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Conditioning Expressive Language in a Nonverbal Child

Frederick R. Moll
Central Washington University

CONDITIONING EXPRESSIVE LANGUAGE IN A NONVERBAL CHILD

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by

Frederick R. Moll

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APPROVED FOR THE GRADUATE FACULTY

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Hyrum S. Henderson, COMMITTEE CHAIRMAN

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Jerald DiMinico

_____

Sam Rust, Jr.

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INTRODUCTION

In order to achieve academic success in the public schools, a child should come equipped with certain basic skills which were to have developed during his pre-school years. Pre-school skills are those which presumably signify that the child is "ready" to begin the traditional school curriculum. Of all these basic skills, perhaps, the ability to use spoken language effectively is the most important. Without it the child can neither understand the words of others nor can he communicate his own ideas and needs. He could not benefit greatly from the normal curriculum and will need, if physically and mentally able, to develope skill in the use of verbal language before attendance.

There are various forms of language disorders including generalized deficits, disorders of receptive language, and disorders of expressive language (Johnson and Myklebust, 1967). Of special interest in this study was that of expressive language and particularly with that of the developement of this skill.

In the area of language acquisition there has developed some controversy as to appropriate procedures to use in treatment (Gray, 1970). The difference of opinion seems to have concentrated between linguistic theorists and behaviorists and their programs of speech remediation.

According to many linguists, behaviorists do not offer a basic and viable language structure and the behaviorists argue that linguistic theory has no way of inserting language into the behavior pattern of a child. With the above in mind, it would seem that a language acquisition program which combined the virtues of both would be most effective.

PROBLEM

The problem of treating the child with delayed speech acquisition has generated a considerable amount of research and these studies have pointed out the need for further work in this area. The purpose of this study is to test the procedures of one particularly effective study, that of Dr. Burl B. Gray at the Monterey Institute for Speech and Hearing in Monterey, California. By removing it from the clinical setting of the Institute, with its unusually well-trained and highly specialized staff, and by successfully employing its procedures using comparatively untrained personnel, it was felt that this program might be applied to more general use. This study, then, investigated the effectiveness of Gray's language acquisition program on a nonverbal five and one half year old boy.

RELEVANT LITERATURE

Linguists and their theories concerning the normal developement of language tended to center around two points of view: (1) theories of association and (2) those theories

insisting that there is a deeper, more basic, mental function involved in the acquisition of speech. Jenkins and Palermo (1964) presented an associationist view in their writing which explained speech as developing in children as a result of listening to the speech of their parents. They maintained that children arrange words into classes due to associations existing among them, when words occurred in similar contexts. Children, then, used these word classes to generalize, and thus acquire speech.

According to Braine (1963), an explanation of language developement involves more than word class associations. He maintained that there are two processes involved. The first he called contextual generalization and the other consisted of a type of association among function words and other grammatical classes. By contextual generalization, Braine meant that as children hear sentences from their parents, they begin to notice the position of various words or phrases in them. They come to perceive the correct grammatical position of language units from context.

Garret and Fodor (1968) proposed a similar account to that of Braine. They too believed that theories of association, alone, did not go far enough. They did, however, admit the contribution of these theories to the total process of language developement. They felt that the process of association established a surface structure of language whereas an adequate explanation of language acquisition required an additional component involving language structure transformations which enabled children to mentally reorganize language units while maintaining similar meaning. A deep and more viable language structure resulted from these transformations.

McNeil (1968) offered another point of view. He argued that theories of association, including those involving stimulus-response views, would result in surface language only and that what was needed was a theory which eliminated simple left-to-right transitions. His theory proposed the existence in children of a biologically-based capacity for language which operated by processing input language from parents and others, thus establishing a grammatical basis from which children generalized. McNeill maintained that his theory explained a deep, basic structure which enabled children to acquire language.

Though the above theories might all share some validity in the normal acquisition of language, some children do not progress normally and experience difficulty in dealing with the spoken language. Of the children with these difficulties, those who exhibit problems in using speech to express themselves were of most interest in this study.

Johnson and Myklebust (1967) pointed out three general areas of disabilities in expressive language, including those with word selection problems, those with articulation problems, and those with defective syntax.

Van Riper (1954) noted similar problem areas including vocabulary deficiency and that which he called retarded developement of sentence structure.

In the developement of programs aimed at treating children with delayed speech acquisition, those employing a delivery system involving the use of behavior modification were quite prominent. This was, perhaps, a result of the fact that children with these disorders are hyperactive and easily distracted (Gray; Johnson and Myklebust; Lovaas,

1966). In order to attain and maintain desired behaviors from such children, a reward system was needed which would make a child want to attend to the difficult task of learning to speak.

McReynolds (1967) employed a system of reinforcement using candy for correct responses in her program of verbal sequence discrimination with severely impaired children.

Schlanger (1959) used a less precise system of reinforcement in his work with speech developement in brain damaged retardates which involved the dispensing of treats at the end of therapy sessions.

In their treatment program for speech deficient children, Sloane, Johnson, and Harris (1968) employed a variety of reinforcers, including spoonsful of regular meals, candy, soda pop, and trinkets, when a child gave correct and appropriate verbal responses.

MacAulay (1968) used a token system in her program for teaching speech to retardates wherein correct verbal responses by the subjects were rewarded with tokens which could later be exchanged for candies.

Spoonsful of the child's regular meals, as reinforcement for correct responses, were used by Lovaas (1966) in his program for teaching speech to psychotic children.

As noted in the introduction to this study, linguists objected to contemporary behavioral speech programs, such as those listed above, because they conditioned only certain verbal responses and not the basic structure needed to become proficient with speech. It was Gray's agreement with the linguists' objections and his faith in reinforcement theory as a delivery system that led him to develope

his "Language Acquisition Through Programmed Conditioning" in 1970. This program was developed to adapt operant conditioning methods to current linguistic theory.

HYPOTHESIS

The hypothesis postulated in this study was that a nonverbal five and a half year old child would progress in the acquisition of expressive language, using Language Acquisition Through Programmed Conditioning (Gray, 1970), by meeting the program's criterion for performance and by using personnel not specially trained in administering this program.

Chapter 2

METHOD

SUBJECT

The subject for this study was a five and a half year old boy who had not previously developed language. Testimony from the boy's mother, sister, and aunt revealed that he had articulated only one word, "apple," before the onset of this study. They were not sure, however, that it was, indeed, a word that he had uttered.

The subject had attended school for six months in the special education program of the Ellensburg Public Schools, at Woldale Non-graded School, but no improvement in language ability was noted while in attendance there. Four weeks after the beginning of language training, the subject was removed from Woldale School.

LANGUAGE ACQUISITION THROUGH PROGRAMMED CONDITIONING (GRAY, 1970)

Curricula

As noted previously, Gray is in fundamental agreement with linguists' claim that a deep inner grammatical structure must exist before children form expressive

language. He thus divided his curriculum into three general divisions in order to condition this structure. The first division consisted of "content" words which have concrete meanings. The second was comprised of "function" words without lexical meanings, but which provided grammatical context. It was this group which ultimately provided deep rules of grammar. The third part of the curriculum was concerned with the correct articulation of speech sounds.

Operationally, the plan of Gray's program was to observe the language ability of a child. If he had no expressive language, the first step would be to acquire a few core content words with which to begin the actual program. These content words were then to be tied to the acquisition of basic function words and the two, in conjunction, would produce a beginning of expressive language. Syntax-wise, the language base formed would at this point be complete, even though small in terms of vocabulary. Each new increment of vocabulary would thus be fitted into a workable syntactical structure.

Another and extremely important aspect of Gray's program was concerned with enabling a child to use and improve his speech without need for further conditioning. Unless a child could generalize both the individual responses and basic grammar forms learned in the training situation, the program had failed. Gray's definition of language success was met when a child in a new situation could form a sentence he had not heard before and have that sentence be both correct and appropriate.

Delivery System

Also noted previously, the delivery system used by Gray to implement his curricula was that of behavior modification. The rationale behind such a system was the fact that, besides systematizing rewards, behavior modification techniques facilitated organization and step-by-step programming. Under this structure, materials, subject responses, and teacher activities were printed in a schedule. Using the schedule the teacher became an interpreter between the program and the subject. Conditioning of the three curriculum areas thus followed the programmed structure.

Figure 1 provides an example of the program topic concerning "common nouns and other content words" (SERIES C, D, and E were deleted for brevity). At the top of the program is space for the "GOAL," "COMMENTS," type of reinforcement ("G"), and "DATE." Under the column "STEP," the numbers refer to movements or frames of difficulty. To the left of the "STEP" column, the "SERIES" notations refer to more generalized increments.

The "STIMULUS" column, to the right of the "STEP" column, provides the type of stimulus to be given the subject. In the case of SERIES A, STEP 1, the stimulus will consist of a picture with a noun phrase and verb phrase (np-vp) repeated twice (as in the "COMMENTS" at the top of the page). The "RESPONSE" column designates the correct responses expected from the subject. In SERIES A, STEP 1, the subject is expected to verbalize the appropriate noun to receive the reinforcement.

GOAL: Identification of pictures in response to questions

G: Soda Crackers

COMMENTS: np-vp repeated twice

DATE: 3-9-70

SERIES	STEP	STIMULUS	RESPONSE	M	SCH	C	SM	RM	Cx
Series A	1	picture np-vp	noun	I	C	10	v/v	v	1-1
	2	picture np-vp	noun	I	50	10	v/v	v	1-1
Series B	1	picture np-vp	noun	IE	C	10	v/v	v	2-1
	2	picture np-vp	noun	IE	50	10	v/v	v	2-1
	3	picture np-vp	noun	IE	I	10	v/v	v	2-1

Fig. 1. Series A and B of the procedural plan for conditioning nouns (Gray, 1970).

The column labeled "M" is the model used by the teacher. Sometimes the teacher will give the child all of the correct response, sometimes part, and sometimes none. The abbreviations in the "M" column refer to these variations.

Column "SCH" refers to the schedule of reinforcement. In Figure 1, "C" means continuous, or one-for-one reinforcement, and "50" means that reinforcement is delivered at every second correct response. Column "C" indicates the criterion, or, the number of consecutive correct responses required before moving to the next higher step. "SM" over the next column to the right is the "stimulus mode," or method used to present the stimulus. In Figure 1, the v/v means that the stimulus is presented both visually (v) and verbally (v). "RM" stands for "response mode," the method used by the child to respond to the stimulus. In this case, "v" means he will respond verbally. Column "Cx" on the extreme right refers to "stimulus complexity," the number of stimulus units given and the number of response units required. In SERIES A, STEP 1, the stimulus model would be a noun (1) and after using that noun in a sentence with a noun phrase and a verb phrase. The response, in this case, would be the articulation of the appropriate noun (1). There is thus a 1-1 stimulus unit-response unit ratio.

General Curriculum in Programmed Conditioning

Table 1 outlines the complete curriculum of topic programs into the three general areas of content words, function words, and articulation.

Table 1

Curricula Used in the Programmed Conditioning Language Acquisition Training (Gray, 1970)

Area	Program Topics
Content Words	1. common nouns and other content words
Function Words	2. is
	3. is verb-ing
	4. what is
	5. is interrogative
	6. he/she is
	7. I am
	8. you are
	9. plural noun are
	10. they are
	11. we are
	12. what are
	13. are interrogative
	14. infinitive to
	15. comparative and superlative adjectives
	16. regular past tense
	17. future tense
Articulation	18. articulation (all sounds)
Optional Programs	19. the
	20. who is
	21. where is
	22. is negative
	23. where are
	24. are negative

MATERIAL AND APPARATUS

The basic tool in this study was Gray's language acquisition program as outlined above. This program was implemented in the speech and hearing room at Mt. Stewart Elementary School in Ellensburg, Washington. Materials in the room consisted of a table and chairs, one for the subject and one for the teacher.

Stimulus materials included objects with familiar names, pictures of familiar things, and three children's picture books.

Reinforcement materials consisted of soda crackers.

Recording sheets were used to note each subject response, correct and incorrect.

PROCEDURE

The subject in this study was given a daily training session lasting three hours, from 9 o'clock A.M. to 12 o'clock noon. The session was broken into three one-hour periods with three different teachers each spending one hour per day in training with the boy. The hour periods were divided into work periods and rest periods, generally working for twenty minutes and resting ten.

In the initial phase of training it was necessary to gain attending behavior from the subject before beginning language training. To do this, a pre-language sub-program was devised. The sub-program is illustrated in the chapter on results.

The work sessions consisted of individual stimulus units delivered by the teacher to the subject via a verbal or combination verbal-visual stimulus including a model ("M" column in Figure 1), and the student generally responding verbally (column "RM" in Figure 1) to the stimulus. "C" column then defined the number of correct responses necessary to move to the next step. An example of a typical unit in this sequence follows.

Teacher: "The ball is red. The ball is red. Johnny, Ball." The teacher has supplied the stimulus in the repeated sentences and has provided a model "Ball.")

Subject: "Ball." (This is the subject's correct response to the stimulus using the model.)

Reinforcement, generally in the form of soda crackers, was given for correct responses as determined by the "SCH" column.

When an entire program sequence had been completed, the child was immediately moved to the next program topic level.

Chapter 3

RESULTS

The subject proceeded through a program topic designed to bring about attending behavior, the first two language program topics, and through SERIES B, STEP 5 of the third language program topic. Figure 2 illustrates the initial sub-program; Figure 3, program topic 1; Figure 4, program topic 2; and Figure 5, program topic 3.

Figure 6 is a cumulative graph of the subject's progress throughout the total period of training, forty-three days, and the precise series and steps accomplished each day. In Figure 6, when the same series and step is listed for two or more days, the subject has not achieved criterion performance and has been retained on the same step.

Table 2 is a list of vocabulary words learned and used by the subject during daily training sessions in the forty-three day study.

GOAL: Sitting in chair, feet on floor, hands folded, eyes on teacher

G: Soda Crackers

DATE: 2-26-70

COMMENTS: Fold hands for child if necessary

SERIES	STEP	STIMULUS	RESPONSE	M	SCH	C	SM	RM	Cx
	1	show me you are ready	sitting in chair	-	C	10	v	nv	
	2	"	sitting in chair feet on floor	-	C	10	v	nv	
	3	"	"	-	50	10	v	nv	
	4	"	sitting in chair feet on floor, hands folded	-	C	10	v	nv	
	5	"	"	-	50	10	v	nv	
	6	"	"	-	I	10	v	nv	
	7	"	sitting in chair feet on floor, hands folded, eyes on teacher	-	C	10	v	nv	
	8	"	"	-	50	10	v	nv	
	9	"	"	-	I	10	v	nv	

Fig. 2. Sub-program for conditioning attending behavior (Gray, 1970).

GOAL: Identification of pictures in response to questions

G: Soda Crackers

DATE: 3-4-70

COMMENTS: np-vp repeated twice

SERIES	STEP	STIMULUS	RESPONSE	M	SCH	C	SM	RM	Cx
A	1	picture np-vp	noun	I	C	10	v/v	v	1-1
	2	"	"	I	50	10	v/v	v	1-1
B	1	"	"	IE	C	10	v/v	v	2-1
	2	"	"	IE	50	10	v/v	v	2-1
	3	"	"	IE	I	10	v/v	v	2-1
C	1	"	"	D	C	10	v/v	v	1-1
	2	"	"	D	50	10	v/v	v	1-1
	3	"	"	D	I	10	v/v	v	1-1
D	1	"	"	N	C	10	v/v	v	1-1
	2	"	"	N	50	10	v/v	v	1-1
	3	"	"	N	I	10	v/v	v	1-1
E	1	picture and questions	"	N	C	10	v/v	v	1-1
	2	"	"	N	50	10	v/v	v	1-1
	3	"	"	N	I	10	v/v	v	1-1

Fig. 3. Program topic 1, common nouns and other content words (Gray, 1970).

GOAL: Use of is in spontaneous language

G: Soda Cracker

DATE: 3-11-70

COMMENTS: np-vp repeated twice

SERIES	STEP	STIMULUS	RESPONSE	M	SCH	C	SM	RM	Cx
A	1	objects np-vp	is	I	C	5	v/v	v	1-1
	2	"	is-pred-nom	I	C	10	v/v	v	2-2
	3	"	sub-is pred-nom	I	C	10	v/v	v	3-3
B	1	pictures np-vp	"	I	50	10	v/v	v	3-3
	2	"	"	IE	50	10	v/v	v	4-3
	3	"	"	DE	50	10	v/v	v	4-3
	4	"	"	IT	50	10	v/v	v	2-3
	5	"	"	IT Sub.	50	10	v/v	v	1-3
	6	"	"	N	50	10	v/v	v	0-3
	7	pictures questions	"	N	C	10	v/v	v	-
C	1	pictures np-vp	is-prep-nom	I	50	10	v/v	v	3-3
	2	"	sub-is-prep-noun	I	50	10	v/v	v	4-4
	3	"	"	IE	50	10	v/v	v	6-4

Fig. 4. Program topic 2, is (Gray, 1970).

SERIES	STEP	STIMULUS	RESPONSE	M	SCH	C	SM	RM	Cx
C	4	pictures np-vp	sub-is-prep-noun	DE	50	10	v/v	v	6-4
	5	"	"	IT	50	10	v/v	v	2-4
	6	"	"	IT Sub.	50	10	v/v	v	1-4
	7	"	"	N	50	10	v/v	v	0-4
	8	pictures, questions	"	N	C	10	v/v	v	-
D	1	"	sub-is pred-nom/ prep-noun	N	50	15	v/v	v	-
	2	objects, questions	"	N	I	15	v/v	v	-
	3	story + pictures,	"	N	I	15	v/v	v	-
		questions	"	N	I	15	v/v	v	-
	4	spontaneous language	"	N	O	-	-	v	-

Fig. 4. (continued).

GOAL: Use of is verb-ing construction in spontaneous language

G: Soda Crackers

DATE: 4-27-70

COMMENTS: np-vp repeated twice

SERIES	STEP	STIMULUS	RESPONSE	M	SCH	C	SM	RM	Cx
A	1	action np-vp	is-verb-ing	I	C	10	v/v	v	2-2
	2	"	sub-is-verb-ing	I	C	10	v/v	v	3-3
B	1	picture np-vp	"	I	50	10	v/v	v	3-3
	2	"	sub-is-verb-ing D.O.	I	50	10	v/v	v	4-4
	3	"	"	IE	50	10	v/v	v	5-4
	4	"	"	DE	50	10	v/v	v	5-4
	5	"	"	IT	50	10	v/v	v	1-4
C	1	"	is-verb-ing-prep-noun	I	50	10	v/v	v	4-4
	2	"	sub-is-verb-ing-prep-noun	I	50	10	v/v	v	5-5
	3	"	"	IE	50	10	v/v	v	7-5
	4	"	"	DE	50	10	v/v	v	7-5
	5	"	"	IT	50	10	v/v	v	1-5

Fig. 5. Program topic 3, is-verb-ing (Gray, 1970).

SERIES	STEP	STIMULUS	RESPONSE	M	SCH	C	SM	RM	Cx
D	1	picture, questions	sub-is-verb-ing-D.O./ prep-noun	N	C	10	v/v	v	-
	2	"	"	N	50	10	v/v	v	-
	3	action, questions	"	N	I	10	v/v	v	-
	4	story-pictures, questions	"	N	I	15	v/v	v	-
	5	spon-taneous language	"	N	-	-	-	v	-

Fig. 5. (continued).

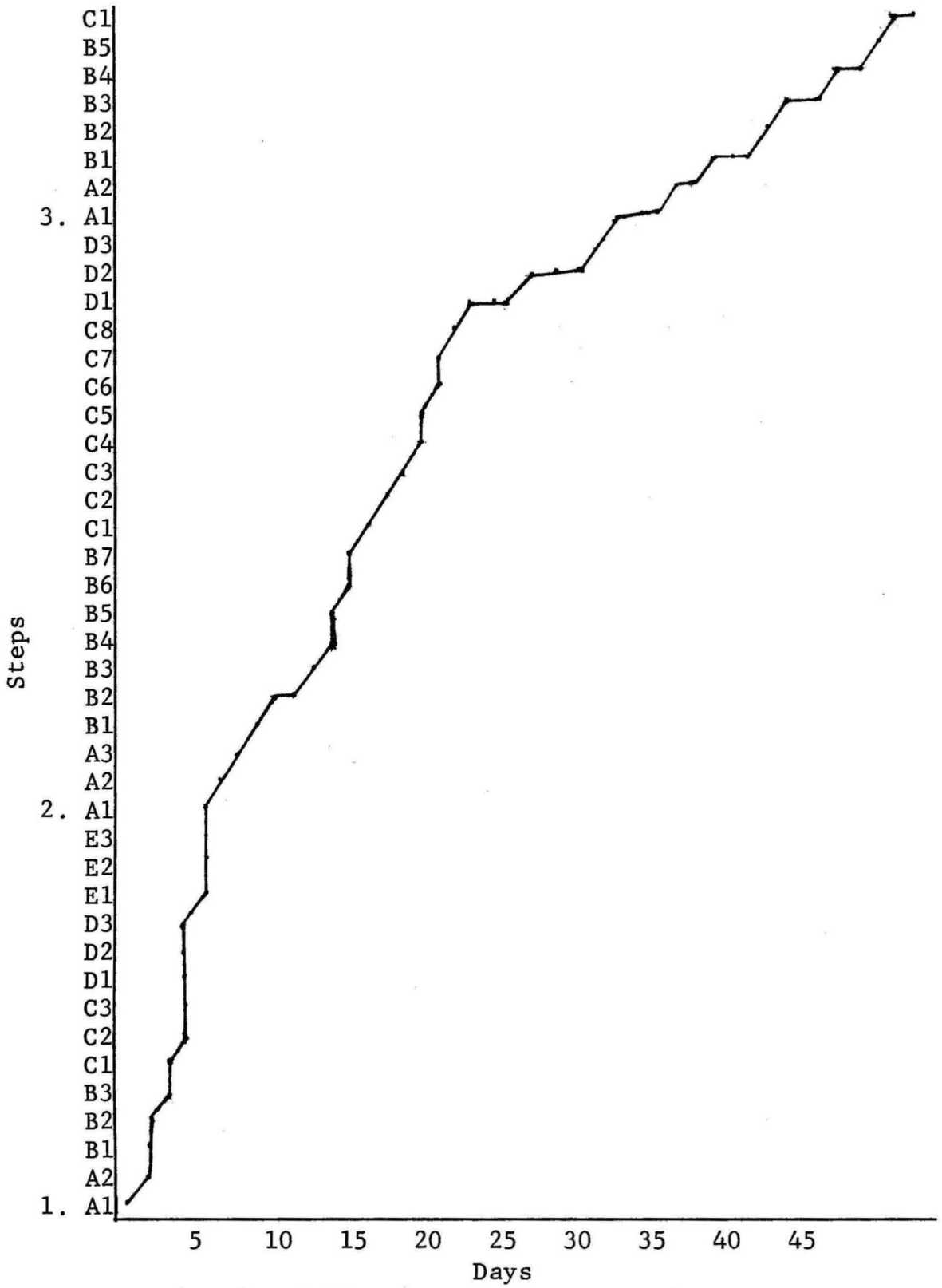

Fig. 6. Subject's daily progress in program steps.

Table 2

Partial List of Subject's Word Vocabulary
at the Termination of Training

Nouns

1. apple	8. box	15. cow	22. egg	29. mama
2. ball	9. boy	16. cup	23. eye	30. man
3. bear	10. bus	17. deer	24. fish	31. meat
4. bed	11. cake	18. desk	25. food	32. moon
5. bell	12. car	19. dog	26. gate	33. shoe
6. bird	13. cat	20. door	27. key	34. table
7. boat	14. coat	21. duck	28. kite	

Adjectives

1. big	4. green	7. small
2. blue	5. orange	8. white
3. brown	6. red	9. yellow

Verbs

1. eating	3. hopping	5. running
2. going	4. is	

Prepositions

1. in
2. on

Chapter 4

DISCUSSION

The subject of this study made gradual and steady progress throughout the forty-three day period of training and on this basis the hypothesis postulated in this study is accepted. Noting the subject's progress, it might be inferred that lack of special training is not of vital importance in administering this program. A corollary inference might also be made that this program is sufficiently well defined as to do away with the need for special training in speech therapy and language developement. The second inference is, however, conjecture.

IMPLICATIONS FOR EDUCATION

The results of this investigation suggest a workable language acquisition program amenable to wider use than in the laboratory situation. In this day of rising concern for the problems of handicapped children there is a need for remedial progress which can be adapted to the resources of the community. Not all school systems can afford to train people in the growing number of areas of specialization, nor can they afford to hire people already trained. The effect of employing Gray's program might be to eliminate the need for such specialists--regular teachers and teacher aides without extensive special training could administer such a program on their own.

LIMITATIONS OF THE STUDY

The description of Language Acquisition Through Programmed Conditioning (Gray, 1970), in the chapter outlining methods, noted that one of the basic goals of the program was to condition deep grammatical structure into a child's language behavior so that he would possess a solid syntactical base from which to expand his language. In this study, however, such a goal was only partially reached, as the subject completed only one function word program topic (program topic 1, in Table 1).

Indicated in the same place, another important aspect of Gray's program was that of generalizing what was learned in training by using and improving language outside the training situation. Observations at the termination of this study showed that little of this generalization had taken place. Although the subject began to articulate words at home for the first time, he did not employ the deep forms of grammar in which he had been trained.

The process of maturation and its effect on the subject's acquisition of expressive language was not considered.

Chapter 5

SUMMARY

This investigation was concerned with testing the effectiveness of Dr. Burl Gray's language acquisition program (Gray, 1970), when administered by individuals not specially trained, on a nonverbal five and one half year old boy. The subject was in language training for a total of forty-three days and passed, by the program's criterion performance, two language program topics and half of a third topic.

The results of this study showed that this child made progress in the acquisition of language when enrolled in this program. Also, it suggested that comparatively untrained personnel could utilize the program successfully.

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APPENDIX

APPENDIX

Remarks Quoted from the Mother of the Subject

"When you started working with him (the subject), he couldn't say anything, just 'apple,' and I'm not even positive about that. He expresses himself better now. He talks alot more and mimics what others say. He is more outgoing with other kids--he tries to play with them now. He really enjoys school now and he gets mad when no one comes some mornings. It's just been a miracle to get him talking so quickly. I really don't have anything bad to say about your working with him."