A SYSTEMATIC LANGUAGE TRAINING PROGRAM FOR THE ACQUISITION OF BASIC GRAMMATICAL RELATIONS

by 2214

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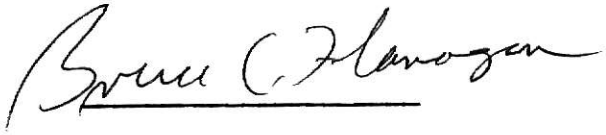
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Chapter I

Introduction to the Problem

There is general agreement that the two primary distinguishing features of mental retardation are subnormal intellectual functioning and inappropriate (maladaptive) social behavior. Language functions seem to be closely associated with each feature. That is, intelligence and language seem to be similarly influenced by the same antecedent factors and are evaluated by largely the same test items. Similarly, adaptive behavior is governed largely by the same factors that have established communication behavior (Schiefelbusch, Copeland and Smith, 1967). Deficient language functions and delayed linguistic structures are often seen as basic features of mental retardation. Schiefelbusch, Copeland and Smith (1970) report that a number of studies have shown that the quality of language produced by the retarded is consistently inferior to that of the non-retarded.

Schiefelbusch et al. (1967) expressed the need for the development of systematic programs for speech and language training with the mentally retarded. Studies have been initiated to determine in what ways the verbal behavior of retarded persons may be modified (Schiefelbusch, 1963; Baer, Lovaas and Wolf, 1965; Risley, 1966; Yoder, 1965; McLean, 1965). These studies demonstrated that specific classes of verbal behavior can be modified under controlled conditions.

Persons developing language training programs should be concerned with the complexity of language. Interpersonal language events include verbal and gestural behavior. The system or code that speakers have learned to use includes phonemes, morphemes, semantic intent and syntax. A person that is displaying "language" has linguistic abilities that include a basic competence for language and two levels of performance, encoding and decoding. Spradlin, (in Schiefelbusch et al., 1967) in discussing language

evaluation procedures, stresses the distinction between language reception and language expression and some of the linguistic features that should be evaluated for both linguistic abilities. He suggested that persons interested in developing language training programs look at the language used in the community to establish the terminal behavior.

Linguists deal with language primarily as a system of rules and not as verbal behavior. Until recently people interested in language as verbal behavior were not concerned with the syntax of language, and its importance in training programs.

Spradlin (1967) suggested establishing the terminal behavior of a language program by looking at the language requirements of the community and to then develop intermediate language goals. He stated that in order to establish these intermediate goals or steps, it would be necessary to study the development of normal children's receptive and expressive language. Spradlin indicated that the language developmental sequence of the majority of children may provide initial guidelines for the development of a language training program.

Language Acquisition

The speed of language acquisition of normal children is a fact which faces many investigators interested in retardation and language. In the brief course of three to four years, during which very early levels of cognitive development are reached, most children succeed in mastering a majority of exceedingly complex structures of their native language. Different children are exposed to different samples of the language, and generally with little conscious training or teaching on the part of the parents, arrive at essentially the same grammar in this brief span. The normal child, at the end of the pre-school period, is able to produce and comprehend an almost endless variety of novel sentences of the language he has mastered (Slobin, 1970).

Blasdell and Jensen (1970) assume that first language learning may be conceptualized as a discovery process - the child's task is to discover which aspects of a total utterance are informative and which are not. Only when such features are known, is the child able to produce communicative utterances. The ability to communicate successfully, therefore, depends on the discovery of those elements of the verbal environment which are functionally significant for the users of the language. They state that prior to explaining how the child acquires the adult code, however, it is necessary to examine his decoding behavior with the respect to how he understands the message of the adult code.

Braine emphasises the role of signal cues in decoding stating, "...the question 'what is learned' is answered by a statement of the stimulus attributes and relationships which the child learns to distinguish. The answers should in some way 'explain' why the grammar at a particular stage of development has the structure it has ..." (1963, p. 304). That is, the child must learn to attend to those aspects of adult speech that cue the functionally significant elements of messages and distinguish them from the nonsignificant features of the verbal environment.

It is possible to infer some hypothetical characteristics of the initial phase of decoding which are amendable to experimentation from several studies of encoding behavior in first-language learners. The two major sources of information are Braine (1963a, 1963b, 1966) and Brown and Fraser (1963). One significant finding is that the utterances of children between approximately 18 and 30 months are quite short, about two or three words in length. Brown and Fraser (1964) suggest that this word length reflects an upper limit on encoding span. They felt that it seems reasonable to assume that decoding span would have a similar storage capacity. Another relevant finding is that the spontaneous utterances of children are composed primarily of the content words: nouns, verbs, and adjectives (Braine, 1963; Brown and Fraser, 1963). This suggests

that the child decodes mainly the content words from adult speech. Brown and Fraser (1963) suggest that the final or most recent item in an utterance may also be an important word position cue in decoding.

Miller and Erwin (1964) reported on the text collection of five children between the ages of 1.9 and 2 years. The investigators noted the techniques that elicited certain types of utterances, and then they increasingly structured the interviews. The children in their project begin forming primitive sentences of two or more words before their second birthday. It appeared that the children selected the stressed utterance segements, which usually carry the most meaning. Miller and Erwin found that the language systems of the children were different in detail, but that there were certain characteristics which applied to all of the children in the project. A few high frequency words tended to be restricted to a given position in the sentence and tended to define the meaning of the sentence as a whole. They defined these words as operators - words having high frequency and few members in a class. Operator words resembled the function words in adult speech. The nonoperator words were precusors of lexical or content words. However, Miller and Erwin did not state that a formal grammatical system existed for the children in their project.

Several investigators (Braine, 1966; McNeill, 1966) described the nature of the rules with which they described children's syntactic construction. They analyzed utterances in terms of the form and distribution of their elements and the elements were classified on the basis of their co-occurrence. They stated that there appeared to be essentially two classes of words, which Braine (1966) termed as pivot class and x-word class. The pivots were a small class of words which occurred frequently, in relatively fixed sentence positions in juxtaposition with the larger class of x-words generally provided lexical content, and the pivots functioned as syntactic operators. Braine (1966)

and McNeill (1966) identified two early sentence types in children's language according to Brown's description of the surface constituents of utterances. Constructions which contained pivot forms (P) could be classed as: P + X-word or X-word + P. Constructions not containing pivot forms could be classed as: X-word + X-word.

Bloom (1970) pointed out that in adult speech some words (such as pivots and function words) occur more frequently and in a greater number of linguistic environments than do other words. She stated that the distributional analyses used to obtain 'pivot grammars' ignored the linguistic function of utterances. The descriptions of the emergence of syntax that relied exclusively on distributional evidence did not account for the verbal behavior of the child.

Bloom (1970) investigated the development of linguistic behavior in relation to the underlying conceptual meaning of language for the child, with specific focus on the relation between children's speech and aspects of their experiences related to the speech that they use. Bloom wrote grammars for three children 19-28 months taking into account the semantic intent of the child rather than relying on distributional evidence to develop grammars. Eight hours of speech was collected from each of the three subjects every six weeks in three different environmental settings, (1) play with a selected group of toys, (2) eating, dressing and toileting, (3) play with a peer. Judgements of semantic intent of the utterances were based on contextual cues, behavior in speech events, and conferences with the mother. Grammars were then written for each corpus collected from each subject in order to "propose rules of grammar to account for the child's knowledge of inherent grammatical relationship.

Bloom (1970) stated that children seem to identify particular syntactic structures with the behavior and context with which they are perceived and then progress to reproducing structures in similar, recurring contexts. To use a structure in a new situation, the child needs to be able to perceive critical aspects of the context of the

situation. Thus, the sequence in which the child learns syntactic structures may be influenced as much by his ability to differentiate aspects of situational context and to recognize recurrent contexts as by such factors as frequency of exposure to structures or their relative complexity. Language training programs that present children with linguistic structure without attention to content ignore the very nature of language (Bloom, 1970).

Fabun (1968) pointed out that

> Common words do not have meaning, only people do.
> And sometimes they don't, either (p. 31).

It appears that learning a linguistic code, as well as "common words," depends upon the child's learning to discriminate, understand, and express certain relationships. Children who don't "see" our meanings in an object or event may have to have objects and events structured in order that successive experiences enable them to discriminate, understand, and express the names or relationships that most of us "see."

The present study was designed as a language program for training the basic grammatical relations to severely to moderately retarded children. Various antecedent stimulus conditions were systematically manipulated in order that the child could discriminate and then produce the two-three word structures that expressed the basic grammatical relations: (1) noun-verb, (2) verb-noun, (3) noun-noun, and (4) noun-verb-noun (object).

Chapter II

Review of the Literature and Statement of the Problem

The present program is a systematic language acquisition program which was developed for severely to moderately retarded children. The objectives of the program include: (1) the child's acquisition of three-word verbal responses which express basic grammatical relations, and (2) the child's acquisition and expansion of spontaneous verbal responses. The following discussion will review two areas of literature relevant to the development of the program: (1) behavior modification techniques and (2) language development data. The second portion of this chapter will present a statement of the problem and research questions designed to improve and expand the program.

Modification of Behavior

Skinner (1957) suggests that the "understanding" of verbal behavior requires more than the use of a consistent vocabulary with which we use to describe specific events, objects, and relations. Skinner stated that the extent to which we understand verbal behavior is not based on a set of theoretical principles, but rather "... is to be assessed from the extent to which we can predict the occurrence of specific instances and, eventually from the extent to which we can produce or control such behavior by altering the conditions under which it occurs."

To understand verbal behavior or any operant behavior under stimulus control, three events must be taken into account: an antecedent discriminative stimulus; the verbal response in question; and the consequent reinforcement (Sloan and MacAulay, 1968).

Functional Relations in Verbal Behavior

One of the most useful ways to categorize or classify speech and language is in terms of its functional properties. Skinner (1957) defined the six types of functional relations in verbal behavior. Skinner's definition of each relation is as follows:

> Mand. In the mand a given form of response which characteristically produces a given reinforcement varies in strength with the state of deprivation or aversive stimulation appropriate to that reinforcement. No prior stimulus determines the specific form of the response.
>
> Echoic, Textual, and Intraverbal. In echoic, textual, and intraverbal behavior, the response is determined by a prior verbal stimulus — auditory in the first case, written or printed in the second, and both in the third. Control is concentrated in the stimulus by generalizing the reinforcement. In echoic and textual behavior there is a point-to-point correspondence between properties of stimulus and response, which makes possible a repertoire of minimal units. The controlling relations in intraverbal units are usually weak.
>
> Tact. In the tact the stimulus which controls the form of response is usually nonverbal. Stimulus control is emphasized by generalizing the reinforcement. The control is shared by all properties of the stimulus, and a novel stimulus possessing one or more of the same properties may be effective. Through a special procedure of differential reinforcement, control may be restricted to one property or group of properties in abstraction.
>
> Audience. The audience is a prior stimulus, usually non-verbal, which controls groups of responses. When two or more responses are under the control of the same stimulus, the audience acts to select one of them. The repertoire under the control of an audience may be a language, a jargon, a cant, or some less sharply-defined functional subdivision of the behavior of the speaker. Skinner (1957) points out that the listener, as an essential part of the situation in which verbal behavior is observed, is again a discriminative stimulus. He is part of an occasion upon which verbal behavior is reinforced and he becomes part of the occasion controlling the strength of behavior. Insofar as the listener stimulates the speaker prior to the emission of verbal behavior, he may be spoken of as part of the audience. In contrast with the discriminative stimuli which controls tacts and echoic, textual, and intraverbal operants, an audience is usually a condition for the reinforcement of a large group of responses and therefore comes to affect the strength of such a group (p. 185).

Skinner (1957) suggests that behaviors may gain strength from similar nonverbal contingencies. Familiar gestures, having roughly the same effects as their verbal counterparts, are subject to similar interpretations. The gestures such as 'Go away,'

'Come here,' 'Sit down' are mands which specify behavior resembling the mechanical effect of the nonverbal responses from which they are derived. Most of the mands we can account for without assuming a prior verbal environment are gestures.

Reinforcement

Numerous studies in verbal behavior have suggested that behavior may vary as a function of its consequences (Sherman, 1965; Risley, 1966; Lovaas, 1966; Risley and Wolf, 1967). Most learning situations require increasing the probability that a specified behavior or class of behavior or class of behaviors will be established, maintained and, or increased. Stimuli following a response are defined in terms of their effect upon the future frequency of that response. If the response rate increases as a function of the presentation of some stimulus after a response, the response-contingent presentation of that stimulus is called positive reinforcement, and the stimulus is defined as a positive reinforcer. If the response rate increases as a function of the removal of some stimulus after a response, the response contingent termination of that stimulus is called negative reinforcement, and that stimulus is defined as a negative reinforcer.

Behavior can also be decreased by consequences. After an undesired behavior is emitted, a positive reinforcer may be removed or a negative reinforcer presented. This is called punishment when the undesired behavior decreases as a result of previous consequences. A "time out from positive reinforcement" is a punishment procedure that involves withdrawal or termination of a positive reinforcer. The time out is often accompanied by a specific stimulus such as the examiner turning his head away from the subject.

When each instance of a particular behavior is followed by reinforcement, the schedule of reinforcement is called continuous reinforcement. If only some occurrences of a response are followed by reinforcement, the schedule of reinforcement is called intermittent reinforcement (Sloan and MacAulay, 1968).

Magitude of the Reinforcer

Ayllon and Azrin (1968) studied the effect of the magnitude of the reinforcer upon mental patients. The experimental design was to provide varying numbers of tokens for participating in the physical exercise. The amount of tokens to be given was announced simultaneously with the general announcement that the activity was about to start. The number of tokens sequence was 0, 2, 10, 50, 2, and 0. They found that participation in the activity period increased directly as a function of the number of tokens given for participation.

Response Shaping

Azrin (1968) states that to develop a desired response chain, one first reinforces an existing response that has a component relation to the target behaviors; then reinforces variations of the components that are in the direction of the target behavior. Risley (1965) demonstrated the effectiveness of shaping and fading procedures in establishing verbal behavior in echolalic children.

Response Priming

Ayllon and Azrin (1968) discuss the priming of responses for developing behaviors of some length or complexity in working with patients who had very little verbal behavior. They found that a convenient method of teaching new behaviors in the motivating environment was to allow the learner to observe another patient or the trainer performing the desired behavior in the appropriate manner.

Numerous studies indicate that modification of specific language behavior has been successful by using operant conditioning techniques (Risley, 1966; Bricker and Bricker, 1966; Baer, Peterson, and Sherman, 1967; Guess, Sailor, Rutherford, and Baer, 1968). These studies have demonstrated training procedures to develop an imitative verbal repertoire. In general these studies demonstrated that imitation is possibly one of the easiest means for establishing stimulus control and building verbal

responses into the repertoire of children with severe language handicaps. McLean (1965) demonstrated a systematized program of pairing and shifting of stimuli designed to modify articulation disorders. Once verbal imitation was established and controlled by an echoic stimulus, it was paired with a stimulus of less predictable control. Various controlling stimuli were gradually paired with a less controlled stimulus until responses could be brought under the control of an intraverbal stimulus. McLean's procedure of pairing and shifting of stimuli would seem to be applicable to language training procedures also.

The studies previously discussed were concerned with developing training procedures and programs for the production of sounds, words, and phrases, and specific aspects of grammar. They demonstrated the effectiveness of specific procedural techniques for establishing the desired terminal behavior. The former studies offer numerous insights for developing language training procedures and techniques.

McNeill (in Slobin, p. 42 1970) states that while the study of language acquisition, or learning, has a short scientific history, the laboratory study of verbal behavior has been productive over a considerably longer period of time, and that "...some of the experimental findings derived from this work, while far from providing a comprehensive account of language acquisition, may have a bearing upon, and provide some clues to, the understanding of how a child learns to talk (1970, p. 42).

Language Developmental Data

Children's first sentences are incomplete and fragmented and the elements that are omitted can generally be predicted as low information words. These early sentences were characterized as 'telegraphic' by Brown and Fraser (1963). In their description of the child's imitation of sentences he has just heard, they reported that the child omits

some words or morphemes from the longer model sentences. The result is an abbreviated utterance that can be compared to the kinds of sentences produced by an adult who is under pressure to be brief - for example, when sending a telegram or taking lecture notes.

This process of "imitation" and "reduction" was discussed by Brown and Bellugi (1964) in describing the children's acquisition of syntax. They observed that in the interaction between mother and child, the child listens to the sentences spoken by his mother; his attempts to imitate what she has said consisted of "highly systematic reduction." Spontaneously sentences produced by the child, without an immediately previous adult model, have the same telegraphic properties. Brown and Bellugi (1964) and Brown and Fraser noted that the 'telegraphic' sentences consisted generally of nouns, verbs, and less often, adjectives. Erwin (1966) also found that sentences produced in spontaneous speech and sentences produced in imitation were "equally predictable" from the same rules for four of the five children studied. In these studies, the nature of the language that the child was learning was considered to be the dominant influence on the form of his sentences.

Bloom (1970) discussed the findings that Murata (1961) reported concerning the early developmental processes of the linguistic forms and functions of requests of Japanese children. Murata found that Japanese children produced verbs and then object-verb strings as request forms—extending the original single-word utterance to a two-word utterance from right to left. Bloom noted that the generalization about the direction of sentence accretion is true only to a limit. The addition of elements to utterances in forming longer or more complex utterances was not cumulative and not strictly linear. Menyuk found that "...the structure of a particular sentence determines whether or not it was repeated, not its length (1969, p. 113)." Until recently the data in

language development did not provide functional strategies that could be used for establishing initial goals in language training programs. The data provided descriptions of the emergence of syntax only on the basis of distributional evidence. In 1968 Bloom completed a project which investigated the "form" and "function" of emerging grammars in normal children, accounting for the semantic intent of the child.

Form and Function in Emerging Grammars

Bloom (1970) reported recent evidence of the underlying conceptual relations in children's early speech and of the form and function of their utterances. Bloom's study was:

> "...based upon the premise that linguistic description of the forms of children's speech provide only partial information about the child's intuitive knowledge of a linguistic code. The approach to analyzing children's language attempted to reach the "meaning" of children's sentences by focusing on the correlation of linguistic and contextual features—on what the child said in relation to what he was talking about and the situation and behavior that co-occurred with what he said—rather than on strictly formal considerations of language content (page 2)."

The data for the study were obtained from observations at six-week intervals. The three subjects in the study were 19-28 months old when first seen. The three children were studied individually and eventually compared at similar levels of linguistic development. All the child's utterances and everything said to him were transcribed on tape. Rules of grammar were proposed for the language for the children when mean length of utterance was less than 1.5 morphemes. Bloom (1970) points out that mean length of utterance is a superficial index of linguistic maturity.

Each sample of spoken language was obtained during the child's (1) play with a selected group of toys, (2) eating, dressing, and toileting, and (3) play with a peer. Judgements were made of the semantic intent of utterances, based upon clues from the context and behavior in the speech events in which utterances occurred.

Using this kind of information, an attempt was made to propose rules of grammar to account for the inherent semantic relations that underlie the juxtaposition of words in early sentences. Bloom (1970) states that the notion of sentence structure implies a pattern of organization - an arrangement of otherwise independent parts that is based on the relationship of the parts to each other - which is something more than simply a sequence of words.

The semantic relations that were coded in the children's speech were essentially of two kinds: functional relations with invariable grammatical meaning, and grammatical relations with variable grammatical meaning between constituents in subject-predicate relationship.

Bloom (1970) found that many of one child's early two-word utterances were equivocal as subject-object strings. The types of utterances signaled either genitive strings ("Gia doll" - as the child reached for her doll) or locative relation ("fly block" - child seeing a fly settle on a block). Bloom stated that although the interpretation of these Noun-Noun sentences was tentative, the first-position noun was a 'movable' object and, in most cases could be characterized as an 'animate' noun. She also noticed that in the first Noun-Verb occurrences, the noun was an object noun—and yet object nouns always occurred in sentence-final position in constructions with other nouns. Bloom offered one possible explanation for the specific (object) Noun-Verb construction as the child had learned something about subject-object order of English sentence constituents but had not yet learned the relational or syntactic features of verb forms with respect to nouns. She also gave an alternative explanation of the Noun-Noun and (object) Noun-Verb constructions as a structural description of the surface constituents in terms of Topic + Comment as the "basic grammatical relation of the surface structure" of the sentences. Chomsky (1965) suggested the Topic of the sentence as the element that was stated first—perhaps in order of importance—and the rest of the sentence as Comment.

Bloom found that noun + noun utterances were one of the most productive constructions in the speech of two of the children. The utterances with two noun forms specified the following grammatical relations (given in order of frequency): subject-object ("Mommy pigtail"), the genitive relation ("Kathryn sock"), the attributive relation ("bread book"), subject-locative ("sweater chair"), and, marginally, conjunction ("umbrella boot"). Verb-object strings appeared earlier and were more productive than subject-verb strings. All three children produced verb forms in predicate relation to noun forms in subject-verb and verb-object strings in the early two-word utterances, when subject-verb-object strings occurred only rarely. The children in the study learned the syntax of language - the arrangements of words in sentences before they learn inflections of noun, verb, and adjective forms.

In summary, Bloom (1970) stresses that the manifestation of the referent in the contexts of speech events was most significant. Utterances most often referred to objects or events which the child was able to see, and functioned as comments or directions. All of Bloom's children used a relational term, "more" or "another," to signal another instance of the referent or recurrence of the referent after previous occurrence. The productivity and frequency of verb-object and subject-object strings reflected the tendency for the children to talk about objects being acted upon. The children's first negative sentences indicated the non-existence of the referent. Children appear to perceive and to discriminate and to then communicate such aspects as (1) existence of a referent, (2) recurrence of a referent, or (3) non-existence and (4) relation of events as between agent, action, and objects, before such features of objects as relative size, color, or other identifying attributes. Bloom, specifically focused on relation between the children's speech and aspects of their experiences and the environment. Thus, providing persons interested in language training with a different

approach to the study of syntactic development. Bloom (1970) provided guidelines that are applicable in establishing initial goals for training functional language to mentally retarded or language deficient children. She also suggested some strategies that normal children seem to use in learning language.

Research in the area of behavior modification, specifically verbal behavior, has provided persons interested in training language with effective training procedures and techniques that might be applicable for developing language training programs.

Statement of the Problem

The present study is designed as a systematic language acquisition program which was developed for severely to moderately retarded children. The intermediate and terminal goals of the program were based on Bloom's developmental data. Behavior modification procedures and techniques were employed to present various types of non-verbal and verbal stimuli in a way that the child could most effectively understand and produce two-three word utterances that express the basic grammatical relations. Research questions include (1) effectiveness of the program by evaluating the results in terms of the established goals and sequencial procedures that were employed, and (2) generalization of novel syntactic structures which represent trained constituents.

Chapter III

Method

The present chapter describes a systematic program for training basic grammatical relations to the mentally retarded child. Operant procedures and techniques are employed to establish reception and production of grammatical relations to various types of stimuli. The goals are to train children to produce two-to-three word structures that express the basic grammatical relations of subject-verb-object to action pictures and questions about these pictures.

The discussion of the method of the present program includes a brief discussion of (1) subjects, (2) experimental materials, (3) experimental equipment and environments and (4) procedures. Detailed information of the subjects, materials, and the programmed demonstrations are included in the appendices.

Subjects

The children selected for language training in the present study were one male and two female residents of Parsons State Hospital and Training Center. They were 9 to 12 years of age. The subjects lacked language for communication within the institutional setting. They were selected for language training on the basis of recommendations by Speech and Hearing Department evaluations and by specific request of cottage personnel who felt that their language abilities were below the average of the majority of children placed on their respective cottages. Both female subjects' spontaneous verbal behavior consisted of one-word noun utterances, which were often paired with a stereotyped one-syllable sound combination and/or gestures. The male subject emitted no spontaneous verbal behavior. When any verbal stimulus was given, he would repeat the final one-two words of the stimulus or emit the word, "That." One female subject

exhibited a 30-40 dB sensorineural, bilateral hearing loss and evidenced numerous articulation omissions and distortions. The other female subject exhibited normal hearing. She could make an intelligible approximation of one-syllable words to an echoic stimulus in isolation. The male subject made a limited number of articulation errors to both picture and echoic stimuli

Chronological data and specific speech and language evaluations for each subject are given in Appendix A.

Materials

Materials selected for the program procedure included specific pictures and objects that represented agent-action-object relations. Motor actions of both examiner and subject were frequently used as "gestural materials." The pictures consist of three different types: (1) simple black and white ink drawings, (2) brown-green shaded lithographs and (3) black and white silhouettes. The objects chosen were flexible, rubber dolls (4 1/2" - 6" tall) that could be bent to assume various positions. The materials were chosen on the basis of: (1) representing functional words used to express agent-action-(object) relations, (2) handling and manipulation ease, and (3) availibility. The materials listed in Appendix B were used for pre-training, probing, training and post-training.

Experimental Equipment and Environment

Each subject was seen in a therapy room at the Speech and Hearing Department at Parsons State Hospital and Training Center. The therapy room was also used as the examiner's office. It was equipped with a two-way mirror and tape recorder. Various types of toys and the stimulus materials were placed in a large cabinet that was in the corner of the room away from the therapy table.

The subject was seated across from the examiner when the stimulus materials were presented at the table. The subject was seated with his back toward the examiner's desk and cabinet. Responses were transcribed and recorded, and later transcribed again.

Reinforcement exchange environments were also used as part of the experimental environment and training stimuli. A plastic coffee cup, which was used as a token container, was placed to the subject's right. Plastic poker chips (tokens) were used as a conditioned reinforcer. They were presented manually by the experimenter. Tokens received during each training session were traded for pennies (1 penny for 10 tokens) at the end of each session. The subject could choose to: (1) keep his pennies, (2) buy M & M candies from the examiner, (3) buy a small item from the clinic toy store, (4) save his pennies for a larger more expensive item or (5) go to the hospital canteen and purchase candy or pop.

Procedures

Each subject was seen individually for approximately 30 minutes, five days a week. Once a week the experimenter terminated the structured training session within the last 15 minutes of the session and engaged the child in play. This was done when the experimenter judged that the first 15 minutes of the session were "good." The last 5 minutes of each therapy session was used for exchanging tokens for pennies. The number of sessions needed to complete each condition of the program depended upon when each subject met criteria for that condition.

The schedule of reinforcement was continuous, with each correct response being immediately followed by presentation of a token and social praise such as "Good," "Right," "Good Girl" "Very Good!" "That was great!" "You're doing a good job today," depending upon promptness and quality of the response as well as the quality relative to

previous responses during the session. If the child emitted a response which included a component of the terminal goal behavior which was not currently being trained directly he was given an additional token, with each of the token presentations being paired with the correct response components which he had added, for example the experimenter said, "Very Good! - Sit-chair (Boy-sit)."

After the subject was positively reinforced (S^{R+}) for the required verbal component(s) of the agent-action-object construction, he was given a response prime of the component which was to be added to the existing required response (Subject's Response - "Stand"; S^{R+}; Examiner's Response Prime - "Girl stand"). In this case the response prime is "Girl." Both verbal discriminative stimuli and response primes were presented in 'telegraphic speech,' (i.e., at first, only content words were added to the components which the child was producing).

The initial class(es) of responses to be trained in daily therapy sessions were as follows: (1) ten action Verbs, (2) Noun-Verb constructions, and (3) Noun-Verb-Object constructions (Table 1). Initial class(es) of responses to be trained during token exchange are: (1) (object) Noun extention, (2) non-action Verb + Object constructions, and (3) proper Noun [first person, singular pronoun] - Verb-Object constructions. Classes of responses to be presented in spontaneous speech and play environment are: (1) "No" responses to signal non-existence and rejection, (2) "More" responses to signal reoccurrence, (3) noun phrase such as, "big ball," "red ball," "new dress," "put way," "in there," "on table," (4) expansion of verb phrase repertoire, "go bathroom," "make ____," "put away," "get (got) ____."

The training program consisted of three distinct training conditions: 1.) Training on verbs; 2.) Training on Noun-Verb constructions; and 3.) Training on Noun-Verb-object constructions. There are four general stages used in the program for establishing

TABLE 1

Content Sequence for Training

A. Verbs selected for training:

Training Verbs	First set	Second set	Third set
1. run	1. sit	3. jump	7. eat
2. read	2. stand	4. ride	8. run
3. sleep		5. look	9. read
4. eat		6. play	10. sleep
5. sit			
6. stand			
7. ride			
8. jump			
9. look			
10. play			

Verbs that are placed in the training sets depend on the subject's correct and incorrect probe responses.

*Additional verbs employed in therapy:

Have	take	get
want	make	show
go	tie	put

B. Noun-Verb constructions for training:

1. Girl sleep
2. Girl eat
3. Boy walk
4. Boy run
5. Boy sit
6. Lady (Mama) read
7. Boy look
8. Boy (Girl) play
9. Girl jump
10. Girl ride

*Addition noun-verb / verb-noun constructions employed for training:

Go me	go cottage	tie shoe
Ron go (I go)	take back?	Boy fell (fall)
want candy	get drink-me	hurt it (her)
Girl have	me-drink-water	go bathroom-me
Girl broke-it	want drink	put 'way?-me
	want get drink	

C. Noun-Verb-Noun Object constructions for training:

1. Girl sleep bed
2. Girl eat candy
3. Boy walk (____)
4. Boy run (____)
5. Boy sit chair
6. Lady read book
7. Boy look ball
8. Girl (Boy) play ball
9. Girl jump rope
10. Girl ride horse

TABLE 1 (Continued)

*Addition noun-verb-object constructions employed for training:

Go cottage me	I get drink	I put 'way
I go school	I want drink	make it
Girl have dress	I go bathroom	take it back
-pretty dress	tie shoe - you	I want get drink
I got it	You tie shoe	

Noun phrases:

big ball	new shoe	in there
more candy	new boy	that big
pretty dress	on table	dirty _____
that?	Wha's that?	red book

*The additional constructions were initiated by the subject(s). The types of constructions demonstrate the types that were expanded in the subjects' spontaneous speech.

use of the (1) action Verbs, (2) Noun-Verb constructions and (3) Noun-Verb-Object constructions. These stages are: (1) non-vocal discrimination to non verbal stimuli; (2) non-vocal discrimination to verbal stimuli, (3) vocal/speech responses to verbal imitative stimuli, and (4) functional speech responses to non-verbal and/or verbal stimuli.

Pre- and Intra- Training Tests

Two 3-minute spontaneous speech samples were collected from each subject and assessed for the types of syntactic constructions used in relation to the context and behavior in the speech events. The additional pre-training tests assess the type of response to the specific stimuli presented. The pre-training tests include assessment of: (1) Vocal response to picture stimuli only, (2) Vocal response to picture-question stimuli, (3) Vocal response to echoic stimuli, and (4) Non-vocal discrimination to verbal stimuli.

Vocal response to picture stimuli. Ten action pictures were presented to each subject and the subject was to make a verbal response to each of the ten pictures. The type of response to each picture was recorded for each subject in order that the type of responses could be compared to post training response types.

Vocal response to picture-question stimuli. Each of the ten action pictures were presented with the question stimulus "What doing?" delivered by the examiner. Responses were recorded as the type of vocal response and/or gesture and no response.

Vocal response to echoic stimuli. The examiner presented ten echoic verbs that were included in each of the ten action pictures to each subject. No pictures were presented to the subject. Intelligible approximation responses were recorded as correct echoic responses.

Non-vocal discrimination to verbal stimuli. Four of the ten action pictures were presented to the subject at one time and the verb included in the picture was used as a verbal stimulus. The subject was to point to the picture which represented the action verb which the examiner presented vocally, "Point to 'stand'." The four picture presentations were interchanged for each verb presentation.

The ten action verbs that were represented in the action pictures were also presented as verbal mands requiring the subject to make a body action response. For example, the examiner would say, "Show me 'Ron sit'." The type of responses were recorded as correct response, type of incorrect response, and no response.

The procedures will be briefly discussed under three distinct training conditions: (1) Verb training, (2) Noun-Verb training, and (3) Noun-Verb-Object training. Procedures for training are discussed in detail in Appendix C. Page number references for the detailed procedures will be listed for each procedural condition in the summary of the procedures (Table 2, 3, and 4) and also in the brief discussion of the procedures.

Verb Training

Ten action verbs were selected which represented the actions of the agent-action-object constructions to be trained later (Table 1). Initially two action verbs were selected for training. These verbs were functional and easily demonstrated by action, pictures, and object manipulation. The types of stimulus control were sequencially ordered to allow for high predictability of correct responding under less controlling response modes. (Table 2)

Non-Vocal Discrimination to Non-Verbal Stimuli

The subject was under the control of the non-verbal stimulus which was paired with a supporting verbal stimulus.

Non-vocal discrimination to non-verbal stimuli

TABLE 2

Summary of Verb Training Procedures
(Refer to Appendix C for detailed training procedures under each step.)

Condition	Step	Stimulus	Response	Stimulus Mode	Response Mode	Criteria	Reinforcement Schedule	Response Priming
I. Imitative motor responses to motor stimuli (86)	1.	Motor body action/ verbal mand	imit. body action	control - support motor/verbal	motor	100% correct responding in a block of 10 out of 10	CRF	None
	2.	Pointing to pict./ verbal mand	imit. pointing	visual motor/verbal	motor		CRF	None
	3.	Manipulation of obj./verbal mand	imit. manip. of objects	visual motor/verbal	motor	10 out of 10	CRF	None
IIA. Matching of stimuli to identical stimuli (90)	1.	Picture (3 choices)/ verbal mand	matching picture	visual/verbal	motor	10 out of 10	CRF	None
	2.	Manipulated objects/ and non-manip. obj. verbal mand	matching obj. manip.	visual/verbal	motor	10 out of 10	CRF	None
IIB. Imitative matching to identical stimuli		Matching						
	1.	Picture/verbal mand	imit. matching picture	visual motor/verbal	motor	10 out of 10	CRF	None
III. Matching pictures to object manipulations and object manipulations to pictures (96)	1.	Manip. obj and pictures/verbal mand	pointing to picture	control/ visual/verbal	motor	10 out of 10	CRF	Verb
	2.	Picture and objects/ verbal mand	manipulating objects	visual/verbal	motor	10 out of 10		Verb

TABLE 2 (Continued)

	Condition	Step	Stimulus	Response	Stimulus Mode	Response Mode	Criteria	Reinforcement Schedule	Response Priming
Non-vocal discrimination to verbal stimuli	IV. Non-verbal-motor responses to verbal stimuli (102)	1.	Verbal mand	body action	verbal/	motor	10 out of 10	CRF	verb
		2.	Pictures/verbal mand	pointing to pictures	verbal/visual	motor	10 out of 10	CRF	verb
		3.	Objects/verbal mand	manipulating objects	verbal/visual	motor	10 out of 10	CRF	verb
Vocal/speech responses to verbal imitative stimuli	V. Alternate non-vocal discriminations and imitative vocal responses to verbal stimuli (105)	1a.	Verbal mand	body action	verbal/	motor	10 out of 10	CRF	noun-verb
		1b.	Imit. verbal	echoic	imit. verbal/visual	verbal	10 out of 10	CRF	(agent-action)
		2a.	Pictures/verbal mand	pointing to pictures	verbal/visual	motor	10 out of 10	CRF	noun-verb
		2b.	Pictures/imit. verbal	echoic	imit. verbal/visual	motor	10 out of 10	CRF	noun-verb
		3a.	Objects/imit. verbal	echoic	verbal/visual	motor	10 out of 10	CRF	noun-verb

TABLE 2 (Continued)

	Condition	Step	Stimulus	Response	Stimulus Mode	Response Mode	Criteria	Reinforcement Schedule	Response Priming
Vocal/speech responses to verbal imitative stimuli	VI. Imitative vocal responses to intraverbal prompt SD paired with echoic stimuli (111)	1.	Body action/verbal prompt (noun)/echoic	echoic	verbal	verbal	10 out of 10	CRF	noun-verb
		2.	Picture/verbal prompt (noun)/ echoic	echoic	verbal/visual	verbal	10 out of 10	CRF	noun-verb
		3.	Manip. obj./verbal prompt/echoic	echoic	verbal/visual	verbal	10 out of 10	CRF	noun-verb
	VII. Imitative vocal responses to questions paired on echoic stimuli (116)	1.	Body action/question/ echoic	echoic	verbal/visual	verbal	10 out of 10	CRF	noun-verb
		2.	Picture/question/ echoic	echoic	verbal/visual	verbal	10 out of 10	CRF	noun-verb
		3.	Manipulated objs./ echoic	echoic	verbal/visual	verbal	10 out of 10	CRF	noun-verb
Functional speech responses to non-verbal and/or verbal stimuli	VIII. Vocal/speech responses to question stimuli (122)	1.	Body action/question	verbal non-echoic	verbal/visual	verbal	[Add object only if child is giving noun-verb] 10 out of 10	CRF	noun-verb-obj.
		2.	Picture/question	verbal non-echoic	verbal/visual	verbal	10 out of 10	CRF	noun-verb-obj.
		3.	Manipulated objs./ question	verbal non-echoic	verbal/visual	verbal	10 out of 10	CRF	noun-verb-obj

TABLE 2 (Continued)

Condition	Step	Stimulus	Response	Stimulus Mode	Response Mode	Criteria	Reinforcement Schedule	Response Priming
IX. Alternate Vocal/speech responses to question stimuli paired with intraverbal prompts (125)	1.	Body action/question/ (noun) prompt	verbal non-echoic	verbal/visual	verbal	10 out of 10	CRF	noun-verb-obj.
	2.	Picture/question/ (noun) prompt	verbal non-echoic	verbal/visual	verbal	10 out of 10	CRF	noun-verb-obj.
	3.	Manipulated objs/ question/(noun) prompt	verbal non-echoic	verbal/visual	verbal	10 out of 10	CRF	noun-verb-obj.

Condition I. Imitative motor responses to motor stimuli. The subject was required to perform three types of imitative responses: (1) imitative body action, (2) imitative pointing to picture, and (3) imitative manipulation of objects. The subject was required to perform blocks of ten out of ten correct responses (five for each Verb) for each of the three stimulus types presented before advancing to Condition II. (86)

Condition IIA. Matching of stimuli to identical stimuli. The subject was required to match pictures to identical pictures, each of which represent the action Verbs being trained. The subject was required to match an object manipulations to previously manipulated models that represent the Verbs being trained. The subject was required to perform blocks of ten out of ten correct responses (five for each of the training Verbs) for each of the two stimulus types presented before advancing to Condition III. If the subject failed to meet criteria on Condition IIA, the examiner provided an imitative matching stimulus of the pictures (Condition IIB). (90)

Condition III. Matching pictures to object manipulations and object manipulations to pictures. The subject was required to match a picture to a manipulated model and to match an object manipulation to a picture stimulus. The subject was required to perform a block of ten out of ten correct responses for each of the types of stimuli presented before advancing to Condition IV. (96)

Condition IV. Non-verbal motor responses to verbal stimuli. The subject was required to perform the motor responses of body action, pointing and object manipulation when a verbal stimulus was presented. The subject was required to perform a block of ten out of ten for each of the types of stimuli presented before advancing to Condition V. (102)

Vocal/Speech Responses to Verbal Imitative Stimuli

Condition V. Alternate non-vocal responses to vocal stimuli and imitative vocal responses to verbal stimuli. The subject was required to respond to a vocal-verb stimulus by performing the act, pointing to a picture of the act, and by manipulating a doll to perform the act. After each such response, a verbal stimulus was presented for the subject to repeat. The subject was required to make a correct receptive response and a correct echoic response for a block of ten out of ten alternating non-verbal acts and verbal imitations for each of the three types of non-verbal acts. (105)

Condition VI. Imitative vocal response to an echoic stimulus which follows an intraverbal prompt paired with a non-verbal action stimulus. For example the experimenter sits and says, "Miss Smith____, say sit." The child should imitate the word 'sit.' Later the say is omitted and a pause is introduced after the experimenter says, "Miss Smith____." The subject was required to make ten out of ten correct responses for each of the types of non-verbal stimuli before advancing to Condition VIII. Condition VII is included as a branching Condition if the subject fails to make 50% correct responses on the first training block under Condition VIII. (111)

Condition VII. Imitative vocal responses to questions paired with echoic stimuli. The subject was required to make an echoic response when the question stimulus, "What + do?" was paired with an echoic stimulus and each of the three types of non-verbal stimuli. The subject was required to correctly repeat the verbal stimulus ten out of ten times for each of the types of stimuli presented before returning to Condition VIII. (116)

Functional Speech Responses to Non-Verbal and/or Verbal Stimuli

Condition VIII. Vocal/speech responses to question stimuli. The subject was required to emit a Verb response when the question stimulus, "What + do?" was paired with a body action, picture and object manipulation. The subject was required to make a block of ten out of ten correct responses for each of the types of stimuli presented before advancing to the addition Verb training. If the subject gave 50% or more echoic responses of "Doing?" under Condition VIII, Condition VII was trained and then the subject returned to continue training under Condition VIII. (122)

Condition IX. Vocal/speech responses to questions paired with an intraverbal 'agent' prompt. Condition IX was included as a branching step. It was to be used only if a subject repeated the "doing" of the experimenter's question as well as giving a correct verb response to the question under Condition VIII. For example if the experimenter presented a block of ten stimulus questions of 'What doing?' and the subject's typical response on the first training block under Condition VIII was, "Doing, sit (stand)," the experimenter trained the subject under Condition IX and then returned to training under Condition VIII. (125)

When the subject met the criteria of 10 correct responses out of 10 attempts on each of the training conditions for the first set of Verbs (5 correct responses for each verb), the additional eight training verbs were probed under Conditions VIII and V.

The additional eight Verbs were probed under Conditions VIII and V. If the subject met the criteria of 2 correct responses out of 2 attempts for each Verb under both Condition VIII and V, he advanced to the Noun-Verb training. If the subject did not give 2 correct responses out of 2 attempts for any one of the eight Verbs under either Condition VIII or Condition V, the error Verb(s) were trained in two additional sets.

Second set of training Verbs: (3) jump, (4) ride, (5) look, (6) play. Or only the error Verbs in Probe B The subject was given training on the second set of Verbs under Conditions IV, V, VI, and VIII, with only pictures being used as visual stimuli. When the subject met the criteria of 5 correct responses out of 5 attempts for each of the second set of training Verbs under Condition IV, V, VI, and VIII, he was given a probe on Conditions VIII and V for any additional error Verbs. If the subject did not give 2 correct responses out of 2 attempts on any of the Verbs in the third set of training verbs under either Conditions VIII and V, those error Verbs were trained.

Third set of training Verbs: (7) eat, (8) run, (9) walk, and (10) sleep. The subject was given training on the third set of Verbs under Conditions IV, V, VI, and VIII, with only pictures being used as visual stimuli. When the subject met the criteria of 5 correct responses out of 5 attempts for each of the verbs in the third set under Condition IV, V, VI and VIII, he advanced to Noun-Verb training (Table 3).

Noun-Verb (Agent-Action) Training

The four nouns that represent the 'agent' in the training and generalization pictures are paired with the 'action' through the basic strategies of (1) non-vocal discrimination, (2) verbal imitation and, (3) production.

Non-Vocal Discrimination to Non-Verbal Stimuli

> Condition I. The subject was required to match pictures representing 'agent' and to manipulate objects to represent 'agent-action', to the verbal stimulus which was presented. Criteria for advancing to Condition II was met when the subject performed 18 correct responses out of 20 attempts. (126)

Vocal/Speech Response to Verbal Imitative Stimuli

> Condition II. The subject was required to emit a verbal response of 'agent-action' when a question stimulus paired with the echoic 'agent'

TABLE 3

Summary of Noun-Verb Training Procedures
(Refer to Appendix C for detailed Procedures under each step)

	Condition	Stimulus	Response	Stimulus Mode	Response Mode	Criteria	Reinforcement Schedule	RP
Non-vocal discrimination to verbal stimuli	I. Matching pictures of 'agent' to verbal stimuli (126)	Pictures of (agents'/ verbal mand	pointing	verbal/visual	motor	18 correct responses out of a block of 20	CRF	Noun-Verb-Object
	Matching picture of 'agent-action' to verbal stimuli	objects needed to represent 'agent-action/verbal mand	manipulating objects to represent 'agent-action' relation	verbal/visual	motor	18 correct responses out of a block of 20	CRF	Noun-Verb-Object
Vocal/speech responses to verbal imitative stimuli	II. Matching verbal response of 'agent' to question/'agent' imitative stimuli. (130)	Pictures representing 'agent-action' relation/question- "What + do"/echoic stimuli	'Agent (echoic)-action (non-echoic) verbal response	verbal/visual	verbal	18 correct responses out of a block of 20	CRF	Noun-Verb-Object
Functional speech responses to non-verbal and/or verbal stimuli	III. Vocal/speech response(s) of 'agent-action' to picture/question stimuli (132)	Pictures representing 'agent-action-(object)/questions "What + do" stimuli	'Agent-action' verbal response	verbal/visual	verbal	18 correct responses out of a block of 20	Noun-Verb-Object or Noun-Verb + ing +prep. + object or Noun + 1st Verb + ing + (Object)	

stimuli was presented. Criteria for advancing to Condition III was met when the subject emitted 18 correct responses out of 20 attempts. (130)

Functional Speech Responses to Non-Verbal and/or Verbal Stimuli

Condition III. The subject was required to emit a verbal response of 'agent-action' when a question stimulus was paired with a picture. The subject was required to emit 18 correct responses out of 20 attempts before advancing to training on Noun-Verb-Object constructions (Table 4). (132)

Noun-Verb-Object (Agent-Action-Object) Training

Each of the three subjects were emitting some "agent-object", "action-object," and a few "agent-action-object" responses before beginning specific training on the construction. Therefore, the subjects were not trained under the non-verbal discrimination stage, and in some cases, the verbal imitation stage. The major objective of training 'agent-action-object' was training the subject to respond to a picture and/or "Wh + do" question stimulus with an "agent-action-object" response. After the subject gave 90% correct N-V-O responses on two consecutive training blocks, he was asked specific questions about the N-V-O construction; for example, "Who is running?" and "Where is boy running?"

Vocal/Speech Response to Verbal Imitative Stimuli

Condition I. The subject was required to emit a verbal response of "agent-action" to a question stimulus. If the subject did not emit an "agent-action-object" response, he was given an echoic 'object' stimulus immediately after he emitted, "agent-action" response. The subject was required to emit 18 correct responses out of 20 attempts before advancing to Condition II. (134)

Functional Vocal/Speech Responses to Non-Verbal and or Verbal Stimuli

Condition II. The subject was required to emit a verbal "agent-action-object" response to both question paired with picture stimuli and picture

TABLE 4

*
Summary for Noun-Verb-Object Training Procedures
(Refer to Appendix C for detailed description of procedures under each step)

	Condition	Stimulus	Response	Stimulus Mode	Response Mode	Criteria	Reinforcement Schedule	Response Priming
Vocal/speech responses to verbal imitative stimuli	I. Verbal response of 'agent-action' to question, then matching vocal/speech response of 'object to imitative verbal stimuli (134)	Pictures representing 'agent-action-"What + do"/echoic 'object'	Verbal 'agent-action' response to question, then 'object' response	verbal/visual	verbal	18 correct responses out of a block of 20	CRF	Noun + is + verb + ing + object
Functional speech responses to non-verbal and/or verbal stimuli	II. Verbal response of 'agent-action-object' to picture/question stimuli (136)	Pictures representing 'agent-action-object'/Question-"What + do"	Verbal 'agent-action-object' response to question	verbal/visual	verbal	18 correct responses out of a block of 20	CRF	
		2nd trial: "Who" "What" "Where"	appropriate verbal response to question	verbal/visual		Response prime same as under Condition I		
	Verbal response of 'agent-action-object' to picture stimuli only	Pictures representing 'agent-action-object' 2nd trial: "Who" "What" "Where"	Verbal 'agent-action-object response to picture or question	visual	verbal	18 correct responses out of a block of 20	CRF	

*Object may be indirect object or noun-verb phrase)

stimuli only. If the subject did not respond with an 'agent-action-object' response to a "What + do" question stimulus, he is given a second trial stimulus of "Who," "What" "Where" and was required to emit an appropriate response. The subject was required to emit 18 out of 20 - 1st or 2nd trial - attempts before advancing and completing the program. (136)

Pre- and post- generalizations items included trained constructions to different pictures, pictures that represented trained constituents but untrained constructions and pictures that represented constructions in which one constituent was untrained.

Proper Noun-Verb (non-action)-Object Training

Additional types of training procedures and strategies were employed to establish and maintain "Proper Noun - (non-action) verb-object' responses. The token exchange period was structured to increase the probability that a mand or tact relationship would exist in order that the child would have to emit a mand or tact response and gradually emit a more complete grammatical relation within his mand or tact response. The procedure used for this type of response employed reverse chaining of the 'agent-action-object." Gestures were employed for the non-action verbs and Proper nouns (first and second singular personal pronouns.) These gestures were paired with verbal responses, and then faded.

Each of the constituents in the sentences: (1) Ron (I) have ten, (2) Ron (I) want penny, and (3) Ron (I) want _____, were presented as an intraverbal chain with each verbal constituent being paired with a gesture or pointing stimulus. The subject was first required to imitate the verbal stimulus which expressed the object(s) of the sentence(s). The subject was required to emit three consecutive correct verbal labels to the object(s) of the sentence(s) before advancing to Step 3 in which the subject was required to give an imitative 'verb' gesture followed by a verbal 'object' label. The subject was

required to perform three consecutive correct 'verb' gestures - 'object' verbal labels before the verbal imitative 'verb' stimulus was introduced in the response chain.

Each constituent within the sentence construction was introduced as an imitative gesture paired with a verbal stimulus. Imitative gesture and verbal stimuli for each constituent were gradually faded until the subject's response was under the control of (a.) question stimuli (paired with a gesture cue if necessary) for the Agent (proper noun or first-person, singular pronoun) (b.) intraverbal response of agent for the 'verb' response and (c.) intraverbal response of agent-action for the 'object' response. Detailed procedures used in the token exchange are included in Appendix C.

Expansion and Extension of Verbal Responses in Spontaneous Speech

Spontaneous speech of the subject was used to expand and extend descriptive adjectives, verb repertoire, and question forms. The subject was required to emit the response(s) in isolation and the responses were gradually incorporated into the basic grammatical relation (i.e., an 'agent-action-object' utterance).

Three types of linguistic forms were selected for expanding and extending the subject's gestures and/or one-word responses which the subject emitted as a request or command in his spontaneous speech. The types of linguistic forms included: (1) descriptive adjectives expressing color, size and number, (2) additional, functional verbs such as go, take, put, get, etc., and (3) question indicators.

Descriptive adjectives. A box which contained various types, number and colors of toys was placed just outside of the subject's reach. If the subject did not indicate a preference of a toy by gesture and/or a verbal label within 30 seconds, a question stimulus, "What do you want?" was presented. If the subject pointed to a toy, he was required to give an imitative verbal label before he was allowed to play with the toy for 30 seconds. If the subject emitted a verbal label response, such as "Ball," the

examiner would say, "Red ball." If the subject did not emit an additional response of "Red," or "Red ball," the echoic stimulus, "Red _____," was presented. The subject was required to emit the adjective-noun construction before he was allowed to play with the toy. At the end of the N-V-O training, he was required to say, "I want red ball."

Verb extension. Additional, functional verbs were usually extended before and after the sequentially, structured therapy session. If the subject gestured or emitted the verbal response, "Bathroom," the examiner would say, "Bathroom," or "Go bathroom," depending upon the subject's initial response. When the subject would verbally request, "Go bathroom," the question stimuli, "Who?" was presented. If the subject did not emit an 'agent-action-object' response within three seconds after the question stimulus, the imitative verbal stimulus of 'agent' was paired with the gesture stimulus and the subject was required to say, "Ron (I) go bathroom," before he was given permission, "Yes, Ron (you) go bathroom."

Question indicators. If the subject gave a gesture response or an unintelligible grunt indicating a question, the examiner would say the final constituent of the intended question, emphasizing the final rising inflection marker, such as "Doing" or "Candy" and then respond with a telegraphic answer to the question form. When the subject was consistently emitting a verbal response of one word with a final rising inflectional marker, the examiner would say, "What doing?" or "Where candy?" and would then give the appropriate answer. The subject was not required to emit the "Wh" form of the question during the Noun-Verb-Object training.

Summary of Procedures

Three mentally retarded subjects whose 'language' consisted primarily of one-word noun utterances were chosen for the present investigation. The subjects met the specific criteria that was required in order to initiate the present language training program. The subjects could emit a verbal labelling response to at least twenty-five out of fifty pictures that represented common functional names of clothing, food, toys, furniture, animals, people and vehicles. The subjects could imitate approximations of one-two (one syllable) words. The subjects did not usually respond appropriately to "Wh" questions. There were no observable expressive verbs in their spontaneous speech with the exception of one subject who was heard to emit "go" one time.

A training sequence consisted of a limited number of (1) action verbs, (2) $\overset{\text{(noun-verb)}}{\text{agent-action}}$ constructions, (3) $\overset{\text{(noun-verb-noun)}}{\text{agent-action-object}}$ constructions. Non-action verbs, personal pronouns, and constituents of noun and verb phrases were introduced, expanded and extended in the subjects' spontaneous speech (stimuli that evoked the response was not always under specific control and the response was not highly predictable).

The basic procedural strategies used for training the constituents of the basic grammatical relations were the following: (1) non-vocal discrimination to non-verbal controlling stimuli, (2) non-vocal discriminations to verbal controlling stimuli, (3) vocal/speech responses to imitative speech stimuli, and (4) functional vocal/speech responses to non-verbal and/or verbal stimuli. There were intermediate sequential steps included within the basic procedural strategies for the verb constituents. When the criteria for each step within a condition was met the next condition was introduced. A positive reinforcer was presented for correct responses; an end of the session reinforcer had to be promised to two of the subjects during probe tests.

The responses of the subjects were evaluated in terms of basic grammatical relations and their constituents and the response class of the specific constituents. These responses were evaluated on the basis of (a) pre-and post-training responses, (b) acquisition of N-V-O responses and (c) generalization to non-trained pictures representing trained constituents but untrained constructions and pictures that represented constructions in which one constituent was untrained. The subjects' responses were not specifically compared, since a complete receptive and expressive language repertoire for each child could not be assessed.

Chapter IV

Results

The training program administered in this study was designed to attain Noun-Verb-Object responses to action pictures and questions about those pictures. The training program consisted of three distinct training conditions: (1) Training on the verbs contained in the pictures, (2) Training on Noun-Verb constructions, and (3) Training on Noun-Verb-Object constructions.

Pre-training tests and intra-training probes were administered to chart the initial rate at which these constructions were emitted prior to training and to follow their emergence throughout the various training conditions.

The results will be presented individually for each subject. The data for each subject will be presented and discussed in the following sequence: (1) Pre-training tests, (2) Acquisition of correct verb responses, (3) Emergence of syntactic constructions during training, and (4) Generalization of syntactic constructions to novel (untrained) pictures. Each of these conditions is discussed briefly below.

Pre-Training Probe Tests

The pre-test data for each subject will be presented in Table form and will be organized and discussed as follows: (a) non-vocal (action) responses to verbal stimuli, (b) non-vocal (pointing) responses to verbal stimuli, (c) vocal responses to imitative vocal stimuli, (d) vocal responses to picture stimuli paired with an evocative question ("What + doing?") delivered by the experimenter.

Acquisition of Non-Vocal and Vocal Verb Responses During Verb Training

The acquisition of non-vocal and vocal responses of the verbs during verb training are presented in figure form. The percentages of correct responses in a block of ten responses are listed for each type of stimulus: (S^1) response to actions, (S^2) response to pictures,

(S^3) response to objects, under each procedural condition. Pictures paired with question stimuli are presented as probes after the first and/or second sets of verbs were trained. Broken lines under various conditions represent the emergence of N-V or V-O constructions under verb training.

Emergence of N-V-O Constructions

The acquisition of N-V-O constructions of responses to pictures and pictures paired with evocative questions about the pictures are presented in figure form for each subject. These data are organized as follows:

Noun-Verb Responses during: (a) final Verb training, (b) Noun-Verb training, and (c) Noun-Verb-Object training.

Noun-Object Responses during: (a) final Verb training, (b) Noun-Verb training, and (c) Noun-Verb-Object training.

Verb-Object Responses during: (a) final Verb training, (b) Noun-Verb training, and (c) Noun-Verb-Object training.

Noun-Verb-Object Responses during: (a) final Verb training, (b) Noun-Verb training, and (c) Noun-Verb-Object training.

The acquisition curves provide a multiple baseline design for showing the emergence of various N-V, N-O, V-O, and N-V-O constructions during the three training conditions.

The percents of responses under each of the constructions listed on the left side in Figures 2, 4, and 5 equal the percent of total types of N-V, N-O, V-O, and N-V-O constructions within a block of ten responses. For example if in a block of ten responses, a subject had responded with 3 N-V constructions, 1 Verb construction, 1 N-O construction, 2 V-O constructions, and 3 N-V-O constructions the responses are charted as percentages under the respective N-V, N-O, V-O, and N-V-O response constructions. Single noun, verb, and object responses are not charted. Therefore, as the emergence of N-V-O responses within a training block increased, the number of N-V, N-O, and V-O responses within the same training block decreased.

Generalization of Syntactic Constructions to Untrained Pictures

The pre- and post- training responses are listed in table form. The type of responses are listed in detail for each subject according to four different types of generalization tests: (1) novel pictures representing trained constituents contained within trained constructions, (2) novel pictures representing trained constituents contained within untrained constructions, (3) novel pictures that represented constructions in which one constituent was untrained and (4) within training the subjects demonstrated a generalization of open class words. The open class words were not trained in the constructions, but only presented inconsistently in various constructions in the response priming by the experimenter. The verbal stimulus, "Tell me about these pictures," was presented before each group of pictures was presented.

The results of the present investigation are discussed for each subject. The figures and tables containing data for each subject's training will be included within the discussion of each subject.

Subject 1

Pre-training Tests

The pre-training tests for Subject 1 were presented to Subject 1 in reverse order according to data presentation (Table 5) and discussion. The pre-training tests were presented as follows: (a) pictures paired with the verbal stimulus, "Tell me about the picture," (b) pictures and questions - "What-doing?" (c) vocal imitation, and (d) non-vocal responding - pointing and actions. The tests were presented in the order of most difficult to least difficult in order that the responses of one test would not influence the responses on the proceeding test. No reinforcement or response priming was given during pre-training tests.

TABLE 5

Subject 1 - Pre-training Tests of Non-Vocal; imitation; Picture and Question; and Picture Evoked Responses

Picture Representation	Non-Vocal Actions		Responses Pointing		Vocal Imitation (Approximations)		Picture and Question Responses	Responses to Pictures
1. Girl sleep bed	+	+	+	+	+	down	"bed"	"bed"
2. Girl eat soup	+	+	+	+	ges.	NR	"eat"	"eat"
3. Boy walk	+	+	+	+	up	up	NR	NR
4. Boy run	+	+	+	+	+	+	NR	NR
5. Boy sit chair	+	+	+	+	+	ges.	"down"	"down"
6. Lady read book	+	+	+	+	+	+	"book"	"girl"
7. Boy look ball	+	+	+	+	+	+	NR	NR
8. (Children)Girl (Boy) play ball	+	+	+	+	+	+	"ball"	"ball"
9. Girl jump rope	+	+	+	+	+	+	"rope"	NR
10. Girl ride horse	+	+	-	+	horse	horse	NR	NR
	100% 1st Trials	100% 2nd	90% 1st Trials	100% 2nd	70% 1st Trials	50% 2nd	10%	10%

Subject 1 gave the appropriate action and pointing response to a verbal and verbal/picture stimuli. She imitated 70% of the vocal stimuli presented on the first trial and 50% of the vocal stimuli presented on the second trial. Subject 1 gave one correct verb response when a block of ten pictures were presented with the question "What + doing?" She gave one correct verb response when the pictures alone were presented. Subject 1 no N-V, V-O, or N-V-O responses to either picture or picture/question stimuli. The

types of vocal responses made were nouns in the 'object' position or the subject made no responses (NR). The spontaneous responses in the two 3-minute speech samples were single nouns or object-noun (topic-comment) responses. Subject 1 used no verbs either in isolation or in a noun or object construction; however, Subject 1 did make some gestures that could be described as indicating non-vocal verb responses.

Acquisition of Non-Vocal and Vocal Verb Responses During Verb Training

The acquisition of non-vocal and vocal verb responses for Subject 1 are charted in Figure 1. The verbs that were contained within the N-V-O constructions to be trained later were trained in the Verb training sequence. The Verb training sequence for Subject 1 was divided into three sets. The first set of two verbs (sit and stand) were trained to S^1-actions, S^2-pictures, and S^3-objects under Conditions II, III, IV, V, VI, VII, and VIII. Condition VIII - "What + doing" questions were probed after training Condition V. Subject 1 made no correct responses to the Condition VIII probe; therefore, Condition VII was included in the training procedures for the first set of verbs in Verb training.

After Subject 1 met criteria on the first set of training verbs, the eight additional training verbs were probed under Condition V - non-vocal responding and vocal imitation, and under Condition VIII - "What + doing?" questions. Subject 1 responded correctly to two out of the eight verbs under both probe Conditions V and VIII; therefore, only two of the verbs out of the six verbs presented in the pictures that evoked the incorrect responses were chosen for training in the second set of training verbs. These verbs were trained to pictures under Conditions IV, V, VI and VIII. After Subject 1 met criteria on the second set of training verbs, all of the ten training verbs were probed under Conditions V and VIII. Only the pictures that represented the four untrained verbs evoked incorrect responses. These four verbs were trained to pictures under Conditions IV, V, VI, and VIII in the third set of training verbs.

Figure 1

Subject I – Acquisition of Non-Verbal and Verbal Responses During the Verb Training Procedures

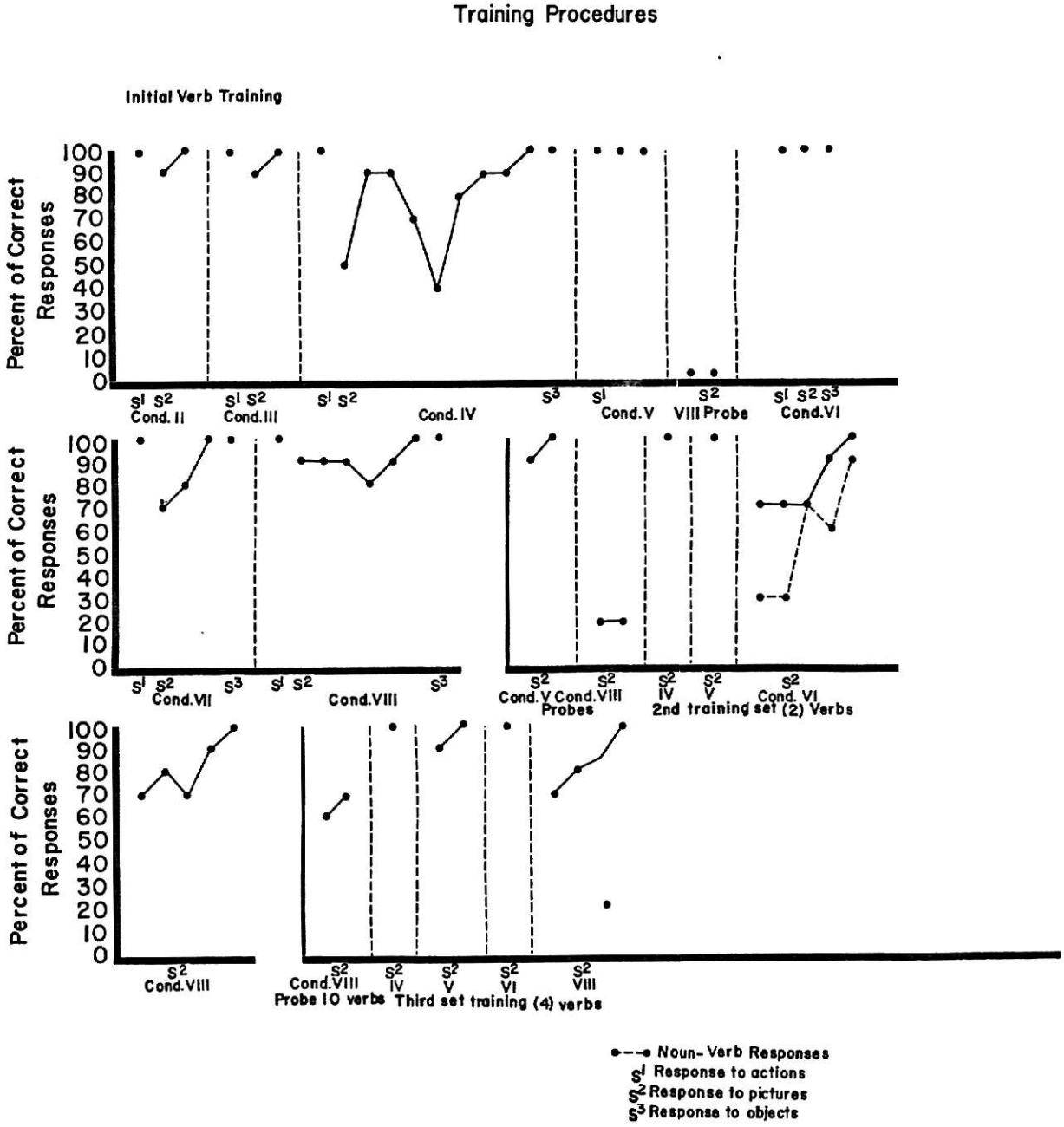


Table 6 represents the number of training blocks that were required for Subject 1 to meet criteria during Verb training. The number of training blocks are listed for each training condition.

TABLE 6

Number of Training Blocks Required for Subject 1
to Meet Verb Training Criteria

1st Set of Verbs - Two Verbs Trained	Number of Blocks
Condition II	3
Condition III	3
Condition IV	11
Condition V	3
Condition VI	3
Condition VII	5
Condition VIII	8
2nd Set of Verbs - Two Verbs Trained (2 Verbs passed probe criteria)	Number of Blocks
Condition IV - S^2	1
Condition V - S^2	1
Condition VI - S^2	5
Condition VIII - S^2	5
3rd Set of Verbs - Four Verbs Trained	Number of Blocks
Condition IV - S^2	1
Condition V - S^2	2
Condition VI - S^2	1
Condition VIII - S^2	4

Emergence of N-V-O Constructions

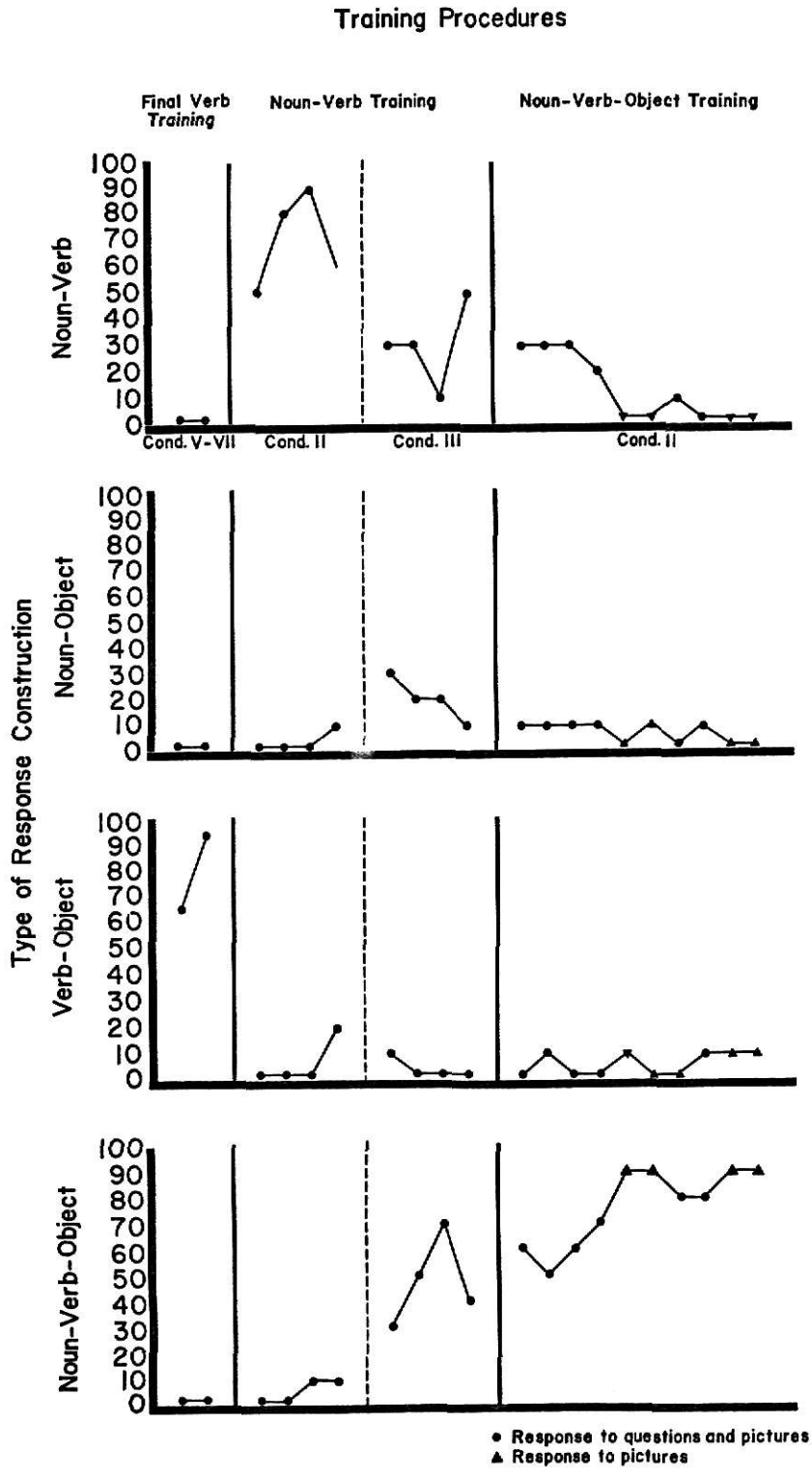
The procedures for Noun-Verb Training consisted of non-vocal responding - Condition I, vocal imitation of the noun (agent) - Condition II, and N-V responding to picture/question "What + doing?" stimuli - Condition III. Reinforcement was contingent upon an appropriate Noun-Verb response. The procedures for Noun-Verb-Object Training consisted of vocal imitation - Condition I, and N-V-O vocal responding to picture/question "What + doing?" stimuli and picture stimuli - Condition II. Reinforcement was contingent upon an appropriate Noun-Verb-Object response (Figure 2).

When Subject 1 gave 70% N-V-O responses and 10% N-V responses on one training block and 40% N-V-O responses and 50% N-V responses on the successive training block during N-V training, a decision was made to change the reinforcement to be contingent upon a N-V-O response. Therefore, the N-V-O training for Subject 1 was the same as the training in Condition III of N-V training, except that Subject 1 was required to give a N-V-O response to each of the same picture/question stimuli before being reinforced.

Subject 1 required 8 Blocks of N-V training before she advanced to N-V-O training. Subject 1 met criteria on N-V-O training after 10 Blocks of training. Four blocks of picture stimuli presented after the verbal stimulus, "Tell me about the pictures," were introduced after four blocks of picture/question "What + doing?" were trained in the N-V-O training. The data indicates that Subject 1 responded slightly better to the picture stimuli (90-90%) alone than to picture/question stimuli (80-80%). Subject 1 did respond correctly to the specific "Wh" questions about the pictures. These questions required appropriate one-word responses. For example, if the experimenter held up the picture of 'Boy sit chair' and asked the questions - "Who's sitting?" "What's boy doing?" and "Where's boy sitting?" Subject 1 responded respectively with the appropriate responses - "Boy," "Sitting chair," and "Chair."

Figure 2

Subject I- Aquisition of Two-Three Word Constructions Under Verb Training, Noun-Verb Training and Noun-Verb-Object Training



Under each training sequence, Subject 1 was given an extra token for an additional response that was a constituent of the response construction to be trained later. Subject 1 was given social praise for each spontaneous untrained construction that was equivalent to the type of construction being specifically trained. She was intermittently given tokens for these types of spontaneous responses also. During the final three blocks of N-V-O training, Subject 1 was consistently giving the appropriate response, "I want penny(candy)," when the 'I' gesture cue was provided by the experimenter. The appropriate response, "I have ten" was given only 60% of the time on the final three blocks of N-V-O training if the 'have' gesture cue was not provided by the experimenter after Subject 1 said, "I." Spontaneous speech samples after training were typically V-O(topic)-N(comment) responses, although a number of appropriate N-V-O responses were also noted. Subject 1 was required to say "Go bathroom," or "Get drink," during the N-V training before she was allowed to carry out the request. Initially 'go' and 'get' were given as echoic stimuli by the experimenter. During the N-V-O training, Subject 1 was required to say "I go bathroom," "I get drink," before the request was granted. The gestural cue for I or the verbal/gesture stimulus was provided by the experimenter if the subject did not say the N-V-O request spontaneously.

Generalization of Syntactic Constructions to Untrained Pictures

The pre- and post- training generalization responses made by Subject 1 are listed in Table 7 to the right of each type of generalization picture representation. Each group of pictures were presented after the experimenter said, "Tell me about these pictures." The majority of pre-training responses on the generalization items were nouns(agents), nouns(objects) and no responses (NR). Generalization data shows that Subject 1 produced: (a) 5 out of 5 correct trained N-V-O responses to novel pictures, (b) 5 out of 5

TABLE 7

Generalization of Syntactic Constructions to Novel (Untrained Pictures) for Subject 1

Picture Representation of Four Types:				Pre-training Responses	Post-training Responses
Trained Constructions Trained Constituents	Untrained Constructions Trained Constituents	Untrained Constructions Constituents(s) Untrained	Trained Constructions Open Class Primed		
1. Girl sleep bed.				"bed"	"Girl sleep bed."
2. Girl eat soup.				"eat"	"Girl eat beans."
3. Boy run fast.				NR	"Boy run home."
4. Boy play ball.				"ball"	"Boy play ball."
5. Girl ride horse.				NR	"Girl ride horse."
	1. Lady stand up.			"girl"	"Mama stand up."
	2. Boy jump.			NR	"Boy jump off tree."
	3. Man ride horse.			NR	"Man on horse."
	4. Man sit chair.			"down"	"Dad sit chair."
	5. Lady eat _____.			"Mama"	"Mama eat 'wich."
		1. Baby cry.		"Baby"	"Baby is cry."
		2. Man drive car.		NR	"Daddy car."
		3. Boy push box.		"Boy"	"Boy (ges. push) box."
		4. Boy kick ball.		NR	"Boy (ges. kick) ball."
		5. Boy write letter.		"pen"	"Boy write book."
		6. Lady stand on chair.		gesture 'no'	"Mama on chair."
			1. Boy run _____.	NR	"Boy run school ('way)."
			2. Girl eat soup.	"eat"	"Girl eat cereal."
			3. Boy play ball.	"ball"	"Boy throw ball."
			4. Lady read book.	"girl"	"Lady read story."
			5. Boy look ball.	NR	"Boy lost ball - look (and ges.) ball"

appropriate untrained N-V-O responses (constituents were trained in training constructions) to novel pictures, (c) 5 out of 6 appropriate words or gestures in the respective verb or object position within untrained constructions which contained one or two untrained constituents (verb and/or objects), and (d) an open class of responses which had been primed by the experimenter within specific trained constructions. During the first three of N-VO training the experimenter inconsistently gave response primes of N-V-O that contained one appropriate constituent which differed from the constituent contained in the subject's N-V-O response. Subject 1 started using different open class constituents in the last four blocks of N-V-O training. She also began to expand her N-V-O responses to include a few prepositions, verb + ing forms and copula 'is' that were being used by the experimenter within the response primed constructions. These expansions made by Subject 1 occurred within the correct constituent position; however the preposition was sometimes used in place of the verb.

Data for Subject 1 shows that Subject 1 was trained to produce N-V-O constructions. Generalization data shows that Subject 1 didn't learn to memorize trained word chains to pictures, but rather the learned the N-V-O constructions that are expressed by 'agent-action-object' words. Subject 1 was also able to give appropriate answers to "Wh" questions about the trained pictures and about recurring, functional events within her environment. An increase of N-V, V-O, and N-V-O constructions were also reflected in the subject's spontaneous speech; for example, "Look boy!" - "Me take candy" ... (E - "Where?") ..."Cottage." - "Go school, me."

Decisions concerning therapy goals for additional language training included increasing the number of expansion responses which were inconsistently occurring within Subject 1's N-V-O responses. For example when the experimenter introduced the prepositions as verbal stimuli paired with gestures within the response primes, Subject 1

began to first include the appropriate gestures within her N-V-O responses. During the final blocks of N-V-O training, Subject 1 was inconsistently using the vocal/gesture, preposition responses of "in," "on," and "over" within her appropriate N-V-O construction responses.

Subject 2

Pre-Training Tests

The pre-training tests for Subject 2 were presented to Subject 2 in reverse order according to the data presented in Table 8. The picture stimuli only was presented first and the Non-vocal (action) response test was presented last.

Subject 2 responded correctly to 90% of the non-vocal-action responding test items and to only 50% of the non-vocal-pointing pre-training test items. She imitated 90% and 100% of the vocal stimuli presented respectively in the first and second trials under the vocal imitation response test. Subject 2 gave two correct verb response to a block of ten pictures paired with "What + doing?" questions. She gave one correct verb response to a block of ten pictures which were paired with the verbal stimulus, "Tell me about the pictures." Subject 2 gave no N-V, V-O, or N-V-O responses to either picture or picture/question stimuli. The typical response to these stimulus presentations were nouns expressed in the object position of the N-V-O construction represented in the picture. The typical spontaneous responses made by Subject 2 in the two 3-minute speech sample consisted of mostly gestures paired with very few nouns. The verb 'go' was used once.

Acquisition of Non-Vocal and Vocal Verb Responses During Verb Training

The acquisition of non-vocal and vocal verb responses for Subject 1 are charted in Figure 3. The Verb training sequence was divided into two training sets. The first

Figure 3

Subject 2 – Aquisition of Non-Verbal and Verbal Responses During the Verb Training Procedures

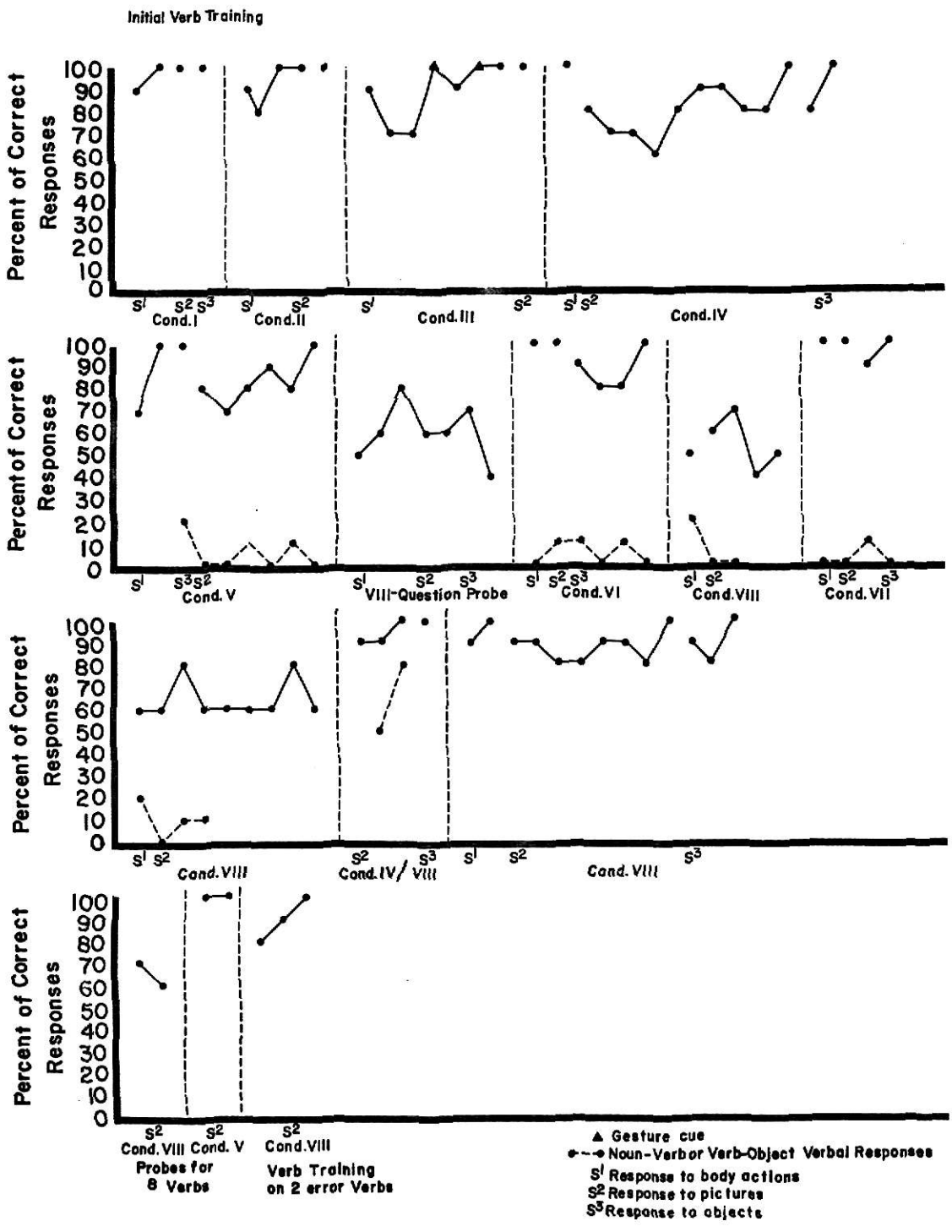


TABLE 8

Subject 2 - Pre-training Tests of Non-Vocal; Imitation; Picture and Question; and Picture Evoked Responses

Picture Representation	Non-Vocal Responses: Actions		Non-Vocal Responses: Pointing		Vocal Imitation (Approximations)		Picture and Question Responses	Responses to Pictures
1. Girl sleep bed	+	+	-	+	+	+	"sleep"	"bed"
2. Girl eat soup	+	+	+	+	+	+	"soup"	"cookie"
3. Boy walk	+	+	-	-	+	+	"run"	"boy"
4. Boy run	+	+	-	-	+	+	"run"	NR
5. Boy sit chair	+	+	+	-	+	+	"chair"	"chair"
6. Lady read book	+	+	+	+	+	+	"book"	"book"
7. Boy look ball	-	-	-	-	+	+	"ball"	"ball"
8. (Children)								
Girl (Boy) play ball	+	+	-	-	+	+	"ball"	"ball"
9. Girl jump rope	+	+	+	+	-	+	"rope"	"jump"
10. Girl ride horse	+	+	+	+	+	+	"horsie"	"horsie"
	90% 1st Trials	90% 2nd Trials	50% 1st Trials	50% 2nd Trials	90% 1st Trials	100% 2nd Trials	20%	10%

set of two verbs (sit and stand) were trained to S^1 - actions, S^2 - pictures, and S^3 - objects under Conditions I, II, III, IV, V, VI, VII, IV/VIII, and VIII. After analyzing the data for S^2 (response to pictures) under Condition IV, the experimenter presented S^3 and then S^2 in Conditions V and VI. Conditions VII was introduced after Subject 2 failed to meet criteria under the Condition VIII (question) probe after Condition VI was trained. Paired Conditions IV/VIII were introduced after Subject 2 failed to meet criteria on

Condition VIII, even when a cost contingency was applied during that Condition. The cost contingency procedure under Condition VIII and the decision to pair Condition IV/VIII were made because Subject 2 was giving a mand response to E's action under Condition VIII, and she was responding under S^2 of Condition VIII without first looking at the pictures. Paired Conditions IV/VIII required a non-vocal response followed immediately by the "What + doing?" question stimulus. Therefore, Subject 2 had to manipulate the objects to perform the verb action (S^3) before the question stimulus (Condition VIII) was presented, and then point to the correct picture (S^2) before the question stimulus (Condition VIII) was presented. Subject 2 seemed to respond better to object stimuli (S^3) than to picture stimuli (S^2) regardless of which preceeded the other.

After Subject 2 met criteria on the first set of training verbs, the eight additional training verbs were probed under Condition V- S^2 non-vocal responding to pictures and vocal imitation, and under Condition VIII - "What + doing?" questions/pictures. Subject 2 responded correctly to all eight verbs under the Condition V probe and she responded correctly to six of the eight verbs under the Condition VIII S^2 probe. Therefore, the two verbs that Subject 2 responded incorrectly to under the Condition VIII S^2 probe were trained to pictures (S^2) under Condition VIII.

Table 9 represents the number of training blocks that were required for Subject 2 to meet criteria during Verb training. The number of training blocks are listed for each training condition.

Subject 2 required extensive training on the initial set of training verbs; however, once she passed Condition VIII (verb response to "What + doing?" questions), she gave eight correct non-vocal/vocal imitation responses to the Condition V probe and six correct vocal-verb responses to the Condition VIII probe for the eight additional untrained verbs. Subject 2 required minimum training on the second set of two verbs under verb training.

TABLE 9

Number of Training Blocks Required for Subject 2
to Meet Verb Training Criteria

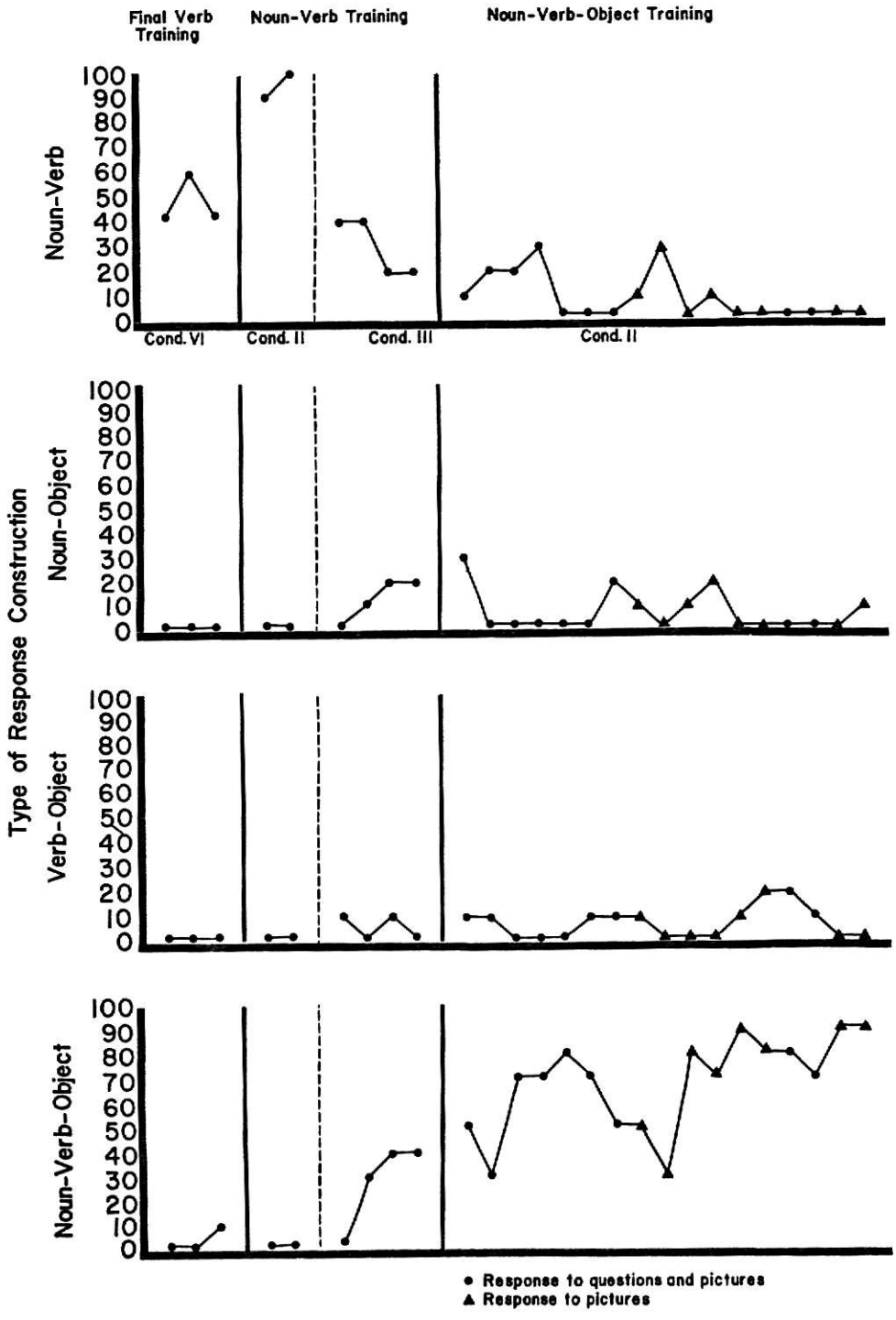
1st Set of Verbs - Two Verbs Trained	Number of Blocks
Condition I	4
Condition II	5
Condition III	8
Condition IV	14
Condition V	9
Condition VI	6
Condition VIII	5
Condition VII	4
Condition VIII	9
Conditions IV/VIII	3
Condition VIII	13
2nd Set of Verbs - Two Verbs Trained (6 Verbs Passed Probe Criteria)	Number of Blocks
Condition VIII - S^2	3

Emergence of N-V-O Constructions

Fifty percent of the Subject 2's verb responses under the second set of training verbs were Noun-Verb constructions (Figure 4). The ten pictures that were used during Verb training were also used during the Noun-Verb training and Noun-Verb-Object training. Subject 2 met criteria on vocal imitation - Condition II under the Noun-Verb training within two training blocks. On the final two blocks of Noun-Verb

Figure 4

Subject 2 - Aquisition of Two-Three Word Constructions Under Verb Training, Noun-Verb Training and Noun-Verb-Object Training



training. Subject 2 gave 40% N-V-O responses, 20% N-V responses and 20% N-O responses to questions/pictures. Since Subject 2 was producing 4 out of 10 N-V-O responses to N-V training, the reinforcement contingency was changed to require N-V-O responses; that is, Noun-Verb-Object training was initiated. Nine blocks of picture stimuli only were presented during the N-V-O training. Subject 2 met criteria for N-V-O training after 17 training blocks were presented. The number of the subject's N-V-O responses in N-V-O training (Figure 4) decreased during the 7th, 8th, and 9th training blocks. Subject 2 was including the copula 'is' in the constructions, but she was also omitting some of the verb or object constituents. For example she would say, "Girl is ball, and "Boy is sitting." After the 9th training block, Subject 2 began to include some "is," "verb + ing," or "prepositions," constituents within the N-V-O constructions without omitting the verb or object constituents.

Subject 2 responded to 80% of the "Wh" questions about the pictures on the last two training blocks. For example after each response on these blocks, the experimenter would ask two or three appropriate "Wh" questions ("Who's walking?" "Where's the boy walking?") and the subject was required to give the appropriate answer to each question about the picture.

Under each training sequence, Subject 2 was given an extra token for an addition response that was a constituent of the response construction to be trained later. Subject 2 was given social praise for each spontaneous untrained construction that was equivalent to the type of construction being specifically trained. She was intermittently given tokens for these types of spontaneous responses. During the final three blocks of N-V-O training, Subject 2 consistently gave the appropriate, "I want _____," response when the experimenter provided the gesture cue for "I"; however, the 'I' gesture cue seemed

to cue "I want" for Subject 2. During the token exchange the gesture cue for "have" had to be provided immediately after the subject said, "I" or she would say, "I want ten!" Spontaneous speech samples of the same type were, "Me go school." - I want go bathroom." - "Take back cottage? - me." Although Subject 2 was producing some N-V-O response constructions in her spontaneous speech, her typical response pattern was a chair of topic - comment type of response, such as, "Sit in chair - doll - naughty doll - fall - hurt knee?" Subject 2 was expanding some of her N-V, V-O, N-VO constructions and she began using strings of N-V, V-O, noun phrase constructions to spontaneously talk about events in her environment.

Generalization of Syntactic Constructions to Untrained Pictures

The pre- and post- training generalization responses made by Subject 2 are listed in Table 10 to the right of each type of generalization picture representation. The majority of pre-training generalization responses were nouns (agents) and nouns (objects) - one verb was used appropriately. Subject 2 gave no two-word constructions during the pre-training generalization tests. Generalization data shows that Subject 1 produced: (a) 4 out of 5 correct trained N-V-O responses to novel pictures and expansions within or to 3 of the 5 responses, (b) 5 out of 5 appropriate untrained N-V-O responses (constituents were trained in training constructions) to novel pictures, (c) 4 out of 5 appropriate words or gestures in the respective verb or object position within untrained constructions which contained one or two untrained constituents (verb and/or objects), and (d) an open class of responses which had been primed by the experimenter within specific trained constructions. Subject 2 displayed a large number of open class words in the "Agent eat _____," and "Agent walk(run) _____," constructions. Many of her open class words had not been primed by the experimenter during training. Subject 2 also produced a number of verb + ing expansions within her N-V-O generalization responses.

TABLE 10

Generalization of Syntactic Constructions to Novel (Untrained) Pictures for Subject 2

Picture Representation of Four Types:					
Trained Constructions Trained Constituents	Untrained Constructions Trained Constituents	Untrained Constructions Constituent(s) Untrained	Trained Constructions Open Class Primed	Pre-training Responses	Post-training Responses
1. Girl sleep bed.				"bed"	"Girl is sleepin."
2. Boy run fast.				NR	"Boy run church."
3. Girl eat soup.				"cookie"	"Girl eat soup-(ges 'no') want soup."
4. Boy play ball.				"ball"	
5. Girl ride horse.				"horsie	"Boy play ball"
					"Girl ride horse - broke leg?"
	1. Boy sleep bed.			"bed"	"Boy in bed - sleep bed."
	2. Girl walk.			"run"	"Girl walk church."
	3. Man run.			"run"	"Daddy runnin home."
	4. Lady eat _____.			"uh"	"Mama eat candy."
	5. Man play ball.			"ball"	"Daddy playin ball."
		1. Baby cry.		"Baby"	"Baby boy - girl-boy is baby."
		2. Girl wave.		gesture 'wave'	"Girl (ges. 'wave') bye."
		3. Man drink pop.		"pop"	"Man (ges. drink) uh pop."
		4. Boy write letter.		NR	"Picture write picture."
		5. Girl play doll.		"Baby"	"Girl (ges. hold) baby."
			1. Boy run home.	NR	"Boy run church."
			2. Girl eat soup.	"soup"	"Girl eat ice cream."
			3. Boy sit chair.	"chair"	"Boy on chair."
			4. Girl sleep bed.	"bed"	"Boy in bed."
			5. Boy walk ____.	"Boy"	"Boy walk cottage-naughty."

Subject 2 demonstrated that she could produce appropriate N-V-O responses to trained and untrained pictures. If Subject 2 didn't know the word for the action or object represented in a novel picture, she would consistently insert an appropriate gesture or an "uh" response in place of the verb or noun(object) within her N-V-O response to the novel picture.

After Subject 2 met criteria on the N-V-O training and after the generalization tests were completed, the reinforcement contingency was changed—a token was presented for only N + is + Verb +ing + object responses. The copula "is" was introduced as a paper symbol (=) paired with the echoic "is" stimulus after the subject produced the 'agent' of the trained N-V-O constructions.

Subject 3

Pre-training Tests

The pre-training test data for Subject 3 is presented in Table 11. The tests were presented to Subject 3 in the reverse order of which they are presented in Table 10 and in the discussion.

Subject 3 made 100% correct responses to the non-vocal action pre-test and 70% to the non-vocal pointing pre-test. He imitated 80% of the verbs and responded to 20% of the items on each vocal pre-test. Many of his vocal responses to questions consisted of the last word of the question or the word, 'that.' However, during the vocal imitation pre-test Subject 3 imitated the verb and also made a '+ ing + the + object' response. For example, if the experimenter said, "Say, play," Subject 3 would say, "Playin the ball." Subject 3 emitted no spontaneous speech during the pre-test period. "Wh" questions evoked only a few appropriate responses. The majority of responses to questions were inappropriate.

TABLE 11

Subject 3 - Pre-training Tests of Non-Vocal; Imitation; Picture and Question, and Picture Evoked Responses.

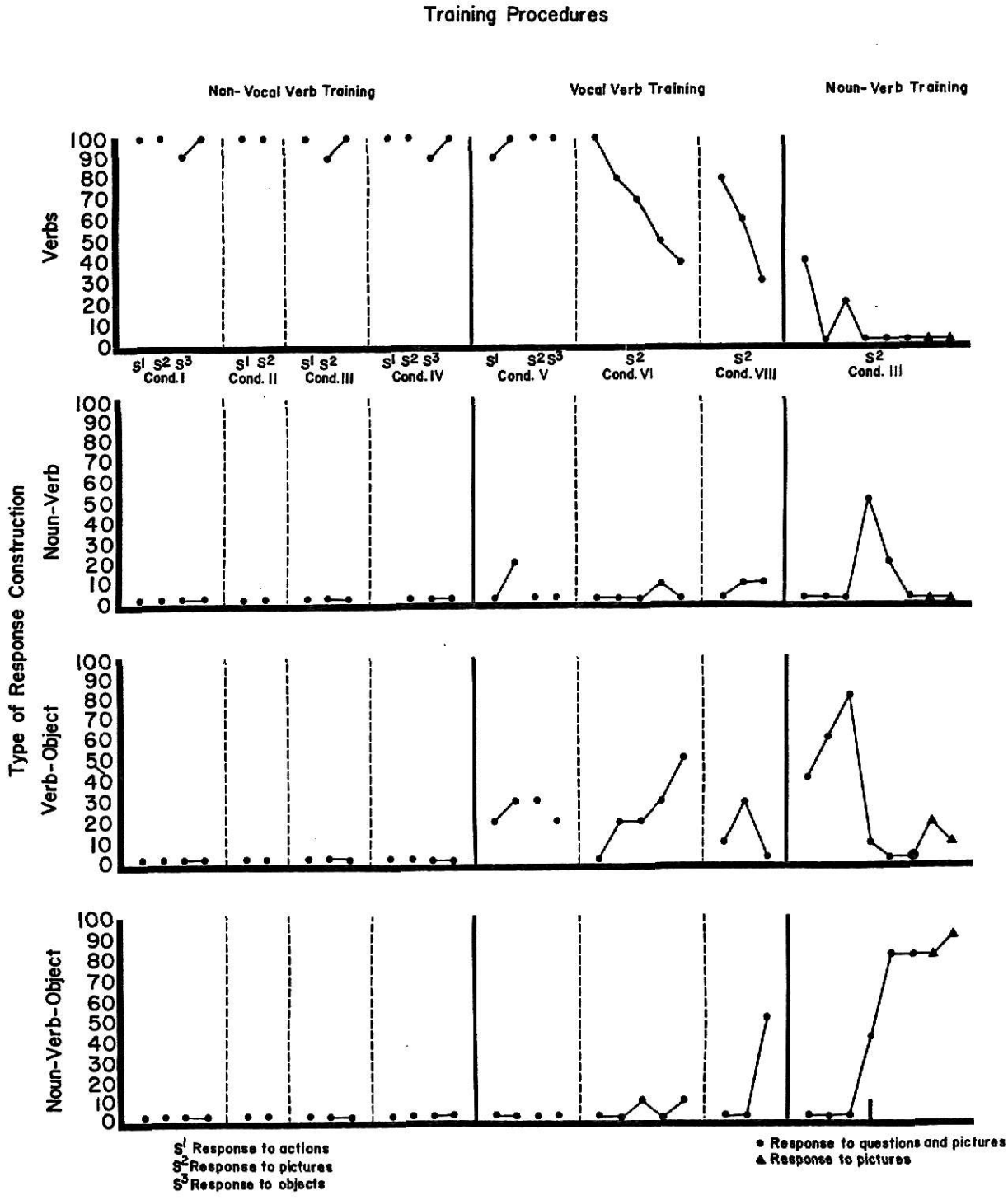
Picture Representation	Non-Vocal Responses				Vocal Imitation (Approximations)		Picture and Question Responses	Responses to Pictures
	Actions		Pointing					
1. Girl sleep bed	+	+	+	+	+	+	"sleepin"	"sleepin"
2. Girl eat soup	+	+	+	+	+	+	"eatin"	"eatin"
3. Boy walk	+	+	-	-	+	+	"what"	NR
4. Boy run	+	+	-	-	+	+	"that"	pointed
5. Boy sit chair	+	+	+	+	chair	chair	"chair"	NR
6. Lady read book	+	+	-	+	+	+	"doing"	NR
7. Boy look ball	+	+	+	-	+	+	"doing"	pointed
8. (Children) Girl (Boy) play ball	+	+	+	+	-	-	"ball"	"ball"
9. Girl jump rope	+	+	+	+	+	+	"that"	NR
10. Girl ride horse	+	+	+	+	+	+	"horse"	"horse"
	100% 1st Trials	100% 2nd	70% 1st Trials	70% 2nd	80% 1st Trials	80% 2nd	20%	20%

Acquisition During Verb Training

Since Subject 3 demonstrated verb + object responses with expansions during the vocal imitative pretest, the ten verbs that were contained in the N-V-O constructions to be trained later were trained as one set in the Verb training. Subject 3 was given Verb training to S^1 - actions, S^2 - pictures and S^3 objects under Conditions I, II, III, IV and V (Figure 5). He responded with 90% to 100% correct responses on these Conditions.

Figure 5

Subject 3 Acquisition of Non-Verbal and Verbal Responses Under the Sequential Training Conditions



Subject 3 began to produce a few N-V and V-O responses during Condition V of the Verb training. In the final training block for Condition VI, Subject 3 produced one N-V-O response and five V-O responses. In the final (3rd) training block of Condition VIII, Subject 3 produced five N-V-O response and one N-V response. Subject 3 met Verb training criteria after 25 training blocks. He was also producing a few N-V, V-O, and N-V-O constructions during Verb training.

Emergence of N-V-O Constructions

Subject 3 was trained only to Condition III - question/picture stimuli - under Noun-Verb training since he was producing 50% N-V-O constructions in the final Verb training block. Therefore, only the reinforcement contingency was changed; that is, the subject was required to give a N-V-O response before he was reinforced. Since Subject 3 was producing numerous V-O responses under Verb training, he was not given an additional token reinforcer for producing an 'object' constituent during Noun-Verb training.

During the initial three N-V training blocks, the question stimulus was "What agent doing?" On the fourth N-V training block, the question was changed to "What doing?" with the 'agent' being omitted from the question stimulus. After the question stimulus was changed, Subject 3 produced an increase of N-V and N-V-O responses. Subject 3 met criteria for N-V-O training under N-V training. Although N-V-O responses weren't required for reinforcement under N-V training, Subject 3 began producing N-V-O constructions. Subject 3 also consistently produced 'is-verbing-the + object' expansions within the N-V-O constructions during Noun-Verb Training.

Generalization of Syntactic Constructions to Untrained Pictures

The pre-and post- training generalization responses made by Subject 3 are listed in Table 12 to the right of each type of generalization picture representation. Each

TABLE 12

Generalization of Syntactic Constructions to Novel (Untrained Pictures) for Subject 3

Picture Representation of Four Types:				Pre-training Responses	Post-training Responses
Trained Constructions Trained Constituents	Untrained Constructions Trained Constituents	Untrained Constructions Constituent(s) Untrained	Trained Constituents Open Class Primed		
Primed 'Objects'	Primed 'Objects'	Primed 'Objects'	Primed 'Objects'		
1. Boy run ____.				"The boy"	"Boy's runnin."
2. Girl sleep bed.				"sleep"	"The girl's sleepin."
3. Boy walk ____.				"The boy"	"Boy's walking."
4. Boy sit chair.				"chair"	"Boy's sittin the chair."
5. Girl eat Soup.				"eat"	"The girl's eatin dinner."
	1. Man sit chair.			"chair"	"Daddy sittin down the chair."
	2. Girl run ____.			pointed	"The girl's running."
	3. Lady eat ____.			"eat"	"Lady's eatin food."
	4. Boy play ball.			"that"	"Boy's catchin the ball."
	5. Man ride horse.			"the horse"	"Boy's ridin the horse."
		1. Girl blow horn.		(ges. blow)"that"	"Girl's honking the horn."
		2. Boy write letter.		(ges. write)	"Boy writin."
		3. Girl play doll.		NR	"Girl's playin."
		4. Man drink water.		"that"	"Daddy (ges. drink) this drink."
		5. Man drive car.		"car"	"Daddy ride car."
			1. Boy look ball.	"ball"	"Boy seein the ball."
			2. Girl eat soup.	"eat"	"Girl's eatin that."
			3. Boy run ____.	"The boy"	"Boy's walkin the cottage."
			4. Boy walk ____.	"The boy"	"Boy's walking the cottage."
			5. Girl sleep bed.	"sleep"	"Girl's goin sleep."

group of pictures were present after the experimenter said, "Tell me about these pictures." The majority of Subject 3's responses to the pre-training generalization items were nouns(objects) or a pointing response paired with the verbal response, "That." The subject's 'that' response didn't seem to refer to any specific referent. Subject 3 did produce a few verbs to the pre-training generalization stimuli. Generalization data shows that Subject 3 produced: (a) 3 N-V-O responses and 2 N-V responses to novel pictures which represented trained constructions, (b) 4 N-V-O appropriate responses out of 5 untrained N-V-O constructions to novel pictures, (c) 5 out of 5 appropriate words or gestures in the respective verb or object position within untrained constructions which contained one or two untrained constituents, and (d) an open class structure - only 2 out of the 5 open class structure words had been previously primed by the experimenter.

Subject 3 produced a majority of interesting types of responses to the post-training generalization items. Subject 3 used more appropriate open class structure words to the novel pictures than he used during training. During the post-training generalization test, Subject 3 didn't produce 'objects' or 'indirect objects' in intransitive sentences; where as, Subjects 1 and 2 used more open class words and expansions in the intransitive sentences. A few of Subject 3's constituent responses to the generalization items slightly changed the meaning of the sentence construction: for example: "Girl's honking(blowing) the horn," "Daddy ride(drive) car," "Boy seein(looking) ball," "Girl's going sleep (sleep bed)." Subject 3 began to use the final sentence articles (the chair) soon after the experimenter used them in her response primes. Subject 3 began to inconsistently use the initial sentence articles (the girl...) only in the two final blocks of N-V training, although he did produce several isolated article-noun(agent) in pre-training responses. The post-training articles that Subject 3 produced, consistently modified the agent 'girl.' Subject 3 began producing the copula 'is' as a contraction with the noun(agent) although it was given as an isolated constituent within the experimenter's response prime.

Data for Subject 3 shows that Subject 3 was trained to produce N-V-O constructions to question and/or picture stimuli. He also produced fairly complete sentence expansions. Although these expansions were used by the experimenter in the response primes, the subject's expansions occurred within the constructions almost simultaneously. For example, the underlined expansion in 'Agent's - action + ing- the - object,' were produced within the same construction when Subject 3 first produced them. However, Subject 3 did not demonstrate the use of expansions that were not used in the response primes.

During the final three N-V training sessions, Subject 3 was producing 40% "I" responses and 60% "Me" responses when he requested a penny or requested to go to the bathroom or to get a drink. Subject 3's post-training spontaneous speech responses consisted of requests and some "Wh" questions, such as, "What ya doing?" "What's that?"

After Subject 3 met criteria for the N-V-O training, the prepositions 'by,' 'in,' and 'on,' were trained under the training conditions which were used for Verb training. The prepositions 'over,' 'to,' and 'with,' were trained to gesture/vocal imitative stimuli within the trained N-V-O constructions.

Summary

Pre-training tests showed that the three subjects used one constituent to express the 'agent-action-object' relation that was represented in question and/or picture stimuli. Each subject's constituent responses consisted of noun 'agent' or noun 'object.' The subjects produced no verb 'action' responses or a very limited number of verb 'action' responses to the question and/or picture stimuli.

The principal findings of the present study provide evidence that the subjects produced N-V-O responses and some expansions on these N-V-O constructions after

completing training under the sequencial Verb training, N-V training, and N-V-O training conditions. The subjects also produced N-V-O responses to novel pictures which represented four different types of generalization tests. Two of the subjects produced a large number of N-V, V-O, and N-V-O responses in their spontaneous speech after the N-V-O training was completed. Additional therapy goals were then established for further language training.

Chapter V

Discussion

Studies in the field of verbal behavior have demonstrated that specific classes of verbal behavior can be modified under controlled conditions. These studies indicate that modification of specific language behavior has been successful by the use of operant conditioning techniques. Specific procedural techniques that have been demonstrated to be effective in establishing, maintaining, and modifying various aspects of verbal behavior were employed in the development of the present language training program.

Bloom (1970) investigated the 'form' and 'function' of emerging grammars in normal children, accounting for the semantic intent of the child. Bloom provided persons interested in language training with a different approach to the study of syntactic development. She stressed that the manifestation of the referent in the contexts of speech events was most significant to the child in learning the syntax of language.

The previous study was designed as a systematic language program for the training of the basic grammatical relations - Noun-Verb-Noun(Agent-Action-Object). The intermediate and terminal linguistic goals of the program were based on Bloom's developmental data. The developmental data and learning strategies which Bloom (1970) provided seem to be productive models for establishing guidelines that are applicable in training functional language to mentally retarded children.

Before training was initiated the subjects used only one constituent to express the relation of 'agent-action-object.' Each subject's majority of one-word verbal utterances in spontaneous speech and to "What + doing" questions paired with pictures consisted of noun(object) referents. The three subjects demonstrated an absence or extremely limited

number of verb referents or relations in spontaneous speech or in response to "What + doing" questions.

The principal findings of the present investigation provide evidence that the sequential stimulus controls employed in the program were effective in changing the subjects' one-constituent response to question and/or picture stimuli to a "Agent-Action-Object' response. The discussion of these findings will be presented in terms of the following: (a) training program, (b) generalization and (c) experimental problems.

Training Program

The initial class(es) of responses to be trained in the daily therapy sessions were as follows: (1) ten action-verbs, (2) Noun-Verb constructions, and (3) Noun-Verb-Object constructions. Initial class(es) of responses to be trained during the token exchange period were: (1) Noun (as object), (2) non-action Verb + Object constructions, and (3) proper Noun-Verb-Object constructions. Classes of responses to be presented in spontaneous speech and play environment were responses that signalled non-existence, rejection, and reoccurrence; and descriptive adjectives, and question indicators.

There were four general strategies used in the program for training production of the (1) action Verbs, (2) Noun-Verb constructions and (3) Noun-Verb-Object constructions. The four general strategies used were: (1) non-vocal discrimination to non-verbal stimuli, (2) non-vocal discrimination to verbal stimuli, (3) vocal/speech responses to verbal imitative stimuli, and (4) functional speech responses to non-verbal and/or verbal stimuli.

The schedule of reinforcement was continuous, with each correct response being immediately followed by presentation of a token paired with a type of social praise. Additional tokens were given for an additional response that was a component of the desired response. Each response was followed by a type of telegraphic expansion that was directed to and then beyond the desired response.

The materials used in the training sessions were body actions, pictures and objects. All three subjects seemed to respond best to action stimuli. The two female subjects demonstrated more incorrect responses to pictures.

The three subjects acquired both the Noun-Verb, and Verb-Object constructions before the constructions were presented by verbal imitation. The subjects also inconsistently expanded a few of their final Noun-Verb-Object constructions to include the copula 'is,' verb + ing, and prepositions (locative). The two female subjects required intensive verb training to the 'wh' question/picture stimuli.

The results of the present investigation indicate that the sequential stimulus conditions employed in the program were effective in expanding each subject's one-constituent response to question and/or picture stimuli to a "Agent-Action-Object' construction. The subjects' additional expansions within their N-V-O responses seem to indicate that the experimenter's response prime (N-V-O expansion) served as a prior stimulus. The experimenter couldn't predict which constituent within the response prime would be used as a response unit within the subjects' N-V-O response. However, once the subject began to use one constituent expansion more consistently than another, it provided a guideline for addition intermediate therapy goals.

Although specific post-training data for spontaneous speech is not reported, the experimenter feels as though the infrequent play periods within the therapy session were beneficial for expanding and extending the syntactic constructions that were trained in therapy. The play periods also provided situations in which the subjects could produce N-V-O constructions in functional situations.

Gestures paired with the verbal constituents seemed to be an effective stimulus and response mode for training non-action verbs and for giving the subjects the correct structure position for prepositions.

Generalization

Pre- and post- training generalization tests of the syntactic constructions consisted of untrained (novel) pictures. These pictures represented four types of generalization: (a) trained constituents within trained constructions, (b) trained constituents within untrained constructions, (c) constructions in which one or two constituents were untrained and (d) open class structure in which the constituents were primed.

The data for the generalization tests for the three subjects showed that the subjects were able to produce N-V-O constructions to novel pictures which represented the previously listed types of generalization tests. The novel pictures often elicited increased expansions on the subjects' trained N-V-O structures.

Experimental Problems

Additional branching procedures were included in the program for individual subjects when the subjects showed that they were having difficulty with a specific training condition. Subject 2 wasn't attending to the visual stimulus items under Condition VIII during Verb training. First, a cost contingency procedure was used if Subject 2 gave a verbal response to the question "What + doing" before looking at the picture or object manipulation. However, this procedure didn't produce a noticable increase in the subject's correct responses. Condition IV (non-vocal discrimination) was then paired with Condition VIII (questions) in an alternate sequence so that Subject 2 had to point to the picture or manipulate the object before the "What + doing?" question was presented. Data for the initial Conditions of Verb training also indicated that Subject 2 responded with more correct responses to object stimuli than to picture stimuli. Therefore, the object stimulus (S^3) was presented before the picture (S^2) in the proceeding training conditions.

The investigator feels that the criteria level for the Verb training sequence was set too high. Perhaps three correct responses out of three stimulus presentations would have been a more effective and efficient criteria level. During N-V training, decisions were made to advance to N-V-O training if the subject(s) were giving 40% correct N-V-O and 20% or more V-O responses. In this case, the subjects were giving 'object' responses and receiving an additional token when the 'object' was emitted within N-V-O responses; however, they were also using some V-O responses in place of N-V responses.

Summary

Studies have demonstrated that specific language behavior can be modified by the use of operant conditioning techniques. These studies have provided strategies and techniques for persons interested in developing language training programs; however, they have not specified what the intermediate or terminal goals of language training should be.

Until recently the linguists in the area of language acquisition have provided few answers to how a child learns to express the basic grammatical relations that are represented in his speech. Bloom (1970) has provided us with new insights into the area of early language acquisition. She stated that children seem to identify particular syntactic structures with the behavior and content with which they are perceived and then progress to reproduce structures in similiar, recurring contexts. She emphasized that the 'function' of the child's early utterances are just as important as the form. Bloom analyzed the speech of three young children to learn what function she thought that they were expressing. Her research gives persons interested in the area of language training some initial directions in which to proceed in order to develop an early language program. Bloom also offered information about how constructed utterances may develop. The child doesn't

seem to have an unsystematical language system as often appears. Bloom stressed the importance of structuring objects and events in an order that the child may perceive, understand and eventually express relations of his world, first in terms of agent-action-object relations.

The purpose of the present investigation was to develop an early language training program that would structure the basic grammatical relations in which the child could discriminate and later express these basic grammatical relations. The program employed some of the strategies and techniques that have been demonstrated to be effective in modifying language behavior. Developmental data, which was noted by Bloom, was used in order to plan initial and intermediate therapy goals to be used within the program.

The training program administered in this study was designed to attain Noun-Verb-Object responses to action pictures and questions about those pictures. The training program consisted of three distinct training conditions: (1) training on the verbs contained in the pictures, (2) training on Noun-Verb constructions, and (3) training on Noun-Verb-Object constructions. The four general procedural strategies used to train the subjects to use Noun-Verb-Object constructions were: (a) non-vocal discrimination to non-verbal stimuli, (b) non-vocal discrimination to verbal stimuli, (c) vocal/speech responses to verbal imitative stimuli, and (d) functional speech responses to non-verbal and/or verbal stimuli.

Prior to training all subjects were presented the training items under each of the four general procedural strategies that were used in training. The subjects' responses to the pre-training tests were compared to final- and post- training test responses. Pre- and post- training generalization items included trained constructions to novel pictures, novel pictures that represented trained constituents but untrained constructions, and pictures that represented constructions in which one constituent was untrained.

The results of the training program supported the program's effectiveness. The subjects who used a single noun to express a Noun-Verb-Object relation to pictures and/or question were trained to express N-V-O relations to the training pictures. The subjects also expressed the appropriate N-V-O constructions to the generalization items. Generalization items that included constructions which contained an untrained constituent were frequently responded to with the untrained constituent being expressed by an appropriate gesture or "uh?" within the N-V-O response.

It should be recognized that no child in need of language training should be molded to fit a particular training program. Language assessments should include aspects of language which are most functional for a child who is delayed in language development. Any language training program should be flexible in that it provides branching steps for the children who require them.

Recommendations for Further Research

In order to allow language programming to be effective and efficient, the program should constantly be evaluated in terms of each subject. The child should be presented with stimuli that is also functional to him.

Variations of the procedures used in the present program need to be attempted and evaluated in terms of the programs effectiveness and efficiency. Also, the children in a language program are excellent sources of information for establishing what is important for them to express.

The use of video tapes and slides would seem to be more effective and reinforcing for the subject than picture stimuli. Variations in the verbal stimuli might include adult model sentences to be used instead of telegraphic speech. Additional research on a full imitative stimulus versus a telegraphic model stimulus should be attempted.

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APPENDICES

APPENDIX A

Test Data on Subjects

Appendix A

Test Data on Subjects

Subject 1 (D. S.)

Birthdate: 10-2-61

CA: 9-3

Parsons Language Sample III (Spradlin, 1963)

Vocal	43.3
Non-Vocal	59.7
Mean	51.5

Peabody Picture Vocabulary Test (Form B)

Raw Score	48
MA	4-11

Subject 2 (J. P.)

Birthdate: 8-30-59

CA: 11-4

Parsons Language Sample III (Spradlin, 1963)

Vocal	45
Non-Vocal	49
Mean	47

Peabody Picture Vocabulary Test (Form B)

Raw Score	23
MA	2-11

Subject 3 (L. M.)

Birthdate: 7-8-60

CA: 11-7

Parsons Language Sample III (Spradlin, 1963)

Vocal	44
Non-Vocal	49
Mean	46

Peabody Picture Vocabulary Test (Form B)

Raw Score	36
MA	3-7

APPENDIX B

Materials

APPENDIX B

Materials

Pictures

(2 sets of each)

Man
Lady
Boy
Girl
Baby
Girl sleep bed.
Girl eat _____.
Boy walk _____.
Boy sit chair.
Lady read book.
Boy look ball.
Girl play ball.
Girl jump rope.
Girl ride horse.
Boy run home.
Girl sit chair.
Girl wave.
Boy stand.
Boy run _____.
Boy eat soup.
Girl come _____.
Girl going _____.
Boy sleep bed.
Dad sit chair.
Baby cry.
Boy fall.
Boy throw ball.
Boy push box.
Boy write letter.
Boy kick ball.
Boy jump over tree.
Girl blow horn.
Man ride horse.
Boy drink water.
Lady stand.
Lady sit chair
Lady eat _____.
Lady stand on chair.

Objects

(2 sets of each)

Man (6")
Lady (6")
Boy (4 1/2")
Girl (4 1/2"
Baby (2")
Car
Chair
Bed
Horse
Big red ball
Little white ball
Colored blocks
Cup for tokens
Poker chips

Gestures

"to" - cross index fingers with one palm up and one palm down.

"want" - hand extended with palm up.

"have" - one or both hands over object.

"in left hand in a loose fist with thumb and index finger upward insert right thumb and index finger into fist.

"on" - right hand placed on left hand - both palms down.

"over" - right hand is moved over left arm in an up and over motion.

"Ron" - point to S

"Miss Smith" - point to E

"I" - place left hand in a fist, with thumb against chest and little finger extended upward.

"You" - E points to S

"You" - S points to E.

The action pictures used for training were: Action Pictures for Flannel Board, Ideal, No. 270 H-1. Pictures used for probes and generalization were: action pictures in What's Its Name? A Guide to Speech and Hearing Development: Jean Utley, University of Illinois Press, Urbana, Chicago and London, 1968. The flexible, rubber dolls (objects) were ordered from: Teaching Aids: 1970-1971, p. 30, R. H. Stone Products, 18279 Livernois, Detroit, Michigan 48221.

APPENDIX C

Demonstration of Program

Initial Verb Training

Condition I, Step 1 - Imitative body action to a motor model.

Objective:
S will imitate E's body actions of 'sit' and 'stand' which are paired with the verbal mands, "sit" and "stand." S will correctly imitate a block of ten motor actions which are paired with the verbal mands, "sit" and "stand" - five for each of the training verbs 'sit' and 'stand' - before advancing to the next step in the program.

Materials:
None

Training Procedure:
S is standing facing E. Both chairs are away from the table. The stimuli for 'sit' and 'stand' are presented in recurring blocks of ten. Within each recurring block of ten, each mand for 'sit' and 'stand' is presented five times in a scrambled order.

Training: Verbs	Discriminative Stimuli	Correct Responses	Reinforcement	Incorrect Responses	Criteria	Response Priming
'sit'	E says, "Ron, do this, sit," as E sits.	S sits within 5 seconds after S^D is presented.	S is reinforced with a token paired with social praise for a correct response.	If S fails to sit within 5 seconds after S^D is presented, S is placed in a sitting position as E says, "Ron sit."	S advances to the next step in the program when he correctly responds to 10 out of 10 stimulus presentations (100% correct responding in a block of ten - five for 'sit' and five for 'stand').	No response is primed.
'stand'	E says, "Ron, do this, stand," as E stands.	S stands within 5 seconds after S^D is presented.	S is reinforced with a token paired with social praise for a correct response.	If S fails to stand within 5 seconds S^D is presented, S is placed in a standing position as E says, "Ron stand."		No response is primed.

Condition I, Step 2 - Imitative pointing response to picture.

Objective:
S will imitate E's pointing to a picture representing 'sit (stand)' while the accompanying mand, "Point to 'girl sit (stand is also given. S will correctly point to a block of ten pictures to E's model paired with the verbal mand - five for each of the training verbs 'sit' and 'stand' - before advancing to the next step in the program.

Materials:
Three pictures representing action verbs: 1.) 'girl sit,' 2.) 'girl stand' and 3.) one picture chosen from seven of the additional verbs being trained; the picture, 'girl walk' is not used as a foil. Picture #3 - one of the seven additional verbs being trained - is varied within and between the block presentations.

Training Procedure:
S is seated at a table across from E. The three pictures are placed on the table in front of S. The pictures are rearranged in a different left to right sequence for each stimulus presentation. E may substitute any of the seven pictures that are used for the #3 foil in each stimulus presentation. The stimuli are presented in recurring blocks of ten. Within each recurring block of ten, each visual/verbal S^D for 'sit' and 'stand' is presented five times in a scrambled order.

Training: Verbs	Discriminative Stimuli	Correct Responses	Reinforcement	Incorrect Responses	Criteria	Response Priming
'sit'	E points to picture and says, "Girl sit." "Ron, do this, point to 'girl sit'," E removes her finger after saying, "Girl sit."	S points to the picture of 'girl sit' within 5 seconds after S^D is presented.	S is reinforced with a token paired with social praise for a correct response.	If S fails to respond correctly within 5 seconds, E points to the correct picture and says, "Girl sit."	S advances to the next step in the program when he correctly responds to a block of 10 out of 10 stimulus presentations (100% correct responding in a block of ten - five for 'sit' and five for 'stand').	No response is primed.
'stand'	E points to the picture and says, "Girl stand." "Ron, do this, point to 'girl stand'." E removes her finger after saying, "Girl stand."	S points to the picture of 'girl stand' within 5 seconds after S^D is presented.	S is reinforced with a token paired with social praise for a correct response.	If S fails to respond correctly within 5 seconds, E points to the correct picture and says, "Girl stand."		

Condition I, Step 3 - Imitative manipulation of objects to model.

Objective:
S will imitate E's actions of manipulating the objects in the positions 'sit' and 'stand' which are paired with E's verbal mand, "Show me, 'boy sit (stand)'." S will correctly manipulate a block of ten object manipulations to E's model paired with the verbal mands - five for 'sit' and five for 'stand' - before advancing to the next step in the program.

Materials:
Two flexible, rubber boy dolls (4 1/2" tall).
Two doll chairs.

Training Procedure:
S is seated at a table across from E. The boy doll and doll chair are placed in front of S. The identical boy doll and doll chair are placed in front of E. The instructional mands for 'boy sit' and 'boy stand' are presented in recurring blocks of ten. Within each recurring block of ten, each visual/verbal S^D for 'sit' and 'stand' is presented five times in a scrambled order.

Training: Verbs	Discriminative Stimuli	Correct Responses	Reinforcement	Incorrect Responses	Criteria	Response Priming
'sit'	E bends the doll that is in front of her into a sitting position and places it in the chair while saying, "Boy sit." "Ron, do this, show me 'boy sit'."	S bends his doll into a sitting position and places it in the chair within 5 seconds after S^D is presented.	S is reinforced with a token paired with social praise for placing his bent doll in the chair within 5 seconds after S^D is presented.	If S fails to respond to E's model within 5 seconds after the verbal mand, E handshapes S's required response while saying, "Boy sit."	S advances to the next step in the program when he correctly responds to 10 out of 10 stimulus presentations (100% correct responding in a block of ten- five for 'sit' and five for 'stand').	No response is primed.
	E bends both dolls in a vertical position and places them in a reclining position, one doll beside each chair.	No response.	No reinforcement.	No incorrect R.		No response is primed.

Condition I, Step 3 (Continued)

Training: Verbs	Discriminative Stimuli	Correct Responses	Reinforcement	Incorrect Responses	Criteria	Response Priming
'stand'	E places her doll on the table in a standing position while saying, "Boy stand." "Ron, show me 'boy stand'."	S places his doll on the table in a standing position within 5 seconds after S^D is presented.	S is reinforced with a token paired with social praise for placing his doll in a standing position within 5 seconds after S^D is presented.	If S fails to respond to E's model within 5 seconds after the verbal mand. E handshapes S's response while saying, "Boy stand."	S advances to the next step in the program when he correctly responds to a block of 10 out of 10 stimulus presentations (100% correct responding in a block of ten - five for 'sit' and five for 'stand'.)	No response is primed.
	E places both dolls in a reclining position, one doll beside each chair.	No response.	No reinforcement.	No incorrect response.		No response is primed.

Condition IIa, Step 1 - Matching picture to identical picture.

Objective:
S will match a picture to an identical picture when E presents the verbal mand, "Match 'girl sit (girl stand)'." S will correctly match a block of ten pictures when E presents the verbal mands, "Match 'girl sit (stand)'," - five for each of the training verbs 'sit' and 'stand' - before advancing to the next step in the program.

Materials:
Two sets of each of the pictures: 1.) 'girl sit,' 2.) 'girl stand' and 3.) one picture chosen from seven of the additional training verbs; (the picture 'girl walk' is not used as a foil). Picture #3 - one of the seven additional training verbs - is varied within and between block presentations.

Training Procedure:
One set of the three pictures are placed on the table in front of S. E has an identical set of pictures placed in her lap. The pictures in front of S are rearranged in a different left to right sequence for each stimulus presentation. The stimuli are presented in recurring blocks of ten. Within each recurring block of ten, each visual/verbal S^D for 'sit' and 'stand' is presented five times in a scrambled order.

Training: Verbs	Discriminative Stimuli	Correct Response	Reinforcement	Incorrect Response	Criteria	Response Priming
'sit'	E hands S the picture of 'girl sit' and says, "Match 'girl sit'."	S places the picture on the identical picture within 5 seconds after S^D is presented.	S is reinforced with a token paired with social praise for each correct response.	If S fails to respond correctly within 5 seconds after the mand is given, E takes S's picture and demonstrates the correct match while saying, "Girl sit."	S advances to the next step in the program when he correctly responds to a block of 10 out of 10 stimulus presentations - five for 'girl sit' and five for 'girl stand'.	No response is primed.

Condition IIa, Step 1 (Continued)

Training: Verbs	Discriminative Stimuli	Correct Response	Reinforcement	Incorrect Response	Criteria	Response Priming
'stand'	E hands S the picture of 'girl stand' and says, "Match 'girl stand'."	S places the picture on the identical picture of 'girl stand,' within 5 seconds after S^D is presented.	S is reinforced with a token paired with social praise for a correct response.	If S fails to respond correctly within 5 seconds after the mand is given, E takes S's picture and demonstrates the correct match while saying, "Girl stand."	S advances to the next step in the program when he correctly responds to a block of 10 out of 10 stimulus presentations - five for 'girl sit' and five for 'girl stand'. If S incorrectly matches 5 or more pictures within a block, go to alternate Condition IIb, Step 1.	No response is primed.

Condition IIb, Step 1 - Imitative matching of picture to identical picture.

Objective:
S will observe E match the picture of 'girl sit (girl stand)' to the identical picture while E says, "Girl sit (Girl stand)." S will then imitate E's matching model when E says, "Match 'girl sit (girl stand)'." S will correctly match a block of ten pictures to an imitative model paired with E's verbal mands, "Match 'girl sit (girl stand)'," before returning to Condition IIa, Step 1.

Materials:
Pictures: 1.) two identical pictures of 'girl sit', 2.) two identical pictures of 'girl stand', and 3.) one picture chosen from seven of the additional verbs being trained; the picture 'girl walk' is not used as a foil. Picture #3 - one of the seven additional verbs being trained - is varied within and between the block presentations.

Training Procedure:
One set of the three pictures is placed on the table in front of S. E has identical pictures of 'girl sit' and 'girl stand' placed in her lap. The pictures in front of S are rearranged in a different left to right sequence for each stimulus presentation. The stimuli are presented in recurring blocks of ten. Within each recurring block of ten, each visual/verbal S^D for 'girl sit' and 'girl stand' is presented five times in a scrambled order.

Training: Verbs	Discriminative Stimuli	Correct Responses	Reinforcement	Incorrect Responses	Criteria	Response Priming
'sit'	E places one picture of 'girl sit' on the identical picture while saying, "Girl sit."	S observes E match the pictures, 'girl sit.'	No reinforcement is given.	If S does not observe, E says, "Look, Ron," and repeats matching for 'girl sit.'	S returns to Condition IIa, Step 1 when he correctly responds to a block of 10 out of 10 stimulus presentations (100% correct responding in a block of ten - five for 'sit' and five for 'stand').	No response is primed.
	E then removes the top picture of 'girl sit' and hands it to S saying, "Match 'girl sit'."	S imitates E's picture match of 'girl sit' within 5 seconds after the verbal mand is presented.	S is reinforced with a token paired with social praise for each correct response.	If S fails to respond correctly within 5 seconds after E gives the mand, "Match 'girl sit'," E removes the two picture foils (#2 and #3) and presents the imitative matching model while saying, "Girl sit."		No response is primed.

Condition IIb, Step 1 (Continued)

Training: Verbs	Discriminative Stimuli	Correct Responses	Reinforcement	Incorrect Responses	Criteria	Response Priming
'stand'	E places one picture of 'girl stand' on the identical picture while saying, "Girl stand."	S observes E match the pictures 'girl stand.'	No reinforcement is given.	If S does not observe, E says, "Look, Ron," and repeats matching for 'girl stand.'	S returns to Condition IIa, Step 1 when he correctly responds to a block of 10 out of 10 stimulus presentations (100% correct responding in a block of ten - five for 'sit' and five for 'stand').	No response is primed.
	E then removes the top picture of 'girl stand' and hands it to S, saying, "Match 'girl stand'."	S imitates E's picture match of 'girl stand' within 5 seconds after the verbal mand is presented.	S is reinforced with a token paired with social praise for each correct response.	If S fails to respond correctly within 5 seconds after E gives the mand "Match, 'girl stand'," E removes the two picture foils (#1 and 3) and presents the imitative matching model while saying, "Girl stand."		No response is primed.

Condition IIa, Step 2 - Matching manipulation of objects to model.

Objective:
S will manipulate the doll into a sitting position (standing position) to match the object manipulations of 'boy sit' and 'boy stand' after E's verbal mand, "Show me 'boy sit (boy stand)'." S will correctly match a block of ten object manipulations to the previously manipulated model which is paired with E's verbal mand, "Show me 'boy sit (boy stand)'," before advancing to the next step in the program.

Materials:
Two flexible, rubber boy dolls (4 1/2" tall). The dolls are identical. Two doll chairs. The chairs should be identical or very similar.

Training Procedure:
S is seated at a table across from E. One of the boy dolls and doll chairs are placed in front of S and the identical boy doll and doll chair are placed in E's lap. The stimuli for 'boy sit' and 'boy stand' are presented in recurring blocks of ten. Within each recurring block of ten, each visual/verbal S^D for 'sit' and 'stand' is presented five times in a scrambled order.

Training: Verbs	Discriminative Stimuli	Correct Responses	Reinforcement	Incorrect Response	Criteria	Response Priming
'sit'	E manipulates the objects for 'boy sit' out of S's view and then places the manipulation on the table while saying, "Boy sit." E then says, "Ron, show me 'boy sit'."	S manipulates his objects to match the manipulated model of 'boy sit.'	S is reinforced with a token paired with social praise for each correct response.	If S fails to match E's model correctly within 5 seconds after the mand is presented, E manipulates S's objects while saying, "Look, Ron, boy sit."	S advances to the next step in the program when he correctly responds to a block of 10 out of 10 stimulus presentations (100% correct responding in a block of ten - five for 'sit' and five for 'stand').	No response is primed.

Condition IIa, Step 2 (Continued)

Training: Verbs	Discriminative Stimuli	Correct Responses	Reinforcement	Incorrect Response	Criteria	Response Priming
	E removes both dolls from the chairs and places one doll and chair in front of S and the other doll and chair in her (E's) lap.	No response.	No reinforcement is given.	No incorrect response.	S advances to the next step in the program when he correctly responds to a block of 10 out of 10 stimulus presentations (100% correct responding in a block of ten - five for 'sit' and five for 'stand').	No response is primed.
'stand'	E picks up the doll that is in her lap and places it in a standing position and says, "Boy stand." E then says, "Ron, show me 'boy stand'."	S manipulates his objects to match the manipulated model 'boy stand.'	S is reinforced with a token paired with social praise for each correct response.	If S fails to match E's model correctly within 5 seconds after the mand is presented, E manipulates S's objects while saying, "Look, Ron, boy stand."		No response is primed.
	E removes both dolls from a standing position and places one doll in a reclining position beside the doll chair in front of S. E places the other doll in her lap.	No response.	No reinforcement.	No incorrect response.		No response is primed.

Condition III, Step 1 - Matching picture to object manipulation.

Objective:
S will match-by pointing - one of three pictures to a manipulated object model after E's verbal mand, "Ron, point to 'sit (stand)'." S will correctly match a block of ten pictures to manipulated object models which are paired with E's verbal mand, "Ron, point to 'sit' (stand)', " before advancing to the next step in the program - five correct pointing responses for 'sit' and five correct pointing responses for 'stand.'
(Note: The verbal labels of the agent, i.e., "boy" and "girl" are not given in Condition III, Step 1.)

Materials:
One flexible, rubber girl doll (4 1/2" tall).
One flexible, rubber boy doll (4 1/2" tall).
One doll chair.
One picture of: 1.) 'boy sit,' 'girl sit'; 2.) 'boy stand,' 'girl stand'; 3.) 'girl drink', 'boy drink'; 4.) 'boy sleep,' 'girl sleep' and 5.) 'boy run,' 'girl run.' *See diagram #1 and #2 for a picture-plate representation.

Training Procedure:
S is seated at a table across from E. E places the boy doll and girl doll and the doll chair in her lap. E places three pictures in front of S - *See diagram #1 and #2 for the picture representations and the sequence presentations. The visual/verbal S^D's for 'sit' and 'stand' are presented in recurring blocks of ten. Within each recurring block of ten, each mand for 'sit' and 'stand' is presented five times in a scrambled order. The manipulated object models representing 'sit' and 'stand' include those of 'boy sit,' 'girl sit' and 'boy stand,' 'girl stand.' These four stimulus-model presentations are scrambled within the block of ten stimulus presentations. *See diagram #1 and #2 for picture representations and sequence presentations.

Training: Verbs	Discriminative Stimuli	Correct Responses	Reinforcement	Incorrect Responses	Criteria	Response Priming
'sit'	E places the boy doll in a sitting position in the doll chair. The pictures 'girl sit,' 'boy stand' and 'girl drink' are placed in front of S. E says, "Ron, point to 'sit'." Presented three times - not in succession.	S points to the picture that represents 'sit' within 5 seconds after verbal mand is presented.	S is reinforced with a token paired with social praise for each correct response.	If S fails to point to the picture of 'sit' within 5 seconds after the verbal mand for "sit" is presented, E points to the correct picture while saying, "Sit."	S advances to the next step in the program when he correctly responds to a block of 10 out of 10 stimulus presentations.	After reinforcement is given, E says, "Sit."

Condition III, Step 1 (Continued)

Training: Verbs	Discriminative Stimuli	Correct Responses	Reinforcement	Incorrect Responses	Criteria	Response Priming
	E places the girl doll in a sitting position in the doll chair. The pictures 'girl stand,' 'boy sit' and 'boy drink' are placed in front of S. E says, "Ron, point to 'sit'." Presented twice.	S points to the picture that represents 'sit' within 5 seconds after verbal mand is presented.	S is reinforced with a token paired with social praise for each correct response.	If S fails to point to the picture of 'sit' within 5 seconds after the verbal mand for "sit" is presented, E points to the correct picture while saying "Sit."	S advances to the next step in the program when he correctly responds to a block of 10 out of 10 stimulus presentations. (The 10 stimulus presentations include 3 for 'boy sit,' 2 for 'girl sit,' 2 for 'boy stand' and 3 for 'girl stand.') Presented in a scrambled order with no two identical manipulations in succession. If S does not respond correctly to 5 or more stimulus presentations on first block of ten, use pictures in diagram #3 and #4 and use "Noun-verb."	After reinforcement is given, E says, "Sit."
'stand'	E places the boy doll in a standing position on the table. The pictures, 'girl stand', 'boy sit' and 'girl run' are placed in front of S. E says, "Ron, point to 'stand'." Presented twice.	S points to the picture that represents 'stand' within 5 seconds after verbal mand is presented.	S is reinforced with a token paired with social praise for each correct response.	If S fails to point to the picture of 'stand' within 5 seconds after the verbal mand for "stand" is presented, E points to the correct picture while saying "Stand."		After reinforcement is given, E says, "Stand."
	E places the girl doll in a standing position on the table. The pictures, 'girl sit,' 'boy stand' and 'girl run' are placed in front of S. E says, "Ron, point to 'stand'." Presented three times not in succession.	S points to the picture that represents 'stand' within 5 seconds after verbal mand is presented.	S is reinforced with a token paired with social praise for each correct response.	If S fails to point to the picture of 'stand' within 5 seconds after the verbal mand for "stand" is presented, E points to the correct picture while saying, "Stand."		After reinforcement is given, E says, "Stand."

Condition III, Step 1 - Matching picture to object manipulation.
Only the verb(action) is given as the verbal S^D.

*Diagram #1: representing pictures and objects of 'boy sit' and 'girl sit.'

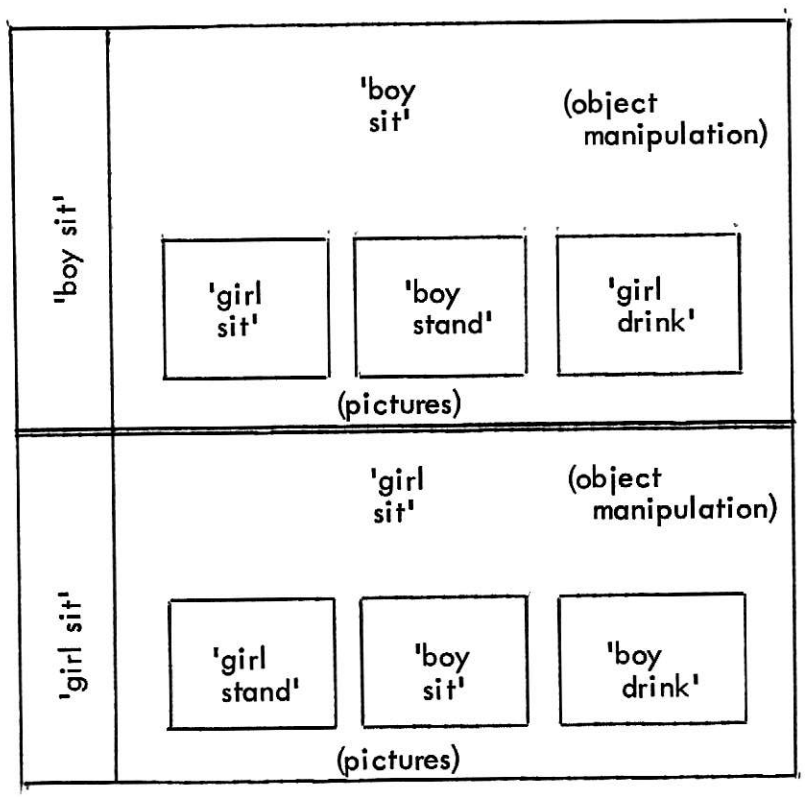
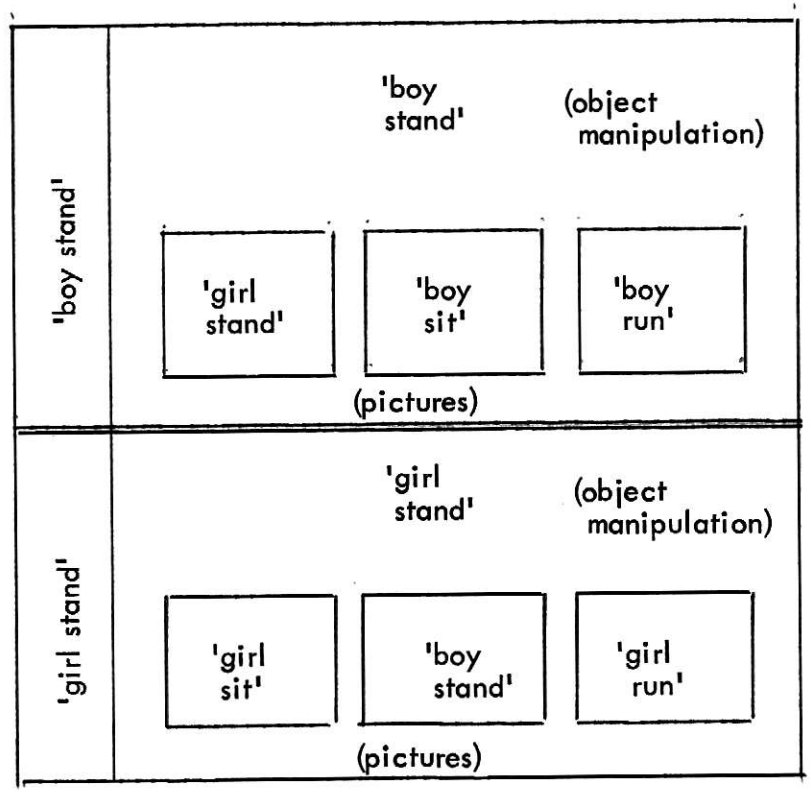


Diagram #2: representing pictures and objects 'boy stand' and 'girl stand.'



Condition III, Step 2 - Matching manipulation of objects to picture.

Objective:
S will manipulate objects to match a picture after E's verbal mand, "Show me 'sit (stand)'." S will correctly match a block of ten object manipulations to pictures which are paired with E's verbal mand, "Ron, show me 'sit (stand)'," before advancing to the next step in the program - five correct object manipulations for 'sit' and five correct object manipulations for 'stand.' (Note: the verbal labels of the agent, i.e.,: "boy" and "girl are not given in Condition III, Step 2.)

Materials:
One flexible, rubber boy doll (4 1/2" tall).
One flexible, rubber girl doll (4 1/2" tall).
One doll chair
One picture of: 1.) 'boy sit,' 'girl sit' and 2.) 'boy stand,' 'girl stand.'

Training procedure:
S is seated at a table across from E. E places the pictures of 'boy sit,' 'girl sit,' 'boy stand' and 'girl stand' in her lap. E places the boy doll and girl doll and doll chair in front of S. The visual/verbal S^D's for 'sit' and 'stand' are presented in recurring blocks of ten. Within each recurring block of ten, each mand for 'sit' and 'stand' is presented five times in a scrambled order. The four pictures representing 'sit' and 'stand' include pictures of 'boy sit,' 'girl sit,' 'boy stand' and 'girl stand.' These four stimulus pictures are scrambled within the block of ten stimulus presentations.

Training: Verbs	Discriminative Stimuli	Correct Responses	Reinforcement	Incorrect Responses	Criteria	Response Priming
'sit'	E places the girl doll and the doll chair in front of S. E then presents the picture of 'boy sit' while saying, "Ron, show me 'sit'." Presented 3 times - not in succession.	S seats the girl doll in the doll chair within 5 seconds after verbal mand is presented.	S is reinforced with a token paired with social praise for each correct response.	If S fails to seat the girl doll in the chair within 5 seconds after the verbal mand for 'sit' is presented, E seats the girl doll in the chair while saying, "Sit."	S advances to the next step in the program when he correctly responds to a block of 10 out of 10 stimulus presentations.	After reinforcement is given, E says, "Sit."

Condition III, Step 2 (Continued)

Training: Verbs	Discriminative Stimuli	Correct Responses	Reinforcement	Incorrect Responses	Criteria	Response Priming
	E places the boy doll and the doll chair in front of S. E then presents the picture of 'girl sit' while saying, "Ron, show me 'sit'." Presented twice.	S seats the boy doll in the doll chair within 5 seconds after verbal mand is presented.	S is reinforced with a token paired with social praise for each correct response.	If S fails to seat the boy doll in the chair within 5 seconds after the verbal mand for 'sit' is presented, E seats the boy doll in the doll chair while saying "Sit."	S advances to the next step in the program when he correctly responds to a block of 10 out of 10 stimulus presentations. (The ten stimulus presentations include 3 for 'girl sit,' 2 for 'boy sit,' 2 for 'girl stand' and, 3 for 'boy stand'.) Presented in a scrambled order with no like picture presentations in succession.	After reinforcement is given, E says, "Sit."
'stand'	E places the girl doll and the doll chair in front of S. E then presents the picture of 'boy stand,' while saying, "Ron, show me 'stand'." Presented twice.	S places the girl doll in a standing position within 5 seconds after verbal mand is presented.	S is reinforced with a token paired with social praise for each correct response.	If S fails to place the girl doll in a standing position within 5 seconds after the verbal mand for 'stand' is presented, E stands the girl doll on the table while saying, "Stand."		After reinforcement is given, E says, "Stand."
	E places the boy doll and the doll chair in front of S. E then presents the picture of 'girl stand' while saying, "Ron, show me 'stand'." Presented three times - not in succession.	S places the boy doll in a standing position within 5 seconds after verbal mand is presented.	S is reinforced with a token paired with social praise for each correct response.	If S fails to place the boy doll in a standing position within 5 seconds after the verbal mand for 'stand' is presented, E stands the boy doll on the table while saying, "Stand."	If S does not respond correctly to 5 or more stimulus presentations on first block of ten, use pictures and object manipulations with like "noun-verb.	After reinforcement is given, E says, "Stand."

Condition IIIb. Step 1 - Matching picture to object manipulation.
The noun (agent) and verb (action) are given as the verbal S^D.

Diagram #1b: representing pictures and objects of 'boy sit' and 'girl sit.'

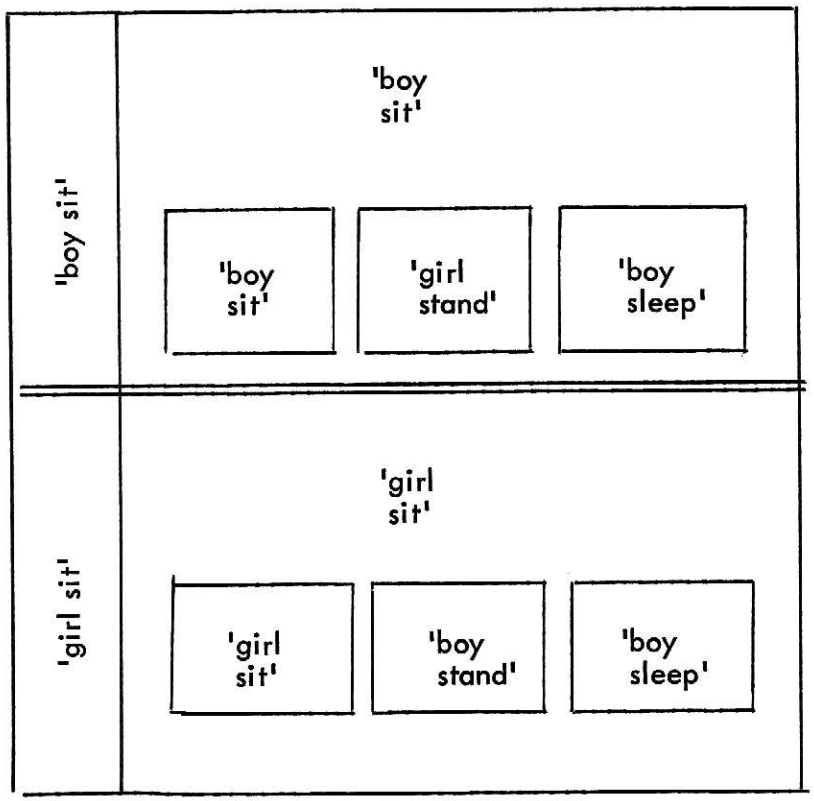
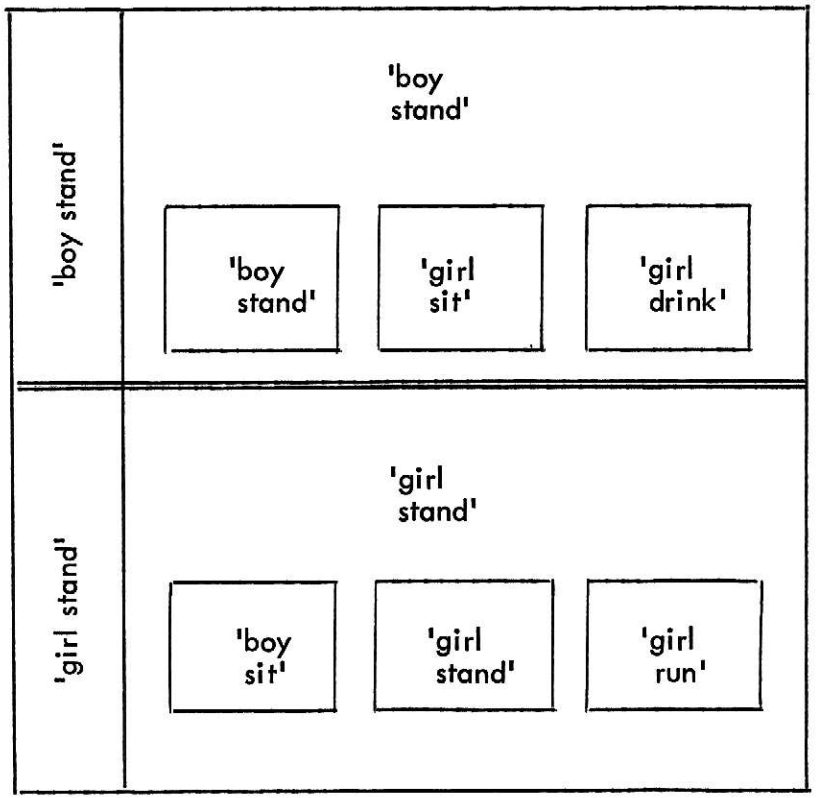


Diagram #2b: representing pictures and objects of 'boy stand' and 'girl stand.'



Condition IV, Step 1 - Non-imitative body action to verbal mand.

Objective:
S will 'sit' or 'stand' when E points to S and gives the verbal mand, "Ron, you sit (stand)." S will perform a block of ten correct body actions to E's verbal mand before advancing to the next step in the program - five correct actions for 'sit' and five correct actions for 'stand.'

Materials:
None.

Training Procedure:
S is standing facing E. Both chairs are away from the table. The verbal stimuli for 'sit' and 'stand' are presented in recurring blocks of ten. Within each recurring block of ten, each mand for 'sit' and 'stand' is presented five times in a scrambled order.

Training: Verbs	Discriminative Stimuli	Correct Responses	Reinforcement	Incorrect Responses	Criteria	Response Priming
'sit'	E gives the verbal mand, "Ron, you sit," while pointing to S.	S sits on his chair within 5 seconds after mand for 'sit' is presented.	S is reinforced with a token paired with social praise for each correct response.	If S fails to sit within 5 seconds after S^D is presented, E sits while saying, "Sit."	S advances to the next step in the program when he correctly responds to 10 out of 10 stimulus presentations. (100% correct responding in a block of ten.	After reinforcement is given, E says, "Sit."
'stand'	E gives the verbal mand, "Ron, you stand," while pointing to S.	S stands within 5 seconds after mand for 'stand' is presented.	S is reinforced with a token paired with social praise for each correct response.	If S fails to stand within 5 seconds after S^D is presented, E stands while saying, "Stand."		

Condition IV, Step 2 - Matching picture to verbal mand.

Objective:
S will point to the picture 'boy sit (boy stand)' when E presents the verbal mand, "Point to 'boy sit (boy stand)'." S will correctly point to a block of ten pictures (five for 'sit' and five for 'stand') to E's verbal mand before advancing to the next step in the program.

Materials:
The pictures representing: 1.) 'boy sit,' 2.) 'boy stand' and 3.) one of the seven additional training verbs.

Training Procedure:
S is seated at a table across from E. The three pictures are placed on the table in front of S. The pictures are rearranged in a different left to right sequence for each stimulus presentation. The verbal/visual stimuli for 'sit' and 'stand' are presented in recurring blocks of ten. Within each recurring block of ten, each verbal/visual S^D for 'sit' and 'stand' is presented five times in a scrambled order.

Training: Verbs	Discriminative Stimuli	Correct Responses	Reinforcement	Incorrect Responses	Criteria	Response Priming
'sit'	E says, "Ron, point to 'boy sit'."	S points to the picture of 'boy sit' within 5 seconds after verbal S^D is presented.	S is given a token paired with social praise for a correct response.	If S fails to point to the picture of 'boy sit' within 5 seconds after verbal S^D, E points to the picture of 'boy sit' while saying, "Boy sit."	S advances to the next step in the program when he correctly responds to a block of 10 out of 10 stimulus presentations - five for 'boy sit' and five for 'boy stand'.	After reinforcement is presented, E says, "Sit," while pointing to picture of 'boy sit.'
'stand'	E says, "Ron, point to 'boy stand'."	S points to the picture of 'boy stand' within 5 seconds after verbal S^D is presented.	S is given a token paired with social praise for a correct response.	If S fails to point to the picture of 'boy stand' within 5 seconds after the verbal S^D, E points to 'boy stand' while saying, "Boy stand."		After reinforcement is presented, E says, "stand" while pointing to picture of 'boy stand.'

Condition IV, Step 3 - Manipulating objects to verbal mand.

Objective:
S will manipulate objects to E's verbal mand, "Show me, 'girl sit (girl stand)'."
S will correctly manipulate a block of ten object manipulations - five for 'girl sit' and five for 'girl stand' - to E's verbal S^D, "Show me 'girl sit (girl stand)'," before advancing to the next step in the program.

Materials:
One flexible, rubber girl doll.
One doll chair.

Training Procedure:
S is seated at a table across from E. The girl doll is placed in a reclining position beside the doll chair in front of S. The stimuli for 'girl sit' and 'girl stand' are presented in recurring blocks of ten. Within each recurring block of ten, each verbal/visual S^D for 'girl sit' and 'girl stand' is presented five times in a scrambled order.

Training Verbs	Discriminative Stimuli	Correct Responses	Reinforcement	Incorrect Responses	Criteria	Response Priming
'sit'	E says "Ron, show me 'girl sit'."	S seats the doll in the doll chair within 5 seconds after verbal S^D is presented.	S is given a token paired with social praise for each correct response.	If S fails to seat the doll in the chair within 5 seconds after S^D is presented, E places the doll in the chair while saying, "Girl sit."	S advances to the next step in the program when he correctly responds to 10 out of 10 stimulus presentations, 5 for 'girl sit' and 5 for 'girl stand'.	After reinforcement is given, E says, "Sit," while pointing to the object manipulation.
'stand'	E says, "Ron, show me 'girl stand'."	S places doll in a standing position on the table within 5 seconds after verbal S^D is presented.	S is given a token paired with social praise for each correct response.	If S fails to place the doll in a standing position within 5 seconds after S^D is presented, E places the doll in a standing position while saying, "Girl stand."		After reinforcement is given, E says, "Stand," while pointing to the object manipulation.

Condition V, Step 1 - Alternate - Body action response to verbal mand and echoic response to verbal stimuli.

Objective:
S will perform a body action 'sit (stand)' to E's verbal mand, "Ron, sit (stand)." S will then give the echoic response 'sit (stand)' to E's echoic model. S will correctly perform a block of ten alternate actions followed by an appropriate echoic response. "Sit (Stand)," when E gives a verbal mand followed by the echoic model, "Sit (Stand)," before advancing to the next step in the program.

Materials:
None.

Training Procedure:
S is standing and facing E. Both chairs are away from the table. The mand "Ron, sit(stand)," is given and then the echoic model for 'sit (stand),' is presented after S completes the correct motor action. The alternate mand-echoic stimuli for 'sit' and 'stand' are presented in recurring blocks of ten. Within each of the recurring blocks of ten, each mand-echoic stimulus for 'sit' and 'stand' is presented five times in a scrambled order. E's echoic model presentation is given only if S responds correctly to E's verbal mand.

Training: Verbs	Discriminative Stimuli	Correct Responses	Reinforcement	Incorrect Responses	Criteria	Response Priming
'sit'	E says, "Ron, sit."	S sits within 5 seconds after verbal mand is presented.	Echoic model is presented. No token is presented.	If S fails to respond correctly within 5 seconds after verbal mand is presented, no echoic model is presented. E demonstrates 'sit.'	S advances to the next step in the program when he correctly responds to 10 out of 10 stimulus presentations (100% correct responding)	No response is primed.
	When S sits, E, while pointing to S, says, "You say 'sit'."	S says, "Sit," within 5 seconds after echoic model is presented.	S is reinforced with a token paired with social praise for each correct response.	If S fails to respond with the echoic response 'sit,' E says, "Sit" then presents to the next action-mand stimulus.	Verbal mand and echoic model are considered as one stimulus presentation in a block of 10.	After reinforcement is given, E says, "Ron sit."

Condition V, Step 1 (Continued)

Training: Verbs	Discriminative Stimuli	Correct Responses	Reinforcement	Incorrect Responses	Criteria	Response Priming
'stand'	E says, "Ron, stand."	S stands within 5 seconds after verbal mand is presented.	Echoic model is presented. No token is presented.	If S fails to respond correctly within 5 seconds after verbal mand is presented, no echoic model is presented. E demonstrates 'stand.'	S advances to the next step in the program when he correctly responds to 10 out of 10 stimulus presentations (100% correct responding). Verbal mand and echoic model are considered as one stimulus presentation in a block of 10.	No response is primed.
	When S sits, E, while pointing to S, says, "You say 'stand'."	S says, "stand", within 5 seconds after echoic model is presented.	S is reinforced with a token paired with social praise for each correct response.	If S fails to respond with the echoic response, 'stand,' E says, 'stand,' then presents to the next action mand stimulus.		

Condition V, Step 2 - Alternate - Pointing response to verbal mand and echoic response to verbal stimuli.

Objective:
S will point to the appropriate picture to E's verbal mand, "Ron, point to 'boy sit (stand)." S will then give an echoic response when E gives the echoic model, "You say 'sit (stand)'." S will perform a block of ten correct alternate pointing responses followed by the echoic response "sit (stand)," when E gives a verbal mand followed by the echoic model, "sit (stand)," before advancing to the next step in the program.

Materials:
Pictures representing the verbs: 1.) 'boy sit', 2.) 'boy stand' and 3.) one picture chosen from seven of the additional verbs being trained: the picture 'boy walk' is not used as a foil. Picture #3 - one of the seven additional verbs being trained - is varied within and between block presentations.

Training Procedure:
S is seated at a table across from E. The three pictures are placed on the table in front of S. The pictures are rearranged in a different left to right sequence for each stimulus presentation. E may substitute any one of the seven pictures, that are used in foil #3, in each stimulus presentation. The alternate mand-echoic stimulus for 'sit' and 'stand' is presented in recurring blocks of ten, each mand-echoic stimulus is presented five times in a scrambled order.

Training: Verbs	Discrimination Stimuli	Correct Response	Reinforcement	Incorrect Response	Criteria	Response Priming
'sit'	E says, "Ron, point to 'boy sit'."	S points to 'boy sit' within 5 seconds after mand is presented.	Echoic model is presented. No token is presented.	If S fails to respond correctly within 5 seconds after verbal mand is presented, no echoic model is presented, E points to 'boy sit.'	S advances to the next step in the program when he correctly responds to 10 out of 10 stimulus presentations. (100% correct responding(. Verbal mand and echoic model are considered as one stimulus presentation in a block of 10. E's echoic model is presented only (continued)	No response is primed.
	When S points to picture of 'boy sit', says, "You say 'sit'."	S says, "Sit," within 5 seconds after echoic model is presented.	S is reinforced with a token paired with social praise for each correct response.	If S fails to respond correctly within 5 seconds after echoic model is presented, E says, "sit," then presents the next action-mand stimulus.		After reinforcement is given, E says, "Ron, sit."

Condition V, Step 2 (Continued)

Training: Verbs	Discriminative Stimuli	Correct Response	Reinforcement	Incorrect Response	Criteria	Response Priming
					(Continued) if S responds correctly to E's verbal mand.	
'stand'	E says, "Ron, point to 'boy stand'."	S points to 'boy stand' within 5 seconds after mand is presented.	Echoic model is presented. No token is presented	If S fails to respond correctly within 5 seconds after verbal mand is presented, no echoic model is presented, E points to 'boy stand.'	S advances to the next step in the program when he correctly responds to 10 out of 10 stimulus presentations. (100% correct responding). Verbal mand and echoic model are considered as one stimulus presentation in a block of 10. E's echoic model is presented only if S responds to E's verbal mand.	No response is primed
	When S points to picture of 'boy stand,' E, while pointing to the picture of 'boy stand' says, "You say 'stand'."	S says, "Stand," within 5 seconds after echoic model is presented.	S is reinforced with a token paired with social praise for each correct response.	If S fails to respond correctly within 5 seconds after echoic model is presented, E says, "Stand," then presents the next action-mand stimulus		After reinforcement is given, E says, "Ron stand."

Condition V, Step 3 - Alternate - Manipulating objects to verbal mand and echoic response to verbal stimuli.

Objective:
S will manipulate the objects into the appropriate positions ('sit,' 'stand'), to E's verbal mand, "Ron, show me 'girl sit (stand)'." S will then give an echoic response when E gives the echoic model, "Show me 'girl sit (stand)'," S will perform a block of ten correct alternate object manipulations followed by the echoic response, "sit (stand)" when E gives a verbal mand followed by the echoic model, "Sit (stand)," before advancing to the next step in the program.

Materials:
One flexible, rubber girl doll (4 1/2" tall).
One doll chair.

Training Procedure:
S is seated at a table across from E. The objects are placed in front of S. The alternate mand-echoic stimuli for 'sit' and 'stand' are presented in recurring blocks of ten. Within each of the recurring blocks of ten, each mand-echoic stimulus for 'sit' and 'stand' is presented five times in a scrambled order.

Training: Verbs	Discriminative Stimuli	Correct Responses	Reinforcement	Incorrect Responses	Criteria	Response Priming
'sit'	E says, "Ron, show me 'girl sit'."	S manipulates objects to 'sit' within 5 seconds after mand is presented.	Echoic model is presented. No token is presented.	If S fails to respond correctly within 5 seconds after verbal mand is presented, no echoic model is presented. E manipulates objects to 'girl sit.'	S advances to the next step in the program when he correctly responds to 10 out of 10 stimulus presentations. (100% correct responding). Verbal mand and echoic model are considered as one stimulus presentation in a block of 10.	No response is primed
	When S manipulates objects to show 'girl sit,' E, while pointing to the manipulation, says, "You say 'sit'."	S says, "Sit," within 5 seconds after echoic model is presented.	S is reinforced with a token paired with social praise for each correct response.	If S fails to respond correctly within 5 seconds after echoic model is presented, E says, "Sit," then presents the next action-mand stimulus.		After reinforcement is given, E says, "Ron, sit."

Condition V, Step 3 (Continued)

Training: Verbs	Discriminative Stimuli	Correct Responses	Reinforcement	Incorrect Responses	Criteria	Response Priming
'stand'	E says, "Ron, show me 'girl stand'."	S manipulates objects to 'stand' within 5 seconds after mand is presented.	Echoic model is presented. No token is presented.	If S fails to respond correctly within 5 seconds after echoic model is presented, E says, "Stand," then presents the next action-mand stimulus.	S advances to the next step in the program when he correctly responds to 10 out of 10 stimulus presentations. (100% correct responding.) Verbal mand and echoic model are considered as one stimulus presentation in a block of 10.	No response is primed.
	When S manipulates the objects to show 'girl stand,' E, while pointing to the manipulation, says, "You say 'stand'."	S says, "Stand," within 5 seconds after echoic model is presented.	S is reinforced with a token paired with social praise for each correct response.	If S fails to respond correctly within 5 seconds after echoic model is presented E says, "Stand," then presents the next action-mand stimulus.		After reinforcement is given, E says, "Ron, stand."

Condition VI, Step 1 - Echoic response of body action to an intraverbal prompt.

Objective:
S will emit the echoic response, "sit (stand)," when E performs a body action while giving the intraverbal prompt followed by an echoic model, "Miss Smith (one-second pause), you say 'sit (stand)'." S will emit a block of ten correct echoic responses, "sit" and "stand," to E's echoic stimulus preceded by an intraverbal prompt before advancing to the next step in the program - five correct echoic responses for 'sit' and five correct echoic responses for 'stand.'

Materials:
None

Training Procedure:
S is seated, facing E. Both S and E are seated away from the table. The echoic stimuli for 'sit' and 'stand' are presented in recurring blocks of ten. Within each recurring block of ten, each echoic stimulus for 'sit' and 'stand' is presented five times in a scrambled order.

Training: Verbs	Discriminative Stimuli	Correct Responses	Reinforcement	Incorrect Responses	Criteria	Response Priming
'stand'	E stands up in front of her chair while pointing to herself and says, "Miss Smith (1 - second pause) you say, 'stand'."	S says, "stand," within 5 seconds after echoic S^D is presented.	S is reinforced with a token paired with social praise for each correct response. If S says "stand," he is given two tokens.	If S fails to emit "stand," within 5 seconds after echoic model is presented, E points to herself and says, "Miss Smith stand."	S advances to the next step in the program when he correctly responds to a block of 10 out of 10 stimulus presentations - five for 'sit' and five for 'stand.'	After reinforcement is given, E says, "Miss Smith stand." If S stands, E points to him and says, "Ron stand."

Condition VI, Step 1 (Continued)

Training: Verbs	Discriminative Stimuli	Correct Responses	Reinforcement	Incorrect Responses	Criteria	Response Priming
'sit'	E sits on her chair while pointing to herself and says, "Miss Smith (1 - second pause), you say, 'sit'."	S says, "sit," within 5 seconds after echoic S^D is presented.	S is reinforced with a token paired with social praise for each correct response. If S says, "'sit'," he is given two tokens.	If S fails to emit "sit," within 5 seconds after echoic model is presented, E points to herself and says, "Miss Smith sit."	S advances to the next step in the program when he correctly responds to a block of 10 out of 10 stimulus presentations - five for 'sit' and five for 'stand.'	After reinforcement is given, E says, "Miss Smith sit." If S sits or is sitting, E points to him and says, "Ron sit."

Condition VI, Step 2 - Echoic response of picture to intraverbal prompt.

Objective:
S will emit the echoic response, "sit (stand)," when E presents a picture of 'boy sit (boy stand)' while giving the intraverbal prompt followed by an echoic model, "Boy (pause), you say, 'sit'." S will emit a block of ten correct echoic responses, "sit (stand)," to E's echoic stimulus which is preceded by an intraverbal prompt before advancing to the next step in the program - five correct echoic responses for 'sit' and five correct echoic responses for 'stand.'

Materials:
One picture of: 1.) 'boy sit' and 2.) 'boy stand.'

Training Procedure:
S is seated at the table across from E. E presents one picture of 'boy sit (boy stand) to S. The picture/echoic stimuli for 'sit' and 'stand' are presented in recurring blocks of ten. Within each recurring block of ten, each picture/echoic stimulus for 'sit' and 'stand' is presented five times in a scrambled order.

Training: Verbs	Discriminative Stimuli	Correct Responses	Reinforcement	Incorrect Responses	Criteria	Response Priming
'sit'	E holds up the picture of 'boy sit' and says, "Boy (pause), you say, 'sit'."	S says, "sit," within 5 seconds after echoic S^D is presented.	S is reinforced with a token paired with social praise for each correct response *If S says, "Boy sit," he is given two tokens.	If S fails to emit "sit," within 5 seconds after echoic model is presented, E points to the picture and says, "Boy sit."	S advances to the next step in the program when he correctly responds to a block of 10 out of 10 stimulus presentations - five for 'sit' and five for 'stand'.	After reinforcement is given, E points to the picture and says, "Boy, sit."
'stand'	E holds up the picture of 'boy stand' and says, "Boy (pause), you say, 'stand'."	S says, "stand," within 5 seconds after echoic S^D is presented.	S is reinforced with a token paired with social praise for each correct response. If S says, "Boy stand," he is given two tokens.	If S fails to emit "stand," within 5 seconds after echoic model is presented, E points to the picture and says "Boy stand."		After reinforcement is given, E points to the picture and says, "Boy stand."

Condition VI, Step 3 - Echoic response of object manipulation to an intraverbal prompt.

Objective:
S will emit the echoic response, "sit (stand)," when E presents an object manipulation of 'girl sit (girl stand)' while giving the intraverbal prompt followed by an echoic model, "Girl (pause), you say, 'sit'." S will emit a block of ten correct echoic responses, "sit (stand)." to E's echoic stimulus which is preceded by an intraverbal prompt before advancing to the next step in the program - five correct echoic responses for 'sit' and five correct echoic responses for 'stand.'

Materials:
One flexible, rubber girl doll (4 1/2" tall).
One doll chair.

Training Procedure:
S is seated at the table across from E. E presents the object manipulation of 'girl sit (girl stand).' The echoic stimuli for 'sit' and 'stand' are presented in recurring blocks of ten. Within each recurring block of ten, each echoic stimulus for 'sit' and 'stand' is presented five times in a scrambled order.

Training: Verbs	Discriminative Stimuli	Correct Responses	Reinforcement	Incorrect Responses	Criteria	Response Priming
'sit'	E presents the object manipulation of 'girl sit,' and says, "Girl (pause), you say, 'sit'."	S says, "sit," within 5 seconds after echoic S^D is presented.	S is reinforced with a token paired with social praise for each correct response. If S says, "Girl sit," he is given two tokens.	If S fails to emit "sit," within 5 seconds after echoic model is presented, E points to the object manipulation and says "Girl sit."	S advances to the next step in the program when he correctly responds to a block of 10 out of 10 stimulus presentations - five for 'sit' and five for 'stand.'	After reinforcement is given, E points to the picture and says, "Boy sit."

Condition VI, Step 3 (Continued)

Training: Verbs	Discriminative Stimuli	Correct Responses	Reinforcement	Incorrect Responses	Criteria	Response Priming
'stand'	E presents the object manipulation of 'girl stand,' and says, "Girl (pause), you say, 'stand'."	S says, "Stand," within 5 seconds after echoic S^D is presented.	S is reinforced with a token paired with social praise for each correct response. If S says, "Girl stand," he is given two tokens.	If S fails to emit "Stand," within 5 seconds after echoic model is presented, E points to the object manipulation and says, "Girl stand."	S advances to the next step in the program when he correctly responds to a block of 10 out of 10 stimulus presentations - for 'stand.'	After reinforcement is given. E points to the object manipulation and says, "Girl stand."

Condition VII, Step 1 - Echoic response of body action to intraverbal question.

Objective:
S will emit the echoic response, "Sit (stand)," when E performs a body action of 'sit (stand)' while asking an intraverbal question, followed by an echoic model - "What is Miss Smith doing?" "You say 'sit (stand)'." S will emit a block of ten correct echoic responses to E's echoic stimulus presentations before correct echoic responses to E's echoic stimulus presentations before advancing to the next step in the program - five correct echoic responses for 'sit' and five correct echoic responses for 'stand.'

Materials:
None

Training Procedure:
S is seated, facing E. Both S and E are seated away from the table. The question/echoic stimuli are presented in recurring blocks of ten. Within each recurring block of ten, each question/echoic stimulus for 'sit' and 'stand' is presented five times in a scrambled order.

Training: Verbs	Discriminative Stimuli	Correct Responses	Reinforcement	Incorrect Responses	Criteria	Response Priming
'stand'	E stands up in front of her chair while pointing to herself and asks, "What is Miss Smith doing?" "You say, 'stand'."	S says, "Stand," within 5 seconds after echoic S^D is presented.	S is reinforced with a token paired with social praise for each correct response. If S says, " " stand," or "Stand up," he is given two tokens.	If S fails to emit "Stand," within 5 seconds after echoic model is presented E points to herself and says, "Miss Smith stand."	S advances to the next step in the program when he correctly responds to a block of 10 out of 10 stimulus presentations - five for 'sit' and five for 'stand.'	After reinforcement is given, E says, "Stand up," while pointing to herself. If S stands, E says, "Ron stand."

Condition VII, Step 1 (Continued)

Training: Verbs	Discriminative Stimuli	Correct Responses	Reinforcement	Incorrect Responses	Criteria	Response Priming
'sit'	E sits on her chair while pointing to herself and asks, "What is Miss Smith doing?" "You say, 'sit'."	S says, "Sit," within 5 seconds after echoic S^D is presented.	S is reinforced with a token paired with social praise for each correct response. If S says, "sit." or "Sit chair," he is given two tokens.	If S fails to emit "Sit" within 5 seconds after echoic model is presented, E points to herself and says, "Miss Smith sit."	S advances to the next step in the program when he correctly responds to a block of 10 out of 10 stimulus presentations - five for 'sit' and five for 'stand.'	After reinforcement is given, E says, "Sit chair."

Condition VII, Step 2 - Echoic response of picture to an intraverbal question.

Objective:
S will emit the echoic response, "Sit (Stand)," when E presents a picture of 'girl sit (girl stand)' while asking the intraverbal question, followed by an echoic model - "What is girl doing?" "You say, 'sit (stand)'." S will emit a block of ten correct echoic responses of 'sit' and 'stand' to E's echoic stimulus presentations before advancing to the next step in the program - five correct echoic responses for 'sit' and five correct echoic responses for 'stand.'

Materials:
One picture of: 1.) 'girl sit' and 2.) 'girl stand.'

Training Procedure:
S is seated across the table from E. E presents one picture of 'girl sit (girl stand)' to S. The picture/echoic stimuli for 'sit' and 'stand' are presented in recurring blocks of ten. Within each recurring block of ten, each picture/echoic stimulus for 'sit' and 'stand' is presented five times in a scrambled order.

Training: Verbs	Discriminative Stimuli	Correct Responses	Reinforcement	Incorrect Responses	Criteria	Response Priming
'sit'	E holds up the picture of 'girl sit' and asks, "What is girl doing?" "You say, 'sit'."	S says, "Sit," within 5 seconds after echoic S^D is presented.	S is reinforced with a token paired with social praise for each correct response. If S says, "Girl sit," or "Sit chair," he is given two tokens.	If S fails to emit "Sit," within 5 seconds after echoic model is presented, E points to the picture and says, "Girl sit."	S advances to the next step in the program when he correctly responds to a block of 10 out of 10 stimulus presentations - five for 'sit' and five for 'stand.'	After reinforcement is given, E says, "Sit chair," while pointing to the chair."

Condition VII, Step 2 (Continued)

Training: Verbs	Discriminative Stimuli	Correct Responses	Reinforcement	Incorrect Responses	Criteria	Response Priming
'stand'	E holds up the picture of 'girl stand' and asks "What is girl doing?" "You say, 'stand'."	S says, "Stand," within 5 seconds after echoic S^D is presented.	S is reinforced with a token paired with social praise for each correct response. If S says, "Girl stand," or "Stand up," he is given two tokens.	If S fails to emit "Stand" within 5 seconds after echoic model is presented, E points to the picture and says, "Girl stand."	S advances to the next step in the program when he correctly responds to a block of 10 out of 10 stimulus presentations - five for 'sit' and five for 'stand.'	After reinforcement is given, E says, "Stand up," while pointing to the picture.

Condition VII, Step 3 - Echoic response of object manipulation to an intraverbal question.

Objective:
S will emit the echoic response, "Sit (Stand)," when E presents an object manipulation of 'boy sit (boy stand)' while asking the intraverbal question, followed by an echoic model - "What is boy doing?" "You say, 'sit (stand)'." S will emit a block of ten correct echoic responses of 'sit' and 'stand' to E's echoic stimulus presentations before advancing to the next step in the program - five correct echoic responses for 'sit' and five correct echoic responses for 'stand.'

Materials:
One flexible, rubber boy doll (4 1/2" tall).
One doll chair.

Training Procedure:
S is seated across the table from E. E presents the object manipulation of 'boy sit (boy stand).' The manipulation/echoic stimuli for 'sit' and 'stand' are presented in recurring blocks of ten. Within each recurring block of ten, each manipulation/echoic stimulus for 'sit' and 'stand' is presented five times in a scrambled order.

Training: Verbs	Discriminative Stimuli	Correct Responses	Reinforcement	Incorrect Responses	Criteria	Response Priming
'sit'	E presents the object manipulation of 'boy sit,' and asks, "What is boy doing?" "You say 'sit'."	S says, "Sit," within 5 seconds after echoic S^D is presented.	S is reinforced with a token paired with social praise for each correct response. If S says, "Boy sit," or "Sit chair," he is given two tokens.	If S fails to emit "Sit," within 5 seconds after echoic model is presented, E points to the picture and says, "Boy sit."	S advances to the next step in the program when he correctly responds to a block of 10 out of 10 stimulus presentations - five for 'sit' and five for 'stand.'	After reinforcement is given, E says, "Sit chair," while pointing to the chair.

Condition VII, Step 3 (Continued)

Training: Verbs	Discriminative Stimuli	Correct Responses	Reinforcement	Incorrect Responses	Criteria	Response Priming
'stand'	E presents the object manipulation of 'boy stand' and asks, "What is boy doing?" "You say, 'stand'."	S says, "Stand," within 5 seconds after echoic S^D is presented.	S is reinforced with a token paired with social praise for each correct response. If S says, "Boy stand," or "Stand up," he is given two tokens.	If S fails to emit "Stand," within 5 seconds after echoic model is presented, E points to the picture and says, "Boy stand."	S advances to the next step in the program when he correctly responds to a block of 10 out of 10 stimulus presentations - five for 'sit' and five for 'stand.'	After reinforcement is given, E says, "Stand up," while pointing to boy doll standing.

Condition VIII, Step 1 - Verbal response of body action to intraverbal question.

Objective:
S will emit the verbal response, "Sit (Stand)" when E performs a body action of 'sit (stand)' while asking the question, "What is Miss Smith doing?" S will emit a block of ten correct verbal responses to E's question stimulus presentations before advancing to the next step in the program - five correct verbal responses for 'sit' and five correct verbal responses for 'stand.'

Materials:
None

Training Procedure:
S is seated, facing E. Both S and E are seated away from the table. The action/question stimuli for 'sit' and 'stand' are presented in recurring blocks of ten. Within each recurring block of ten, each action/question stimulus for 'sit' and 'stand' is presented five times in a scrambled order.

Training: Verbs	Discriminative Stimuli	Correct Responses	Reinforcement	Incorrect Responses	Criteria	Response Priming
'stand'	E stands up in front of her chair while pointing to herself and asks, "What is Miss Smith doing?"	S says, "Stand," within 5 seconds after question S^D is presented.	S is reinforced with a token paired with social praise for each correct response. If S says, "stand," or "Stand up," he is given two tokens.	If S fails to emit "Stand" within 5 seconds after question stimulus is presented, E points to herself and says, "Miss Smith stand."	S advances to the next step in the program when he correctly responds to a block of 10 out of 10 stimulus presentations - five for 'sit' and five for 'stand.'	After reinforcement is given, E says, "Stand up," while pointing to herself.
'sit'	E sits on her chair while pointing to herself and asks, "What is Miss Smith doing?"	S says, "Sit," within 5 seconds after question S^D is presented.	S is reinforced with a token paired with social praise for each correct response. If S says, "sit," or "Sit chair," he is given two tokens.	If S fails to emit "Sit" within 5 seconds after question stimulus is presented, E points to herself and says, "Miss Smith sit."		After reinforcement is given, E says, "Sit chair," while pointing to the chair.

Condition VIII, Step 2 - Verbal response of picture to intraverbal question.

Objective:
S will emit the verbal response, "Sit (Stand)," when E presents a picture of 'boy sit (boy stand)" while asking the question, "What is boy doing?" S will emit a block of ten correct verbal responses to E's question stimulus presentations before advancing to the next step in the program - five correct verbal responses for 'sit' and five correct verbal responses for 'stand.'

Materials:
One picture of: 1.) 'boy sit' and 2.) 'boy stand.'

Training Procedure:
S is seated across the table from E. E presents one picture of 'boy sit (boy stand)' to S. The picture/question stimuli for 'sit' and 'stand' are presented in recurring blocks of ten. Within each recurring block of ten, each picture/question stimulus for 'sit' and 'stand' is presented five times in a scrambled order.

Training: Verbs	Discriminative Stimuli	Correct Responses	Reinforcement	Incorrect Responses	Criteria	Response Priming
'sit'	E holds up the picture of 'boy sit' and asks, "What is boy doing?"	S says, "Sit," within 5 seconds after question S^D is presented.	S is reinforced with a token paired with social praise for each correct response. If S says, "Boy sit," or "Sit chair, he is given two tokens.	If S fails to emit "Sit" within 5 seconds after question stimulus is presented, E points to the picture and says, "Boy sit."	S advances to the next step in the program when he correctly responds to 10 out of 10 stimulus presentations - five for 'sit' and five for 'stand.'	After reinforcement is given, E says, "Sit chair," while pointing to the picture.
'stand'	E holds up the picture of 'boy stand' and asks, "What is boy doing?"	S says, "Stand" within 5 seconds after question S^D is presented.	S is reinforced with a token paired with social praise for each correct response. If S says "Boy stand," or "Stand up," he is given two tokens.			After reinforcement is given, E says, "Stand up," while pointing to the picture.

Condition VIII, Step 3 - Verbal response of object manipulation to intraverbal question.

Objective:
S will emit the verbal response. "Sit (Stand)," when E presents an object manipulation of 'girl sit (girl stand)' while asking the intraverbal question. "What is girl doing?" S will emit a block of ten correct verbal responses to E's question stimulus presentations before advancing to the next step in the program - five correct verbal responses for 'sit' and five correct echoic responses for 'stand.'

Materials:
One flexible rubber girl doll (4 1/2" tall).
One doll chair.

Training Procedure:
S is seated across the table from E. E presents the object manipulation of 'girl sit (girl stand).' The manipulation/question stimuli for 'sit' and 'stand' are presented in recurring blocks of ten. Within each recurring block of ten, each manipulation/question stimulus for 'sit' and 'stand' is presented five times in a scrambled order.

Training: Verbs	Discriminative Stimuli	Correct Responses	Reinforcement	Incorrect Responses	Criteria	Response Priming
'sit'	E presents the object manipulation of 'girl sit,' and asks, "What is girl doing?"	S says, "Sit," within 5 seconds after S^D is presented.	S is reinforced with a token paired with social praise for each correct response. If S says, "Girl sit," or "Sit chair," he is given two tokens.	If S fails to emit "Sit," within 5 seconds after question stimulus is presented. E points to the object manipulation and says, "Girl sit."	S advances to the next step in the program when he correctly responds to 10 out of 10 stimulus presentations - five for 'sit' and five for 'stand.'	After reinforcement is given, E says, "Sit chair," while pointing to the chair.
'stand'	E presents the object manipulation of 'girl stand,' and asks, "What is girl doing?"	S says, "Stand," within 5 seconds after question S^D is presented.	S is reinforced with a token paired with social praise for each correct response. If S says, "Girl stand," or "Stand up," he is given two tokens.	If S fails to emit "Stand," within 5 seconds after question stimulus is presented, E points to the object manipulation and says, "Girl stand."		

Condition IX, Step 1 - Verbal response of body action to intraverbal question paired with intraverbal (agent) prompt.

Objective:
S will emit the verbal response "Sit (Stand)," when E performs a body action while asking the question, "What doing," paired with ten correct verbal responses to E's question/(agent) prompt stimulus presentations before advancing to the next step in the program - five correct verbal responses for 'sit' and five correct verbal responses for 'stand.'

Materials:
None

Training Procedure:
S is seated, facing E. Both S and E are seated away from the table. The action/question/prompt stimuli for 'sit' and 'stand' are presented in recurring blocks of ten. Within each recurring block of ten each action/question/prompt stimulus for 'sit' and 'stand' is presented five times in a scrambled order.

Training: Verbs	Discriminative Stimuli	Correct Responses	Reinforcement	Incorrect Responses	Criteria	Response Priming
'stand'	E stands up in front of her chair while pointing to herself and asks, "What doing?" "Miss Smith (pause)."	S says, "Stand," within 5 seconds after prompt S^D is presented.	S is reinforced with a token paired with social praise for each correct response. If S says, "____" stand, or "Stand up," he is given two tokens.	If S fails to emit "Stand" within 5 seconds after (agent)prompt stimulus is presented. E points to herself and says, "Miss Smith stand."	S advances to the next step in the program when he correctly responds to a block of 10 out of 10 stimulus presentations - five for 'sit' and five for 'stand.'	After reinforcement is given, E says, "Miss Smith stand up," while pointing to herself.
'sit'	E sits on her chair while pointing to herself and asks, "What doing?" "Miss Smith (pause)."	S says, "Sit," within 5 seconds after prompt S^D is presented.	S is reinforced with a token paired with social praise for each correct response. If S says, "____ sit," or "Sit chair," he is given two tokens.	If S fails to emit "Sit" within 5 seconds after (agent) prompt is presented, E points to herself and says, "Miss Smith sit."		After reinforcement is given, E says, "Miss Smith sit chair," while pointing to herself.

Training Basic Grammatical Structure Expressing Subject - Action-Verb-Object relation.

Condition I, Step 1 - Matching picture, representing noun, to verbal stimuli

Objective:
S will point to one of the pictures, representing 'boy,' girl,' 'man,' or 'lady,' when E presents the verbal stimulus, "Point to ____." S will correctly point to a block of 18 out of 20 pictures to E's verbal mands before advancing to the next step in the program.

Materials:
The pictures representing: 1.) 'boy,' 2.) 'girl,' 3.) 'man,' and 4.) 'lady.'

Training Procedure:
S is seated at a table across from E. The four pictures are placed on the table in front of S. The pictures are rearranged in a different left to right sequence for each stimulus presentation. The visual/verbal stimuli for the four nouns are presented in recurring blocks of twenty. Within each recurring block of twenty, each visual/verbal stimulus is presented five times in a scrambled order.

Training: Nouns	Discriminative Stimuli	Correct Responses	Reinforcement	Incorrect Responses	Criteria	Response Priming
'boy'	E says, "Ron, point to 'boy'."	S points to the picture of 'boy' within 5 seconds after verbal S^D is presented.	S is given a token paired with social praise for a correct response.	If S fails to point to the picture of 'boy' within 5 seconds after verbal S^D, E points to the picture of 'boy' while saying, "Boy."	S advances to the next step in the program when he correctly responds to a block of 18 out of 20 stimulus presentations - five for each of the four nouns.	No response is primed.

Condition I, Step 1 (Continued)

Training: Nouns	Discriminative Stimuli	Correct Responses	Reinforcement	Incorrect Responses	Criteria	Response Priming
'girl'	E says, "Ron, point to 'girl.'"	S points to the picture of 'girl' within 5 seconds after verbal S^D is presented.	S is given a token paired with social praise for a correct response.	If S fails to point to the picture of 'girl' within 5 seconds after verbal S^D E points to the picture of 'girl' while saying, "Girl."	S advances to the next step in the program when he correctly responds to a block of 18 out of 20 stimulus presentations - five for each of the four nouns.	No response is primed.
'man'	E says, "Ron, point to 'man'."	S points to the picture of 'man' within 5 seconds after verbal S^D is presented.	S is given a token paired with social praise for a correct response.	If S fails to point to the picture of 'man' within 5 seconds after verbal S^D, E points to the picture of 'man' while saying, "Man."		No response is primed.
'lady'	E says, "Ron, point to 'lady'."	S points to the picture of 'lady' within 5 seconds after verbal S^D is presented.	S is given a token paired with social praise for a correct response.	If S fails to point to the picture of 'lady' within 5 seconds after verbal S^D E points to the picture of 'lady' while saying, "Lady."		No response is primed.

Condition 1, Step 2 - Matching object manipulation, representing agent-action relation, to verbal stimuli.

Objective:

S will manipulate the dolls, representing 'boy,' 'girl,' 'man,' and 'lady,' into action positions when E presents the verbal stimulus, "Point to (agent) (action). S will correctly respond to a block of 18 out of 20 object manipulations to E's verbal mands before advancing to the next step in the program.

Materials:

One flexible, rubber boy doll (4 1/2" tall).
One flexible, rubber girl doll (4 1/2" tall).
One flexible, rubber man doll (6" tall).
One flexible, rubber lady doll (6" tall).
One flexible, rubber horse (4 1/2" tall).
One doll chair.
One doll bed.

Training Procedure:

S is seated at a table across from E. E places the objects on the table in front of S. The verbal S^D's for agent (man, boy, girl, and lady) - action (sit, stand, ride, jump, and sleep) are paired so that each agent-action combination is presented one time in recurring blocks of twenty.

Condition I, Step 2 (Continued)

Training: Agent-action	Discriminative Stimuli	Correct Responses	Reinforcement	Incorrect Responses	Criteria	Response Priming
	E says, "Ron, show me ...	S demonstrates correct object manipulation for each of the twenty agent-action combinations within 5 seconds after verbal S^D is presented.	S is given a token paired with praise for each correct response.	If S fails to demonstrate the correct object manipulation within 5 seconds after verbal S^D, E demonstrates correct agent-action manipulation while saying the corresponding 'agent-action' combination.	S advances to the next step in the program when he correctly responds to a block of 18 out of 20 stimulus presentations - one for each of the agent-action combinations.	After each correct response is reinforced, E says the corresponding agent-action-object combination; i.e., "Girl sleep bed," "Boy stand up."
'boy sit'	"boy sit"	If S says the agent-action combination within 5 seconds after verbal S^D is presented, the verbal response is recorded.	S is given an additional token paired with the correct agent-action verbal response.			
'girl stand'	"girl stand"					
'man ride'	"man ride"					
'lady sleep'	"lady sleep"					
'girl jump'	"girl jump"					
'man stand'	"man stand"					
'lady sit'	"lady sit"					
'boy jump'	"boy jump"					
'girl ride'	"girl ride"					
'man sleep'	"man sleep"					
'boy ride'	"boy ride"					
'lady stand'	"lady stand"					
'man jump'	"man jump"					
'girl sleep'	"girl sleep"					
'man sit'	"man sit"					
'boy stand'	"boy stand"					
'lady ride'	"lady ride"					
'girl sit'	"girl sit"					
'boy sleep'	"boy sleep"					
'lady jump'	"lady jump"					

Condition II, Step 1 - Verbal response of 'agent-action' relation to question paired with echoic 'agent' stimuli.

Objective:

S will emit the verbal response, "Agent-action," when E presents one of ten pictures and asks the question, "What doing?" E points to the agent while saying, "You say, boy." S will emit 18 out of 20 correct verbal responses in two consecutive blocks after E's question/echoic 'agent' stimulus presentation before advancing to the next step in the program.

Materials:

Ten pictures representing 'agent-action' relation: 1.) 'girl sleep,' 2.) 'girl eat,' 3.) 'boy walk,' 4.) 'boy run,' 5.) 'boy sit,' 6.) 'lady read,' 7.) 'boy lock,' 8.) 'girl play,' 9.) 'girl jump,' and 10.) 'girl ride.'

Training Procedure:

S is seated across the table from E. E presents one of the ten 'agent-action' pictures to S. Each of the ten question/echoic 'agent' stimulus presentations are presented one time in each block of ten recurring blocks of ten are presented until S correctly responds to 18 stimulus presentations in two consecutive blocks of ten.

Condition II, Step 1 (Continued)

Training: Agent-action	Discriminative Stimuli	Correct Response	Reinforcement	Incorrect Responses	Criteria	Response Priming
	E presents one of the ten pictures representing 'agent-action' while asking S, "What doing?" E points to the agent in the picture and says, "You say, :	S emits the correct verbal 'agent-action' relation within 5 seconds after E's echoic 'agent' stimulus.	S is reinforced with a token paired with social praise for each correct response.	If S fails to emit the correct response within 5 seconds after S^D is presented, E says the required 'agent-action' response, stressing the word that S omitted.	S advances to the next step in the program when he correctly responds to 18 out of 20 stimulus presentations - 90% correct responding in two consecutive blocks of the 10 'agent-action' relations.	After reinforcement is given, E says, :
		S response:				
'Girl sleep'	"Girl _____."	"Girl sleep,"				"Girl sleep bed,"
'Girl eat'	"Girl _____."	"Girl eat,"				"Girl eat dinner,"
'Boy walk'	"Boy _____."	"Boy walk,"				"Boy walk home,"
'Boy run'	"Boy _____."	"Boy run,"				"Boy run home,"
'Boy sit'	"Boy _____."	"Boy sit,"				"Boy sit chair,"
'Lady read'	"Lady _____."	"Lady read,"				"Lady read book,"
'Boy look'	"Boy _____."	"Boy look,"				"Boy look ball,"
'Girl play'	"Girl _____."	"Girl play,"				"Girl play ball,"
'Girl jump'	"Girl _____."	"Girl jump,"				"Girl jump rope,"
'Girl ride'	"Girl _____."	"Girl ride,"				"Girl ride horse,"

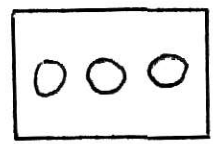
Condition III, Step 1 - Verbal response of 'agent-action' relation to question stimuli.

Objective:
S will emit the verbal response, "Agent-action," when E presents one of ten pictures and asks the question, "What doing?" S will emit 18 out of 20 correct verbal responses in two consecutive blocks of ten before advancing to the next step in the program.

Materials:
Ten pictures representing 'agent-action'relation: 1.) 'girl sleep,' 2.) 'girl eat,' 3.) 'boy walk,' 4.) 'boy run,' 5.) 'boy 'sit,' 6.) 'lady read,' 7.) 'boy look,' 8.) 'girl play,' 9.) 'girl jump,' and 10.) 'girl ride.'
One 5" x 8" note card with three circles, drawn one inch from one another.

Training Procedure:
S is seated across the table from E. E places the 5" x 8" note card in front of S. E holds the ten stimulus pictures in a pile, so that they are clearly visible to S. After each stimulus presentation, E puts the previous stimulus picture at the back of the additional nine pictures. The question stimulus for each picture is presented one time in each recurring block of ten. E places a white token on the first circle of the note card when S emits, "agent" and a white token on the second circle when S emits, "action." S is required to earn two white tokens for each stimulus presentation before receiving one red token. Rucurring blocks of ten are presented until S correctly responds to 18 stimulus presentations in two consecutive blocks of ten.

Condition III, Step 1 (Continued)

Training: Agent-action	Discriminative Stimuli	Correct Response	Reinforcement	Incorrect Responses	Criteria	Response Priming
'Girl sleep' 'Girl eat' 'Boy walk' 'Boy run' 'Boy sit' 'Lady read' 'Boy look' 'Girl play' 'Girl jump' 'Girl ride'	E presents each of the ten 'agent-action' pictures in a specific order, while asking, "What doing?"	S emits the correct verbal 'agent-action' relation within 5 seconds after E's question stimulus. S response: "Girl sleep," "Girl eat," "Boy walk," "Boy run," "Boy sit," "Lady read," "Boy look," "Girl play," "Girl jump," "Girl ride," If S emits 'agent-action-object' response, E places a white token on the third circle of the note card.	S is reinforced with two white tokens paired with social praise for each correct 'agent-action' response. E places a white token on the first circle of a note card when S says, "agent" and a white token on the second circle as S says, "action." S must receive two white tokens to earn one red token. If S emits "object," E places a token on the third circle, and S earns two red tokens. 	If S fails to respond correctly within 5 seconds after question, S^D is presented, E points to the first and second circle on the note card while saying, "Agent-action."	S advances to the next step in the program when he correctly responds to 18 out of 20 stimulus presentations in two consecutive blocks of ten.	After S is reinforced, E says, "Agent-action-object," while pointing to the appropriate circles on the note card. If S emits, "Agent-action-object" response, E primes with 'agent + is + action + ing + object' relation.

Condition 1, Step 1 - Verbal response of 'agent-action-object' relation to question paired with echoic 'object' stimuli.

Objective:
S will emit the three word verbal response expressing 'agent-action-object' relation when E presents the question stimulus. "What doing?" paired with a delayed echoic 'object' stimulus. S will correctly respond to 18 out of 20 stimulus presentations in two consecutive blocks of ten before advancing to the next step in the program.

Materials:
Ten pictures representing 'agent-action-object' relation: 1.) 'girl sleep bed,' 2.) 'girl eat _____,' 3.) 'boy walk _____,' 4.) 'boy run _____,' 5.) 'boy sit chair,' 6.) 'lady read book,' 7.) boy look ball,' 8.) 'girl play ball,' 9.) 'girl jump rope,' and 10.) 'girl ride horse.' The 'object' responses for the blanks in #2 may include a meal name or a specific food, and in #3 and #4 may include place or manner.
One 5" x 8" note card with three circles drawn one inch from one another.

Training Procedure:
S is seated across the table from E. E places the 5" x 8" note card in front of S. E holds the ten stimulus pictures in a pile so that they are clearly visible to S. After each stimulus presentation, E places the previous stimulus picture at the back of the additional nine pictures. The question/echoic 'object' stimulus is presented one time in each recurring block of ten. E places a white token on the first circle of the note card when S emits, "agent," a white token on the second circle when S emits, "action," and a white token on the third circle when S gives echoic 'object' response. S is required to earn three white tokens for each stimulus presentation before receiving one red token. Recurring blocks of ten are presented until S correctly responds to 18 out of 20 stimulus presentations in two consecutive blocks of ten.

Condition I, Step 1 (Continued)

Training: Agent-action-object	Discriminative Stimuli	Correct Responses	Reinforcement	Incorrect Responses	Criteria	Response Priming
	E presents one of the ten pictures representing 'agent-action-object' while asking S, "What doing?" After S emits, "Agent-action" response, E immediately points to the object and says: S R /E S^D	S emits the correct 'agent-action relation within 5 seconds after question S^D is presented, and S emits echoic 'object' within 3 seconds after echoic S^D.	S is reinforced with three white tokens paired with social praise for each correct 'agent-action-object' response. E places a white token on the first circle of the note card when S says, "Agent," and a white token on the second circle as S says, "Action," and a token on the third circle as S says, "Object." S must receive three tokens on first or second trial to earn one red token. If S consistently relies on gesture prompt within four blocks of ten, he is not given a red token for second trial responses. E then points to the appropriate circle on the note card and says the emitted word. E then shakes her head 'no' and removes the other token(s) from the note card.	If S fails to emit correct 'agent-action' relation after question S^D is presented, S is given another trial in which E prompts the omitted 'agent-action' by pointing or gesturing. If S responds correctly on second trial, E gives echoic 'object' S^D. If S fails to emit correct or an appropriate 'object' response after echoic S^D is presented, E says the appropriate "Agent-action-object, response, while pointing to the appropriate circle on the note card and stressing 'object.'	S advances to the next step in the program when he correctly responds to 18 out of 20 first trial stimulus presentations - 90% correct responding in two consecutive blocks of 10 'agent-action-object' relations.	After reinforcement is given, E says the appropriate "Agent + is + action + ing + object' relation.
"Girl sleep bed."	"_____ bed."	"Girl sleep bed."				
"Girl eat soup."	"_____ soup."	"Girl eat soup."				
"Boy walk home."	"_____ home."	"Boy walk home."				
"Boy run home."	"_____ home."	"Boy run home."				
"Boy sit chair."	"_____ chair."	"Boy sit chair."				
"Lady read book."	"_____ book."	"Lady read book."				
"Boy look ball."	"_____ ball."	"Boy look ball."				
"Girl play ball."	"_____ ball."	"Girl play ball."				
"Girl jump rope."	"_____ rope."	"Girl jump rope."				
"Girl ride horse."	"_____ horse."	"Girl ride horse."				
		If S emits an appropriate 'object' response without the echoic S^D, it is counted as a correct response.				If S emits an appropriate 'object' response without the echo S^D, E emits that 'object' response in the response priming.

Condition II, Step 1 - Verbal response of 'agent-action-object' relation to question stimuli.

Objective:
S will emit the three word verbal response expressing 'agent-action-object' relation when E presents the question stimulus, "What doing?" S will correctly respond to 18 out of 20 stimulus presentations in two consecutive blocks of ten before advancing to the next step in the program.

Materials:
Ten pictures representing 'agent-action-object' relation: 1.) 'girl sleep bed' 2.) 'girl eat ____,' 3.) 'boy walk ____,' 4.) 'boy run ____,' 5.) 'boy sit chair,' 6.) 'lady read book,' 7.) 'boy look ball,' 8.) 'girl play ball,' 9.) 'girl jump rope,' and 10.) 'girl ride horse.' The 'object' responses for the blands in #2 may include a meal or specific food; and in #3 and #4 may include place or manner.
One 5" x 8" note card with three circles drawn one inch from one another.

Training Procedure:
S is seated across the table from E. E places the 5" x 8" note card in front of S. E holds the ten stimulus pictures in a pile so that they are clearly visible to S. After each stimulus presentation, E places the previous stimulus picture at the back of the additional nine pictures. The question stimulus is presented one time in each recurring block of ten. E places a white token on each of the three circles of the note card while saying, "Agent-action-object," after S has given the appropriate 'agent-action-object' response. S is required to earn three white tokens for each stimulus presentation before receiving one red token or one M & M candy. Recurring blocks of ten are presented until S correctly responds to 18 out of 20 stimulus presentations in two consecutive blocks of ten.

Condition II, Step 1 (Continued)

Training: Agent-action-object	Discriminative Stimuli	Correct Responses	Reinforcement	Incorrect Responses	Criteria	Response Priming
'Girl sleep bed.' 'Girl eat _____.' 'Boy walk _____.' 'Boy run _____.' 'Boy sit chair.' 'Lady read book.' 'Boy look ball.' 'Girl play ball.' 'Girl jump rope.' 'Girl ride horse.'	E presents one of the ten pictures representing 'agent-action-object,' while asking S, "What doing?" Types of prompts for second trial response given 5 seconds after first S^D. S omits 'agent' – E says, "Who?" E points to agent in the picture. E points to first circle on note card. S omits 'action' – E says, "Agent _____." E gestures 'action.' E asks question and gestures action immediately after S emits, "Agent." E points to second circle on note card. S omits 'object' – E gestures 'where' or 'what.' E says, "Where?" or "What?" E points to 'object' if it is pictured. E points to third circle on the note card.	S emits the correct 'agent-action-object' relation on first or second trial. A prompt may be given for the second trial. "Girl sleep bed." "Girl eat _____." "Boy walk _____." "Boy run _____." "Boy sit chair." "Lady read book." "Boy look ball." "Girl play ball." "Girl jump rope." "Girl ride horse."	S is reinforced with three white tokens paired with social praise for each correct 'agent-action-object response on first or second trial. E places the tokens on the note card after S's response. S must receive three white tokens to earn a red token or a M & M candy. If S emits, "Agent + *is* + action + object," or "Agent + action + ing + object," he is given an additional red token or candy.	If S fails to emit the correct response on the second trial when a prompt is given, S points to the circles on the note card while saying the appropriate 'agent-action-object' response, stressing the word that S omitted. E gives one of the prompts for second trial responses. E begins to use the type of prompt that S responds to best.	S completes this programming language training when he correctly responds to 18 out of 20 stimulus presentations on the first or second trial. Additional pictures and activities are used to extend and expand 'agent-action-object' relation.	After reinforcement is given, E says the appropriate 'Agent + is + action + ing + object' relation.

Training Basic Grammatical Structure Expressing Proper Noun - Non-Action Verb - Object Relation

Proper Noun				Non-Action Verb				Object			
Motor Stimulus	Verbal Stimulus	Motor Response	Verbal Response	Motor Stimulus	Verbal Stimulus	Motor Response	Verbal Response	Motor Stimulus	Verbal Stimulus	Motor Response	Verbal Stimulus
1. Gesture	Verbal	S observes E	No response required	Gesture	Verbal	S observes E	No response required	Gesture	Verbal	S observes E	Imitative
2. Gesture	Verbal	S observes E	No response required	Gesture handshaped	Verbal	Hand-shaped gesture	No response required	Gesture	No verbal stimulus	No response required	Verbal
3. Gesture	Verbal	S observes E	No response required	Gesture	Verbal	Imitative gesture	No response required	Gesture	No verbal stimulus	No response required	Verbal
4. Gesture	Verbal	S observes E	No response required	No gesture	Verbal	Gesture	No response required	Pointing	No verbal stimulus	No response required	Verbal
5. Gesture	Verbal	S observes E	No response required	Gesture	Verbal	Gesture	Imitative	No gesture	No verbal stimulus	No response required	Verbal
6. Gesture hand-shaped	Question verbal	Hand-shaped gesture	No response required	Gesture	No verbal stimulus	No gesture required	Verbal	No gesture	No verbal stimulus	No response required	Verbal
7. Gesture	Question verbal	Imitative Gesture	No response required	No gesture	No verbal stimulus	No gesture required	Verbal	No gesture	No verbal stimulus	No response required	Verbal
8. Gesture	Question verbal	Gesture	Imitative	No gesture	No verbal stimulus	No gesture required	Verbal	No gesture	No verbal stimulus	No response required	Verbal
9. Gesture	Question	No gesture required	Verbal	No gesture	No verbal stimulus	No gesture required	Verbal	No gesture	No verbal stimulus	No response required	Verbal
10. No Gesture	Question	No gesture required	Verbal	No gesture	No verbal stimulus	No gesture required	Verbal	No gesture	No verbal stimulus	No response required	Verbal

Training Basic Grammatical Structure Expressing Proper Noun - Non-Action Verb - Object Relation.

Condition I, Steps 1 to 10 - Verbal response, "Ron have ten," to question stimulus.

Objective:
S will emit sentence "I have ten," or, "I have ten tokens," when the question, "How many tokens do you have?" is presented. Within each step, S will correctly respond to three consecutive complete stimulus presentations before advancing to the next step within Condition I.

Materials:
Tokens received for each correct response during the therapy session.

Training Procedure:
S is seated at the table across from E. The tokens S has accummulated during the therapy session are placed on the table in front of S. E places both of S's hands, palms down, on the table and places a token under each finger while counting to ten. E then presents the stimulus for the response being trained. This procedure is repeated until all of S's tokens are counted and exchanged. S must correctly respond to three consecutive complete stimulus presentations in each step before advancing to the next step in the program.

"Ron . . .		. . . have . . .		. . . ten (tokens)."		Criteria	Response Priming for Final Response
Discriminative Stimuli	Correct Response	Discriminative Stimuli	Correct Response	Discriminative Stimuli	Correct Response		
1. E points to S and says, "Ron. . ."	S observes E's pointing response.	E gestures 'have' by putting her hand over S's ten tokens and says, ". . . have . . ."	S observes the gesture of 'have'.	E holds up ten fingers and says, ". . . ten." E says to S, "Say, ten."	S emits echoic response, within 5 seconds after S^D is presented. If S does not respond on first trial, additional trials are given.	3 consecutive correct responses for each S^D before advancing to Step 2. If S incorrectly responds to 3 out of 3 trials, E requires S to imitate gesture S^D of 'ten.'	After each correct final response, E says, "Ron have ten," as she holds up her ten fingers.

Condition I (Continued), Step 2 and 3

"Ron. . .		. . . have. . .		. . . ten (tokens)."			
Discriminative Stimuli	Correct Response	Discriminative Stimuli	Correct Response	Discriminative Stimuli	Correct Response	Criteria	Response Priming for Final Response
2. E points to S and says, "Ron . . ."	S observes E's pointing response.	E gestures 'have' by putting her hand over S's ten tokens and says, ". . . have . . ." while taking S's hand and placing it in an identical position over the tokens.	S allows E to hand-shape the gesture response and observes the response.	E holds up ten fingers. If S does not say, "ten" within 5 seconds after gesture and verbal S^D E says to S, "Say, ten."	S emits verbal response, "Ten," within 5 seconds after gesture S^D is presented	3 consecutive correct responses for each S^D before advancing to Step 3. If S incorrectly responds to 3 out of 3 trials, return to Step 1.	After each correct final response E says, "Ron have ten," as she gestures 'have' and then holds up ten fingers.
3. E points to S and says, "Ron . . ."	S observes E's pointing response.	E gestures 'have' by putting her hand over S's ten tokens and says, ". . . have . . ."	S imitates E's gesture of 'have' within 5 seconds after gesture and verbal S^D are presented. If S responds incorrectly, E hand-shapes the gesture.	E holds up ten fingers.	S emits verbal response, "Ten." If S does not respond correctly, E repeats, "Ron have . . ."	3 consecutive correct responses for each S^D before advancing to Step 4. If S incorrectly responds to 3 out of 3 trials, return to Step 2.	After each correct final response, E says, "Ron have ten," as she gestures 'have.'

Condition I (Continued), Steps 4 - 5

"Ron. . .		. . . have. . .		. . . ten (tokens)."			
Discriminative Stimuli	Correct Response	Discriminative Stimuli	Correct Response	Discriminative Stimuli	Correct Response	Criteria	Response Priming for Final Response
4. E points to S and says, "Ron . . ."	S observes E's pointing response.	E says," . . . have . . ."	S gestures 'have' when E says, ". . . have. . ." within 5 seconds after E says, ". . . have. . ."	E points to the ten tokens.	S emits verbal response, "Ten," after E's previous prompt "Ron have ____."	3 consecutive correct responses for each S^D before advancing to Step 5. If S incorrectly responds to 3 out of 3 trials return to Step 3.	After each correct final response, E says, "Ron have ten."
5. E points to S and says, "Ron . . ."	S observes E's pointing response.	E gestures 'have' and says to S, "Say, have ____."	S gestures 'have' and emits the echoic response, "Have," within 5 seconds after S^D is presented. If S does not respond correctly, E gives the gesture S^D paired with the echoic S^D, "have."	No S^D is given after S emits the previous echoic response of "have . . ."	S emits verbal response, "Ten," after his echoic response, "Have . . ."	3 consecutive correct responses for each S^D before advancing to Step 6. If S incorrectly responds to 3 out of 3 trials, return to Step 4.	After each correct final response, E says, "Ron have ten."

Condition I (Continued), Steps 6 - 8

"Ron ...		... have ten."		Criteria	Response Priming for Final Response
Discriminative Stimuli	Correct Response	Discriminative Stimuli	Correct Response		
6. E asks S, "how many tokens does Ron have? E handshapes S's response of pointing to himself while saying, "Ron ___."	S allows E to handshape the pointing gesture.	E gestures 'have.'	S says, "Have ten," with or without the accompanying gesture.	3 consecutive correct responses for each S^D before advancing to Step 7. If S incorrectly responds to 3 out of 3 trials, return to Step 4.	After each correct final response, E says, "Ron have ten."
7. E asks S, "How many tokens does Ron have?" E points to S and says, "Ron ___."	S points to himself within 5 seconds after verbal S^D is presented.	No S^D is given within 3 seconds after S points to himself.	S says, "Have ten," within 3 seconds after he points to himself.	3 consecutive correct responses for each S^D before advancing to Step 8. If S incorrectly responds to 3 out of 3 trials, return to Step 6.	After each correct final response E says, "Ron have ten."
8. E asks S, "How many tokens do you have?" E points to S and says, "You say, Ron..."	S points to himself and emits the echoic response, "Ron ...," within 5 seconds after verbal S^D is presented.	No S^D is given within 3 seconds after S's echoic response, "Ron ..."	S says, "... have ten," within 3 seconds after his echoic response, "Ron ..." If S does not say, "have" within 3 seconds after he emits the echoic response, "Ron," E gives the gesture S^D of 'have,' after saying, "Ron ___."	3 consecutive correct responses for each S^D before advancing to Step 9. If S incorrectly responds to 3 out of 3 trials, return to Step 7.	After each correct final response, E says, "Ron, you have ten."

Condition I (Continued), Steps 9 - 10

"Ron ...		... have ten."			
Discriminative Stimuli	Correct Response	Discriminative Stimuli	Correct Response	Criteria	Response Priming for Final Response
9. E asks S, "How many tokens do you have?" E points to S.	S emits the verbal response, "Ron have ten." within 5 seconds after gesture S^D is presented.			3 consecutive correct responses for each S^D before advancing to Step 10. If S incorrectly responds to 3 out of 3 trials, return to Step 8.	After each correct final response, E says, "Ron, you have ten tokens.
10. E asks S, "How many tokens do you have?"	S emits the verbal response, "Ron have ten," within 5 seconds after question S^D is presented.			3 consecutive correct responses for each S^D before replacing verbal response, "I" in place of "Ron ..." If S incorrectly responds to 3 out of 3 trials, return to Step 9.	After each correct final response, E says, "You have ten tokens."

Condition II, Steps 1 to 10 - Verbal response, "Ron want penny," to question stimulus.

Objective:
S will emit the sentence, "I want penny (object)," when the question, "What do you want?" is presented within each step. S will correctly respond to three consecutive stimulus presentations before advancing to the next step within Condition II.

Materials:
Tokens received for each correct response during the therapy session.
Ten pennies.

Training Procedure:
S is seated at the table across from E. S has counted or sorted out ten of the tokens he has accumulated during the therapy session. E takes the ten tokens and while pointing to herself says, "Miss Smith have ten." E then presents the stimulus for the response being trained. This procedure is repeated until all of S's tokens are exchanged for pennies. S must correctly respond to three consecutive complete stimulus presentations in each step before advancing to the next step in the program.

"Ron ...		... want ...		... penny ..."			
Discriminative Stimuli	Correct Response	Discriminative Stimuli	Correct Response	Discriminative Stimuli	Correct Response	Criteria	Response Priming for Final Response
1. E points to S and says, "Ron ..."	S observes E's pointing response.	E gestures 'want' by holding out her hand in a cupping position and says, "...want..."	S observes the gesture of 'want'.	E holds up a penny and says, "... penny." E then says to S "Say, penny."	S emits echoic response, "Penny," within 5 seconds after S^D is presented. If S does not respond on the first trial, additional trials are given.	3 consecutive correct responses for each S^D before advancing to Step 2. If S incorrectly responds to 3 out of 3 trials S is required to point to the penny.	After each correct final response, E says, "Ron want penny," as she gives S a penny.

Condition II, (Continued) Steps 2 - 3

"Ron..."		... want ...		... penny ..."			
Discriminative Stimuli	Correct Response	Discriminative Stimuli	Correct Response	Discriminative Stimuli	Correct Response	Criteria	Response Priming for Final Response
2. E points to S and says, "Ron ...	S observes E's pointing response.	E gestures 'want' by holding out her hand in a cupping position and says, "... want..." while taking S's hand and hand-shaping it in an identical position.	S allows E to hand-shape the gesture response and observes the response.	E holds up a penny.	S emits verbal response, "Penny" within 5 seconds after E holds up a penny. If S does not say, "penny." within 5 seconds after S^D is presented, E says to S, "Say, penny."	3 consecutive correct responses for each S^D before advancing to Step 3. If S incorrectly responds to 3 out of 3 trials, return to Step 1.	After each correct fina response, E says, "Ron want penny, as she gives S a penny.
3. E points to S and says, "Ron ..."	S observes E's pointing response.	E gestures 'want' and says, "... want ...	S imitates E's gesture of 'want within 5 seconds after gesture and verbal S^D is presented. If S responds incorrectly, E handshapes S.	E holds up a penny.	S emits non-echoic response "penny." If S does not respond correctly within 5 seconds after S^D is presented, E repeats "Ron want ___."	3 consecutive correct responses for each S^D before advancing to Step 4. If S incorrectly responds to 3 out of 3 trials return to Step 2.	After each correct final response, E says, "Ron want penny, as she gestures 'want.'

Condition II, (Continued) Steps 4 - 5

"Ron ...		... want ...		... penny"			
Discriminative Stimuli	Correct Response	Discriminative Stimuli	Correct Response	Discriminative Stimuli	Correct Response	Criteria	Response Priming for Final Response
4. E points to S and says, "Ron ..."	S observes E's pointing response.	E says, "...want ..."	S gestures 'want' when E says, "... want ..." within 5 seconds after verbal S^D is presented. If S responds incorrectly, E, gestures 'want' as an imitative cue.	E holds up a penny.	S emits verbal response, "Penny," after E's previous prompt, "Ron want ____."	3 consecutive correct responses for each S^D before advancing to Step 5. If S incorrectly responds to 3 out of 3 trials, return to Step 3.	After each correct response, E says, "Ron want penny."
5. E points to S and says, "Ron ..."	S observes E's pointing response.	E gestures 'want' and says to S, "Say, want ____."	S gestures 'want' and emits the echoic response, "want," within 5 seconds after E says, "Say, want." If S does not respond correctly, E gives the gesture S^D paired with the echoic S^D "have".	No S^D is given after S emits the previous echoic response of "Ron want ____."	S emits verbal response, "Penny," after his echoic response, "Have ..."	3 consecutive correct responses for each S^D before advancing to Step 6. If S incorrectly responds to 3 out of 3 trials return to Step 4.	After each correct final response, E says, "Ron want penny."

Condition II, (Continued) Steps 6 - 7 - 8

"Ron ...		... want penny."			
Discriminative Stimuli	Correct Response	Discriminative Stimuli	Correct Response	Criteria	Response Priming for Final Response
6. E asks S, "What do you want?" E handshapes S's response of pointing to himself while saying, "Ron, ____."	S allows E to handshape the pointing response.	E gestures 'want.'	S says, "Want penny, with or without the accompanying gesture within 5 seconds after E gives gesture, 'have'.	3 consecutive correct responses for each S^D before advancing to Step 7.	After each correct final response, E says, "Ron want penny."
7. E asks S, "What do you want?" E points to S and says, "Ron ___."	S points to himself within 5 seconds after verbal S^D is presented.	No S^D is given within 3 seconds after S points to himself.	S says, "Want penny," within 3 seconds after he points to himself.	3 consecutive correct responses for each S^D before advancing to Step 8. If S incorrectly responds to 3 out of 3 trials, return to Step 6.	After each correct final response, E says, "Ron want penny."
8. E asks S, "What do you want?" E points to S and says, "You say, Ron ..."	S points to himself and emits the echoic response, "Ron ...," within 5 seconds after verbal S^D is presented.	No S^D is given within 3 seconds after S's echoic response, "Ron ..."	S says, "... want penny," with 3 seconds after his echoic response, "Ron ..." If S does not respond correctly, E gives gesture S^D of 'have' after saying, "Ron ____."	3 consecutive correct responses for each S^D before advancing to Step 9.	After each correct final response, E says, "Ron, you want penny." E then gives S a penny and says, "You have penny."

Condition II, (Continued) Steps 9 - 10

"Ron ...				
Discriminative Stimuli	Correct Response		Criteria	Response Priming for Final Response
9. E asks S, "What do you want?" E points to S.	S emits the verbal response, "Ron want penny," within 5 seconds after gesture S^D is presented.		3 consecutive correct responses for each S^D before advancing to Step 10. If S incorrectly responds to 3 out of 3 trials return to Step 8.	After each correct final response, E says "You want penny." E then gives S a penny and says, "You have penny."
10. E asks S, "What do you want?"	S emits the verbal response, "Ron want penny," within 5 seconds after question S^D is presented.		3 consecutive correct responses for each S^D before pairing echoic response "I" with self gesture. If S incorrectly responds to 3 out of 3 trials, return to Step (.	After each correct final response, E says, "You want penny." E then gives S a penny and says, "You have penny."

A SYSTEMATIC LANGUAGE TRAINING PROGRAM FOR THE ACQUISITION OF BASIC GRAMMATICAL RELATIONS

by

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Abstract

Studies have demonstrated that specific language behavior can be modified by the use of operant conditioning techniques. These studies have provided strategies and techniques for persons interested in developing language training programs; however, they have not specified what the intermediate or terminal goals of language training should be.

Until recently the linguists in the area of language acquisition have provided few answers to how a child learns to express the basic grammatical relations that are represented in his speech. Bloom (1970) has provided us with new insights into the area of early language acquisition. She stated that children seem to identify particular syntactic structures with the behavior and content with which they are perceived and then progress to reproduce structures in similiar, recurring contexts. She emphasized that the 'function' of the child's early utterances are just as important as the form. Bloom analyzed the speech of three young children to learn what function she thought that they were expressing. Her research gives persons interested in the area of language training some initial directions in which to proceed in order to develop an early language program. Bloom also offered information about how constructed utterances may develop. The child doesn't seem to have an unsystematical language system as often appears. Bloom stressed the importance of structuring objects and events in an order that the child may perceive, understand and eventually express relations of his world, first in terms of agent-action-object relations.

The purpose of the present investigation was to develop an early language training program that would structure the basic grammatical relations in which the child could discriminate and later express these basic grammatical relations. The program employed some of the strategies and techniques that have been demonstrated to be effective in

modifying language behavior. Developmental data, which was noted by Bloom, was used in order to plan initial and intermediate therapy goals to be used within the program.

The training program administered in this study was designed to attain Noun-Verb-Object responses to action pictures and questions about those pictures. The training program consisted of three distinct training conditions: (1) training on the verbs contained in the pictures, (2) training on Noun-Verb constructions, and (3) training on Noun-Verb-Object constructions. The four general procedural strategies used to train the subjects to use Noun-Verb-Object constructions were: (a) non-vocal discrimination to non-verbal stimuli, (b) non-vocal discrimination to verbal stimuli, (c) vocal/speech responses to verbal imitative stimuli, and (d) functional speech responses to non-verbal and/or verbal stimuli.

Prior to training all subjects were presented the training items under each of the four general procedural strategies that were used in training. The subjects' responses to the pre-training tests were compared to final- and post- training test responses. Pre- and post- training generalization items included trained constructions to novel pictures, novel pictures that represented trained constituents but untrained constructions, and pictures that represented constructions in which one constituent was untrained.

The results of the training program supported the program's effectiveness. The subjects who used a single noun to express a Noun-Verb-Object relation to pictures and/or question were trained to express N-V-O relations to the training pictures. The subjects also expressed the appropriate N-V-O constructions to the generalization items. Generalization items that included constructions which contained an untrained constituent were frequently responded to with the untrained constituent being expressed by an appropriate gesture or "uh?" within the N-V-O response.

It should be recognized that no child in need of language training should be molded to fit a particular training program. Language assessments should include aspects of language which are most functional for a child who is delayed in language development. Any language training program should be flexible in that it provides branching steps for the children who require them.