td>9</td>
</tr>
<tr>
<td>8</td>
<td>5-5</td>
<td>4-5</td>
<td>12</td>
</tr>
</tbody>
</table>

Mean 5-5 4-4 10

Range 4-10 5-11 4-1 5-0 8-12
The mean percentage and mean number of correct responses on the daily language quiz for each subject are summarized in Table 4.

Table 4

Mean Percentages and Number of Correct Responses on the Daily Language Quiz for Eight Subjects

<table>
<thead>
<tr>
<th>Subject</th>
<th>Baseline</th>
<th>NCI</th>
<th>CI</th>
<th>NCII</th>
<th>CII</th>
</tr>
</thead>
<tbody>
<tr>
<td>MC</td>
<td>MC</td>
<td>PC</td>
<td>MC</td>
<td>PC</td>
<td>MC</td>
</tr>
<tr>
<td>1</td>
<td>2.7</td>
<td>3.4</td>
<td>4.2</td>
<td>5.2</td>
<td>7.2</td>
</tr>
<tr>
<td>2</td>
<td>1.5</td>
<td>20</td>
<td>3.0</td>
<td>38</td>
<td>6.5</td>
</tr>
<tr>
<td>3</td>
<td>3.0</td>
<td>33</td>
<td>4.0</td>
<td>52</td>
<td>7.0</td>
</tr>
<tr>
<td>4</td>
<td>1.7</td>
<td>21</td>
<td>2.0</td>
<td>24</td>
<td>6.8</td>
</tr>
<tr>
<td>5</td>
<td>1.0</td>
<td>13</td>
<td>3.0</td>
<td>31</td>
<td>6.6</td>
</tr>
<tr>
<td>6</td>
<td>1.5</td>
<td>18</td>
<td>3.0</td>
<td>38</td>
<td>6.3</td>
</tr>
<tr>
<td>7</td>
<td>.25</td>
<td>.3</td>
<td>1.7</td>
<td>22</td>
<td>5.8</td>
</tr>
<tr>
<td>8</td>
<td>2.0</td>
<td>25</td>
<td>4.0</td>
<td>43</td>
<td>7.0</td>
</tr>
</tbody>
</table>

MC = Mean Number of Correct Responses
PC = Percentage of Correct Responses
NCI = Noncontingent Reinforcement I
NCII = Noncontingent Reinforcement II
CI = Contingent Reinforcement I
CII = Contingent Reinforcement II
Statistical Analysis

Pre and post test scores for the seven of the eight subjects receiving auditory receptive language training were analyzed for statistical significance (Subject Five did not take the post test due to illness and subsequent hospitalization). Statistical significance was tested with the one-tailed Wilcoxon Matched Pairs Signed-Ranks Test (Siegel, 1956, p. 75). T* was found to equal 0 which achieved statistical significance at p. 02. This statistical significance is attributed to gains made in auditory receptive language abilities of the seven subjects. The null hypothesis was therefore rejected at the .02 level of confidence.

Discussion of Data

The primary purpose of this study was to determine the effects of contingent and noncontingent reinforcement on the auditory receptive language abilities of eight preschool children. This variable was measured by the number of correct responses on the daily language quiz of auditory receptive language behaviors under five experimental conditions: Baseline, Noncontingent Reinforcement I, Contingent Reinforcement I, Noncontingent Reinforcement II, and Contingent Reinforcement II.

The data recorded revealed that all eight subjects showed increases over Baseline conditions, which no reinforcement was programmed. When reinforcement was programmed increases were noted regardless of the contingent and noncontingent condition. These findings may be compared with results reported by others researchers that reinforcement is more
effective than no reinforcement in increasing behaviors (Journal of Applied Behavior Analysis, 1968-1974).

However, analyses of scores obtained by conditions revealed that although increases were noted over Baseline in the Noncontingent conditions no significant change was noted in any of the eight subjects number of correct responses on the daily language quiz when reinforcement was programmed on a noncontingent basis. Trends on the daily language quiz revealed that the mean percentage and number of correct responses on the daily language quiz during Noncontingent I ranged from twenty-two to fifty-two percent. In Noncontingent II the mean percentage of correct responses for the eight subjects ranged from thirty-two to sixty-six percent. These findings are similar to those reported by Cotter and Spradlin (1969A, 1969B) that noncontingent reinforcement has little if any effect in increasing academic behaviors to a more acceptable level.

When reinforcement was programmed contingent on correct responding significant change was noted in the number of correct responses of seven subjects in both contingent conditions. During Contingent Reinforcement I Subject Seven mean percentage of correct responses increased to only sixty-six percent (less than acceptable) from .25 during Baseline. However, during Contingent Reinforcement II Subject Seven's mean percentage of correct responses on the daily language quiz increased to eighty-five

*Risely (1969) notes "significant change" not in terms of statistical significance but as a change in the topography and/or rate of response to a more acceptable level. Acceptable level here is considered seventy percent or better correct responses as anything less than seventy percent is generally considered unacceptable in a classroom.
percent indicating a significant change in the mean number of correct responses on the daily language quiz.

Similar finding related to the positive effects of contingent reinforcement are reported in the literature (Reynolds and Hart, 1968; Master and Morris, 1971; Redd, 1972; Ingham and Andrews, 1973).

Another purpose of the study was to determine the effects of intervention on auditory receptive language ability of the subjects receiving reinforcement and auditory receptive language training. Statistically significant difference between pre and post test scores for the seven subjects on which data were available indicate that auditory receptive language ability of the subjects increased from pre test stage. The gain scores on the Illinois Test of Psycholinguistic Abilities: Auditory Receptive Language Ability Subtest ranged from eight to twelve months. The mean gain of the seven subjects was ten months.

The results obtained by this study revealed that when reinforcement was presented, scores on the daily language quiz increased from Baseline. Analysis according to conditions further revealed that contingent reinforcement was effective in achieving significant change in the percentages of correct responses on the daily language quiz while noncontingent reinforcement was not effective. The percentages of correct responses showed greater increase during Contingent Reinforcement I and Contingent Reinforcement II than in Noncontingent Reinforcement I and Noncontingent Reinforcement II. The results also indicated that experimental intervention was effective in increasing auditory receptive language abilities of the seven subjects on which data were available. Statistical analysis of
the data revealed that there was a statistically significant difference between pre and post test scores. This statistical significance is attributed to the gains made in auditory receptive language ability.
CHAPTER V
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Performance of eight six-year old preschoolers was analyzed in this study to determine effects of contingent and noncontingent reinforcement on auditory receptive language ability. Performances on pre and post test measures were also analyzed to determine the effects of experimental intervention (which employed auditory receptive language training and reinforcement) on auditory receptive language ability as measured by the Illinois Test of Psycholinguistic Abilities: Auditory Receptive Language Abilities Subtest.

The study employed five experimental conditions. In condition one, Baseline, subjects received auditory receptive language training, during individual language training sessions, however, no reinforcement was programmed in Baseline. Following each training session the daily language quiz was given to each subject. The daily language quiz consisted of eight questions pertaining to material covered during the preceding language training session. Scores on the daily language quiz were recorded and the number of correct responses graphed for each of the eight subjects.

Noncontingent reinforcement was programmed in the second experimental condition (Noncontingent Reinforcement I). Noncontingent reinforcement was programmed on a fixed interval schedule (FI=75). Subjects were seen during daily language training sessions and the language quiz was given subsequent to each training session. The number of correct responses on the daily language quiz was recorded and graphed.
Reinforcement was made contingent upon correct responses in the third experimental condition (Contingent Reinforcement I). During this condition token reinforcement was given for correct responses emitted by the subject during the language training sessions. The number of correct responses on the daily language quiz was recorded and graphed for each subject.

Conditions four and five consisted of the reversal conditions. Noncontingent reinforcement was reinstated in Condition four. In Noncontingent Reinforcement II, the fixed interval schedule was determined individually for each subject. In Contingent Reinforcement II the fixed interval schedule was established by dividing the number of tokens actually delivered in Contingent Reinforcement I into the actual time available for reinforcement to occur in Noncontingent Reinforcement II. Reinforcement was reinstated in condition five (Contingent Reinforcement II). Subjects received language training on an individual basis. Subsequent to each session the language quiz was given to each subject and the number of correct responses were recorded and graphed.

The language training program employed in this study was based on information obtained during pre test stage and followed procedures outlined by Kirk (1972) and Vollett (1970). Throughout language training sessions subjects received blue chip plastic tokens (except in Baseline). Tokens were traded in following each session for prizes or activities at the Reward Center.
The effects of contingent and noncontingent reinforcement were analyzed by a reversal design across the five experimental conditions. In addition, the mean percentages of correct responses were analyzed for each subject per condition, and statistical comparisons (Wilcoxin Matched Pairs Signed Rank Test) were made for pre and post test scores.

The evaluation of data revealed that the mean percentage of correct responses was higher for all subjects in experimental conditions in which reinforcement was programmed. The data also revealed that "significant change" (Risely, 1970) over Baseline was observed only in conditions where contingent reinforcement was programmed.

Statistically significant differences were found between pre and post test scores (p < .02). For all subjects post test scores were higher than pre test scores.

Conclusions

From analysis of measures obtained during the present study answers to the research questions are presented.

1. Can auditory receptive language ability be significantly (p = .02) increased through intervention which employed language training and reinforcement?

Yes statistical comparisons of pre and post test scores achieved significance on a one tailed Wilcoxin Signed Ranks Test for Matched Pairs (p < .02). In every case post test score was higher than pre test score.

2. Will there be a "significant change" (Risely, 1970) in the subjects' responses on the daily language quiz under five experimental conditions?
Yes, Analysis of correct responses on the daily language quiz revealed that each subject's mean percentage of correct responses on the daily language increased above seventy percent only when reinforcement was contingent upon correct responses. Data obtained also indicated that noncontingent reinforcement did increase correct responses on the daily language quiz over Baseline, however, a "significant change" was noted only when reinforcement was programmed on a contingent basis.

3. Will there be a functional relationship between the reinforcement variable and correct responses on the daily language quiz?

Yes. A functional relationship was found between reinforcement and the number of correct responses on the daily language quiz. When reinforcement was programmed, responses increased. When contingent reinforcement was programmed a higher mean percentage of correct responses on the quiz was noted. When contingent reinforcement was reinstated the mean percentage of correct responses increased and a significant change over Baseline was again noted.

Recommendations

The limited number of subjects in this study prevented the analysis of effects in interaction between the independent variables. It is recommended that research procedures be replicated with more subjects to allow statistical comparisons of an analysis of variance.

Follow-up measures of this study were limited to post tests administered after training. Retention over a longer period of time would provide valuable information for analyzing program effects.

The limited number of subjects employed in this study prohibited generalizations of results. For credible generalization to occur it is recommended that the procedure employed in this study be replicated with other subjects with similar characteristics.
As revealed in the graphic presentation of the dependent variable, one can note a marked difference in the mean percentage of correct responses on the daily language quiz over Baseline when no reinforcement was programmed. It is recommended that effect of reinforcement on other language behaviors be investigated.

**Implications for Further Research**

Some of the implications that can be drawn from the present study are concerned with the manner in which the study of language can be approached and researched. This would involve an approach to investigate relationships between other areas of language and the reinforcement variable, such as the variables used in this study, contingent and noncontingent reinforcement.

Further implications are noted for additional research employing a behavioral approach to the study language. While there is an abundance of research in the area of language, the bulk of that analysis has not been experimental (Baer, 1973). The research presented here proposed a process of defining variables of language into behaviors which can be observed, and then measuring the effects of manipulating those variables. If this approach is substantiated by further research, then implications for the classroom could be sought. Children might then be assessed on a needs basis and a program designed to increase language behaviors could be implemented.
APPENDIX A

LANGUAGE PROGRAM
INSTRUCTIONAL STRATEGY FORM

Session 1

Task: To match picture with sound when sound is presented on tape recorder.

Terminal Criteria (Task): Subject will match eight pictures with appropriate sound.

Modes: Visual
       Auditory

Media/Materials: Tape recorder and pictures of hammer, typewriter, sweeper, people clapping, glass breaking, drum, water running.

Evaluation Notes: Eight Question Quiz. Subject will point to picture when sound is presented on the tape recorder.
INSTRUCTIONAL STRATEGY FORM

Session 2

Task: To comprehend directional commands. Ex. Turn off the light. Put the book on the shelf. Give me the box, etc.

Terminal Criteria: The student will comprehend directional commands. The student will demonstrate this skill by following appropriate directions when given.

Modes: Visual
        Auditory

Media: None

Evaluation Notes: Eight Question Quiz. The student will be asked to follow eight directional commands.
INSTRUCTIONAL STRATEGY FORM

Session____3____

Task: To identify uses of objects.

Terminal Criteria (Task) 8/8 Correct Responses

Modes: Auditory
       Visual

Material/ Media: Brush, broom, plate, table, saw, toothbrush, lamp, glass.

Evaluation Notes. Eight Question Quiz. This is a____ it is used to ____?
INSTRUCTIONAL STRATEGY FORM

Session 4

Task: To distinguish objects that are big from objects that are little. To select four objects that are big. To select four objects that are little.

Terminal Criteria (Task): 4/4 Correct responses to "Give me the big______".
4/4 Correct Responses to "Give me the little______".

Modes: Visual
       Auditory

Media/Materials: Box, Ballon, pencil, can, shapes.

Evaluation Notes: Eight Question Quiz. The student will be required to select from pairs of objects. Give the the big_______ 4/4.
Give me the little ________ 4/4.
INSTRUCTIONAL STRATEGY FORM

Session 5

Task: To identify objects from clues given by instructor.
   Clues to include things that are big round and bounces, lon, sharp and yellow, etc.

Terminal Criteria (Task): Identification of eight objects.

Modes: Visual
       Auditory
       Tactile

Media/Materials: Pencil, ball, box, cotton ball, glass, knife, boat.

Evaluation Notes: Eight Question Quiz. Child will point to the object and name when given the clue.
   Objects to include, ball, pencil, boat, cotton ball, knife, glass, box.
INSTRUCTIONAL STRATEGY FORM

Session 6

Task: Drawing and Marking Exercise.
   To follow verbal directions with written response.

Terminal Criteria (Task): 8/8 Correct Responses

Modes: Visual
       Auditory

Media/Materials: Ditto

Evaluation Notes: Eight Question Quiz. Put a circle around the house on the right. Place an X on the house on the left. Color the circle in the top row red. Color the circle in the top row on the left blue, etc.
INSTRUCTIONAL STRATEGY FORM

Session 7

Task: To match picture with their sounds when presented on a record. Sounds to include cow, cat, clock, airplane, gun, piano, train, etc.

Terminal Criteria: Subject will match appropriate picture with sound when presented.

Modes: Auditory Visual

Media/Materials: Mr. Sounds Says. Sears and Roebuck #49N4645

Evaluation Notes: Eight Quiz. Subject will point to the picture when the sound is presented on the record.
INSTRUCTIONAL STRATEGY FORM

Session 8

Task: To place objects into appropriate categories: Things to eat. Things to play with.

Terminal Criteria (Task): 8/8 Correct Responses

Modes: Visual
       Auditory

Media/Materials: Objects - banana, candy, apple bread. tricycle, doll, wagon, top.

Evaluation Notes: Eight Question Quiz. Student will identify and place object into the appropriate category. Put all the things to eat on the table. Place all the things to play with on the desk.
INSTRUCTIONAL STRATEGY FORM

Session 9

Task: To point to the pairs of objects that are the same when presented on stimulus cards.

Terminal Criteria (Task): 8/8 Correct Responses

Modes: Visual
       Auditory

Media/Material: Developmental Learning Materials "Same or Different Cards"

Evaluation Notes: Eight Question Quiz. Point to the ones that are the same. "Point to the ones that are not the same."
INSTRUCTIONAL STRATEGY FORM

Session 10

Task: To distinguish prepositions "on" and "under".
Ex. Place the box on the shelf.
Place the box under the table.

Modes: Auditory
Visual

Media/Materials: Box, Book, Block, Cup.

Evaluation Notes: Subject will distinguish between the four prepositions by following directions.
Place the box on the table.
Place the book on the shelf.
Place the block on the chair.
Place the cup on the floor.
Place the box under the chair.
Place the pencil under the table.
Place the block under the chair.
Place the cup under the table.
INSTRUCTIONAL STRATEGY FORM

Session 11

Task: To construct a story of field trip using tape recorder.
     To draw pictures pertaining to story on the chart.

Terminal Criteria: To relate experiences of field trip.

Modes:  Auditory
         Visual

Media/Materials: Tape recorder, chart for each student, Crayons.

Evaluation Notes: Student answers questions pertaining to story written. Eight question quiz.
INSTRUCTIONAL STRATEGY FORM

Session 12

Task: To respond orally "yes" or "no" to questions presented orally by instructor.

Terminal Criteria: (Task) 8/8 Correct responses.

Modes: Auditory

Media/Materials: None

INSTRUCTIONAL STRATEGY FORM

Session 13

Task: To distinguish soft objects from hard objects.
To identify objects that is soft. To identify object that is hard.

Terminal Criteria: 8/8 Correct Responses to task. The student will be able to identify soft objects and hard objects.

Modes: Tactile
Auditory
Visual

Media/Materials: Touch Me, Palfrey School Supplies.
Cotton balls, rock, sponge, tissue, wood, etc.

Evaluation Notes: Eight question quiz. Give me the things that are soft. Give the things that are hard. This is a _____ it is_______ (Ex. soft).
INSTRUCTIONAL STRATEGY FORM

Session 14

Task: To duplicate the noise/sounds made by the instructor. Instructor will make a noise with one of eight objects (students back is turned). The student will select the object used and make same noise/sound. Items include: whistle, bell, harmonica, glass, hammer, paper to crumble, can (to tap).

Modes: Auditory
       Visual

Media/Materials: Whistle, bell, drum, harmonica, hammer, paper, glass, can.

Evaluation Notes: Eight Question Quiz. The student will duplicate each of eight sounds made by the instructor.
INSTRUCTIONAL STRATEGY FORM

Session 15

Task: To identify items that are smooth.
To identify items that are rough

Terminal Criteria: Student identifies items that are smooth when presented.

Modes: Visual
      Auditory
      Tactile

Media/Materials: Sandpaper (three grade) Corduroy material pieces, glass, metal strip, mirror.

Evaluation Notes: Eight Question Quiz. Student identifies items that are rough. Student will select the one that is smooth. Student will select the one that is rough.
INSTRUCTIONAL STRATEGY FORM

Session 16

Task: To place a red circle around the objects that are the same. To place a blue X on the objects that are not the same when presented on a ditto containing four pairs of objects that are the same and four pairs that are not the same.

Terminal Criteria (Task): 8/8 Correct Responses.

Modes: Auditory
Visual

Media/Materials: None

Evaluation Notes: Eight question quiz. The Subject will circle four objects that are the same in the pairs presented. The Subject will place an X on the ones that are not the same.

Same Pairs: banana-banana; lamp-lamp; dog-dog; telephone-telephone
Different Pairs: doll-house; shoe-clock; cup-cat; chair-apple
INSTRUCTIONAL STRATEGY FORM

Session 17

Task: To complete a story appropriately when presented the first part. (Each story to include child name and concerns a previous field trip). To relay story on tape.

Terminal Criteria: Child completes story on tape recorder.

Modes: Auditory
Visual

Media/Materials: Tape recorder.

Evaluation Notes: Eight Question Quiz: Quiz pertaining to the story developed by child.
INSTRUCTIONAL STRATEGY FORM

Session 18

Task: To distinguish prepositions "in front of" and "beside". Ex. "Place the block in front of the chair". Place the block beside the chair.

Terminal Criteria(Task): 8/8 Correct Responses.

Modes: Auditory
Visual

Media/Materials: Box, Block, Cup, Book.

Evaluation Notes: Eight question quiz. The student will be asked to "Place the block beside the chair, etc. Place the cup in front of the chair, etc."
INSTRUCTIONAL STRATEGY FORM

Session 19

Task: To follow directions given on record.

Terminal Criteria: Students follows directions when given.

Modes: Auditory


Evaluation Notes: Eight Question Quiz. Student listens to record and follows eight directions. Ex. Stand Up, Sit Down, Turn Around, etc.
INSTRUCTIONAL STRATEGY FORM

Session 20

Task: To answer questions relating to story "My Bike and Me".

Terminal Criteria: Child will correctly answer questions pertaining to story read.

Modes: Auditory
Visual

Media: Book: My Bike and Me.

Evaluation: Eight Question Quiz. Ex. What was the boy's name? Where did he ride? etc..
Session 21

Task: To identify and select from a group of objects, things that fly in the sky and things that we ride on the ground.

Terminal Criteria (Task): The student will select items that fly in the sky and things that we ride on the ground.

Modes: Auditory
        Visual

Media/Materials: Pictures of airplane, helicopter, bird, balloon, bus, car, horse, truck.

Evaluation Notes: The child will select the items that fly; the child will select the items that ride on the ground.
INSTRUCTIONAL STRATEGY FORM

Session ___22____

Task: To match eight pictures of musical instruments with appropriate sounds presented on the tape recorder. Sounds include piano, drum, bell, horn, harmonica, etc.

Terminal Criteria (Task): Subject matches appropriate picture and sound. 8/8 Correct Responses.

Modes: Visual
       Auditory

Media/Materials: Tape recorder, pictures of musical instruments.

Evaluation Notes: Eight Question Quiz. Subject will point to the appropriate picture when the sound is presented on the tape recorder.
INSTRUCTIONAL STRATEGY FORM

Session 23

Task: To identify body parts (chin, heel, palm, eyebrow)
To locate body parts (chin, heel, palm, eyebrow).

Terminal Criteria: Student identifies body parts.
Student locates body parts.

Modes: Visual
Auditory

Media/Material: Filmstrip "Body Parts" Educational Media Services

Evaluation Notes: Eight Question Quiz. The student will locate
chin, heel, palm, eyebrow. The student will identify
chin, heel, eyebrow, palm.
INSTRUCTIONAL STRATEGY FORM

Session 24

Task: To answer orally "Yes" or "No" to questions pertaining to story read.

Terminal Criteria: Student correctly answer question pertaining to what has been read.

Modes: Visual
       Auditory

Media/Materials: Stories Children Enjoy; Palfrey Educational Materials. "My, Kitten and Me.

Evaluation Notes: Eight question quiz pertaining to story read.
INSTRUCTIONAL STRATEGY FORM

Session __ 25 __

Task: To identify right position. Ex. Show me your right hand.

Terminal Criteria: The student correctly identifies right position.

Modes: Visual
       Auditory

Media/Materials: None.

Evaluation Notes: Eight Quiz. Show me your right hand, show me your right foot, etc.
INSTRUCTIONAL STRATEGY FORM

Session 26

Task: To identify and say sound when heard on a tape recorder.

Terminal Criteria (Task): Subject will identify and say sound when presented.

Modes: Auditory

Media/Materials: Tape recorder and Developmental Learning Series Tape "Familiar Environmental Sounds".

Evaluation Notes: Eight Question Quiz. Child will give the name of the sound when presented. Sounds include baby crying, whistle, telephone ringing, saw, children singing, boy talking, water running, hammer.
INSTRUCTIONAL STRATEGY FORM

Session 27

Task: To follow verbal instruction given by the instructor with appropriate responses. Ex. Color the car.

Terminal Criteria (Task): 8/8 Correct Responses.

Modes: Tactile
       Visual
       Auditory

Media/Materials: Ditto

Evaluation Notes: Eight Question Quiz. Student will be asked to follow eight directions. Color the car. Draw a circle around the boy, Draw a line from car to the boy. Draw a line from the tree to the boy. Place an X on the apple. Color the apple red. Draw a line from the dog to the house. Place an X on the house.
<table>
<thead>
<tr>
<th>SUBJECT</th>
<th>ITPA DATA SHEET</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUDITORY RECEPTION</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DEMONSTRATION 1</th>
<th>11. Y N</th>
<th>31. Y N</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Y N</td>
<td>12. Y N</td>
<td>32. Y N</td>
</tr>
<tr>
<td>b. Y N</td>
<td>13. Y N</td>
<td>33. Y N</td>
</tr>
<tr>
<td>c. Y N</td>
<td>14. Y N</td>
<td>34. Y N</td>
</tr>
<tr>
<td>1. Y N</td>
<td>15. Y N</td>
<td>35. Y N</td>
</tr>
<tr>
<td>2. Y N</td>
<td>16. Y N</td>
<td>36. Y N</td>
</tr>
<tr>
<td>3. Y N</td>
<td>17. Y N</td>
<td>37. Y N</td>
</tr>
<tr>
<td>4. Y N</td>
<td>18. Y N</td>
<td>38. Y N</td>
</tr>
<tr>
<td>6. Y N</td>
<td>20. Y N</td>
<td>40. Y N</td>
</tr>
<tr>
<td>7. Y N</td>
<td>21. Y N</td>
<td>41. Y N</td>
</tr>
<tr>
<td>8. Y N</td>
<td>22. Y N</td>
<td>42. Y N</td>
</tr>
<tr>
<td>9. Y N</td>
<td>23. Y N</td>
<td>43. Y N</td>
</tr>
<tr>
<td>10. Y N</td>
<td>24. Y N</td>
<td>44. Y N</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DEMONSTRATION 1</th>
<th>11. Y N</th>
<th>31. Y N</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Y N</td>
<td>12. Y N</td>
<td>32. Y N</td>
</tr>
<tr>
<td>b. Y N</td>
<td>13. Y N</td>
<td>33. Y N</td>
</tr>
<tr>
<td>27. Y N</td>
<td>47. Y N</td>
<td></td>
</tr>
<tr>
<td>28. Y N</td>
<td>48. Y N</td>
<td></td>
</tr>
<tr>
<td>29. Y N</td>
<td>49. Y N</td>
<td></td>
</tr>
<tr>
<td>30. Y N</td>
<td>50. Y N</td>
<td></td>
</tr>
</tbody>
</table>
DATA SHEET

NAME_________________________  C.A._____

<table>
<thead>
<tr>
<th>DATE</th>
<th>SESSION</th>
<th>CONDITION</th>
<th>NO. CORRECT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX D

INTEROBSERVER OBSERVATION FORM
# Interoobserver Observation Form

**Subject**

**Session**

**Condition**

<table>
<thead>
<tr>
<th>QUESTION</th>
<th>OBSERVER OBSERVATION (Correct or Incorrect)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
</tr>
</tbody>
</table>

**Total Correct**

**Total Incorrect**
APPENDIX E

AUDITORY COMPREHENSION CHECKLIST FORM
<table>
<thead>
<tr>
<th>NAME</th>
<th>AGE</th>
<th>BIRTHDAY</th>
<th>DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Year, 6 Months</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Recognizes Doll Parts (Same as 2 years, Item No. 1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Follows Directions (Same as 2 years, Item No. 2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Looks Attentively</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Understands Questions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Years</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Recognizes Doll Parts (Same as 18 months, Item No. 1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Follows Directions (Same as 18 months, Item No. 2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Identifies Pictures</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Discriminates Pictures</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Years, 6 Months</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Recognizes understands the concept of the Number &quot;One&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Compares Size (1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Understands Use (1) (Same as 3 years, Item No. 3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Distinguishable Parts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Years</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Recognizes Action</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Distinguishes Prepositions (Same as 4 years, Item No. 2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Understands Use (1) (Same as 2 years, 6 months, Items No. 3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Distinguishes Parts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Years, 6 Months</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Recognizes Time</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Compares Size (11)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Matches Sets</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Groups Objects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Years</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Recognizes Colors (Same as 4 years, 6 months, Item No. 1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Distinguishes Prepositions (Same as 3 years, Item No. 2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Distinguishes Texture</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Understands Use (11) (Same as 4 years, 6 months, Item No. 4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Years, 6 Months</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Recognizes Colors (Same as 4 years, Item No. 1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Touches Thumbs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Understands the concept of the Number &quot;Three&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Understands Use (11) (Same as 4 years, Item No. 4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Years</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Comprehends Right</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Taps Rhythm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Distinguishes Weight Differences</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Knows Body Parts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Years</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Comprehends Directional Commands (1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Counts Blocks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Distinguishes Animal Parts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Adds Numbers up to Five</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 Years</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Comprehends Directional Commands</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Counting Taps</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Coin Values</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Adds and Subtracts Numbers up to Ten</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
BIBLIOGRAPHY


