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Effects of Programmed Conditioning on Language Achievement of a Ten Year Old Non-verbal Child

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EFFECTS OF PROGRAMMED CONDITIONING ON
LANGUAGE ACHIEVEMENT OF A TEN YEAR
OLD NON-VERBAL CHILD

A Thesis
Presented to
the Graduate Faculty
Central Washington State College

In Partial Fulfillment
of the Requirements for the Degree
Master of Education

by
Robert J. Moore
July, 1970

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Chapter 1

Introduction

In our educational system the main tool for information transfer is language. Therefore, a non-verbal child will experience educational problems which will result in failure in school (Gray and Fygetakis, 1968).

The hypothesis tested in this study was developed from research that has been done in programmed conditioning. The theory suggests that programmed conditioning is an effective procedure in language training for linguistically divergent children (Gray and Fygetakis, 1968). Also suggested in the theory, is that by giving these children certain function words through programmed conditioning they will be able to generate spontaneous constructions and also will be able to acquire additional basic language structure without further training (Gray and Fygetakis, 1968). It seemed reasonable then that a non-verbal child could be helped by using programmed conditioning. With the above assumption in mind, an attempt was made to determine the effects of programmed conditioning on language achievement in a non-verbal boy in a public school setting.

Hypothesis

It was hypothesized that a ten year old non-verbal boy could progress in the development of language through

the use of programmed conditioning (Gray, 1968) conducted in a public school by a teacher not specifically trained in speech and language.

Chapter 2

Review of the Literature

Programmed Conditioning

Going back to the late 1950's there has been a great deal of research in the behavioristic approach to many problems in human behavior and learning (Gray and Fygetakis, 1968). The beginning of this increased attention to behavioristic application of learning theory and conditioning is notably outlined by Wolpe (1958) and Eysenck (1960, 1964, 1965). The name behavior therapy was coined by Lazarus (Wolpe and Lazarus, 1966) to refer to that group of learning theory based procedures which could be effectively applied to human behavior. This categorization, sometimes called behavior modification, included both instrumental and classical procedures (Gray and Fygetakis, 1968).

In this theory, behavior is considered in terms of stimuli, response and consequence. The consequence may result in a greater likelihood that the response will reoccur in future similar situations with a reward or conversely in a lesser likelihood that the response will occur in future similar situations with a punishment. In following this philosophy, one way to modify or control the response would be to have control over either or both the stimulus and the consequence (Gray and Fygetakis, 1968).

Much of the research on the efficiency and effectiveness of this approach has been published. Many books and papers have been published, each of which offers many different authors, many different therapy examples, and many different classifications of human problems (Gray and Fygetakis, 1968; Eysenck, 1960, 1964; Eysenck and Rachman, 1965; Ullmann and Krasner, 1965; Krasner and Ullmann, 1965; Ulrich, Stachnik and Mabry, 1966). Within this and other literature there are many articles dealing with children. As an example some of the authors have used conditioning methods to deal with emotional and behavioral problems (Patterson, 1965; Allen et al., 1965). Some have concentrated upon the verbalization of mute children (Kerr et al., 1965; Salzinger et al., 1965). Still others have been primarily concerned with language (Risley and Wolf, 1967; Schell, Stark and Gidden, 1967).

In these and other papers, regardless of other problems in these children, the concern seems to center upon language performance and its improvement. Much of behavior modification is concerned with delineating very carefully those overt acts to be changed. According to Gray and Fygetakis (1968) this type of preoccupation with fractionization can lead to a series of highly conditioned language responses which are only loosely connected to each other. As a result the child often lacks the base language structure which is necessary for the spontaneous generation of new correct grammatical constructions. The result is an automatic type of speech (Gray and Fygetakis, 1968).

Gray and Fygetakis suggest that programmed instructional techniques represent the most sophisticated method of organizing and facing the presentation of educational

materials, and is continuing to play an important role in the educational process. Originally formulated by Skinner (1958), the number and sophistication of programmed instruction materials has steadily increased. Hendershot (1964) lists over one hundred publishers and manufacturers and more than four hundred programs. Topics cover all the standard educational subjects. In terms of language, they offer only vocabulary and reading skill programs.

In the area of speech pathology there have appeared in the commercial market, types of programmed booklets and tapes for various articulation disorders (Sound Production Associates, 1967; General Electronics Laboratories, Inc., 1967). The most common element to be found in this classification of material is a sequential presentation of work assignments, or problems, or auditory signals.

Any good program would be effective to one degree or another, but only for the adult or child who already has a basic competence in the language. Language serves as a vehicle between the information and student. According to Gray and Fygetakis (1968) there are no programmed instruction materials for the acquisition of basic language.

Chapter 3

Method

The following is an explanation of the method that was used in this study and was developed by the Monterey Institute for Speech and Hearing for using programmed conditioning.

The institute operates a training center at Monterey, California called Children's House. There is a maximum enrollment of six children per class. To be placed in the class a child must be between the ages of three and seven and be referred by a neurologist, psychologist or a speech pathologist (Gray and Fygetakis, 1968).

The daily routine is carried out by a trained professional speech and language teacher who is assisted by two trained volunteers. The teacher has the task of administering the programmed conditioning procedures and in supervising the volunteers in similar procedures. The program at the school goes from 9:00 a.m. - 12:00 noon, five mornings a week.

The first problem that is dealt with is behavioral control of hyperactivity and distractibility. Control is desirable not only for social reasons but also is necessary if learning is to take place. No language program is started until behavioral control is assured.

All the activities at Children's House are under behavioral control and reinforcement contingency. A child receives a styrofoam token in the form of a star for a correct

response during programmed conditioning or for desired behavior. These are accumulated by each child in a paper cup. At the end of the week each child turns in his full cups for a toy.

There are very specific rules set down for behavior in and out of the classroom. A star is sometimes removed for inappropriate behavior, but never for an error made during programmed conditioning. If the behavior becomes severe the child is placed in a "time out" room for about five minutes. At the end of this time the child has the option of returning to the group or remaining in the "time out" situation (Gray and Fygetakis, 1968).

Delivery System

Once the children are under operant control for their general behavior, it is then possible to activate the mechanism or the vehicle by which the desired information will be transferred to the child. The method is called programmed conditioning.

The most obvious fact is that any program in this situation has to be administered in some non-reading manner. One method would be for the teacher to act as an "interpreter" between the program and the child. Thus, the program could become a set of instructions for the teacher as well as a template of subject activity (Gray and Fygetakis, 1968).

Figure 1 is an example of the programmed conditioning procedures for acquisition of the verbal-linguistic unit "is".

According to Gray (1968) this program considers a number of variables which are important in a learning situation. These are then "regulated" by the program.

In Figure 1 under the column labeled Step, Gray has developed numerical notations for each line of the program. The Steps are similar to a frame in a regular program. The Series to the left of the Step column refers to the homogeneous activities that are used. A Series heading can be compared to a chapter heading in a book.

B. B. GRAY AND L. FYGETAKIS

Goal: Use of is in spontaneous language G: Star-tokens and social approval

Comments: np-vp repeated Date:

	Step	Stimulus	Response	M	Sch	C	SM	RM	Cx
Series A	1	objects np-vp	is	I	C	5	V/V	V	1-1
	2	objects np-vp	is-pred. nom	I	C	10	V/V	V	2-2
	3	objects np-vp	sub-is- pred. nom	I	C	10	V/V	V	3-3
Series B	1	pictures np-vp	sub-is pred. nom	I	50	10	V/V	V	3-3
	2	pictures np-vp	sub-is- pred. nom	IE (art.)	50	10	V/V	V	4-3
	3	pictures np-vp	sub-is- pred. nom	DE (art.)	50	10	V/V	V	4-3
	4	pictures np-vp	sub-is- pred. nom	IT (sub.)	50	10	V/V	V	1-3
Series C	1	pictures np-vp	is-prep, noun	I	C	10	V/V	V	3-3
	2	pictures np-vp	sub-is- prep, noun	I	50	10	V/V	V	4-4

Figure 1. Procedural plan for programmed conditioning of the verbal-linguistic verb "is".

	Step	Stimulus	Response	M	Sch	C	SM	RM	Cx
	3	pictures np-vp	sub-is- prep, noun	IE (art.)	50	10	V/V	V	1-4
	4	pictures np-vp	sub-is- prep, noun	DE (art.)	50	10	V/V	V	6-4
	5	pictures np-vp	sub-is- prep, noun	IT (sub.)	50	10	V/V	V	6-4
Series D	1	pictures non-rep questions	sub-is- pred. nom- prep, noun	N	C	10	V/V	V	-
	2	pictures non-rep questions	sub-is- pred. nom- prep, noun	N	50	10	V/V	V	-
	3	objects non-rep questions	sub-is- pred. nom- prep, noun	N	I	10	V/V	V	-
	4	story + pictures non-rep questions	sub-is- pred. nom- prep, noun	N	I	15	V/V	V	-
	5	spon- taneous language	sub-is- pred. nom- prep, noun	N	0	-	0/0	V	-

Figure 1. (continued)

The Stimulus column to the right of the Step column, gives a description of the stimulus being used. In Series A, Step 1 the notation indicates that stimulus items will include objects which will be accompanied by an appropriate noun phrase and verb phrase (which will be repeated twice as per Comments at the top of the page).

Under the heading Response are the descriptions of the minimally acceptable responses to the appropriate stimuli. Figure 1, of Series A, Step 1 the response is the verbalization of the word "is".

The next column, M, refers to the model being used. Sometimes the teacher will "act out" certain aspects of the response, which he is requiring the child to give. He may act out the exact entire response, a portion of it, or none of it. Various symbols are used to designate the type of modeling procedure to be used. They are: I - immediate complete model, IT - immediate truncated model (only part is given, that which appears in the parentheses), IE - immediate expanded (more is given in the model than is required in the response), D - delayed model--same as immediate except that the model and request for a response from the child are separated by a time pause, DT - delayed truncated, DE - delayed expanded, N - no model.

Column Sch refers to reinforcement schedule to be followed on that particular step (C - continuous reinforcement, 50 - a ratio schedule of 50 percent reinforcement, I - intermittent reinforcement, and 0 - only social reinforcement). Any contingency that satisfies the definition of a reward may be used as a reinforcement.

Column C, refers to Criteria, and indicates the number of consecutive correct responses required before moving to the next step. "SM" refers to the stimulus mode or the method used to present the stimulus. The V/V means that the stimulus is given both visually and verbally. "RM" stands for the response mode. NV is for nonverbal responses and V is for verbal responses.

In the final column, Cx stands for "stimulus complexity" and refers to the number of stimulus units given and the number of response units required.

Figure 2 outlines the complete curriculum used in programmed conditioning and language acquisition training (Gray, 1970). In this study, only the first four programs were covered.

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 adjective 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

Figure 2. Curricula used in the programmed conditioning language acquisition training (Gray, 1970).

Procedures

There was a daily training session, three hours in length, from 9:00 a. m. to 12:00 noon, with the subject of this study. The sessions were broken into three one-hour periods. Three different teachers spent one hour per day in training with the boy. The division of work periods and rest periods usually consisted of 20 minutes of work and 10 minutes of rest over an hour period.

Attending behavior of the subject was the initial problem of the study before language training could begin. A pre-language sub-program was devised for this purpose. The illustration of the sub-program will be found under the heading of Figure 3.

Individual stimulus units delivered by the teacher to the subject, by verbal or combination verbal-visual stimulus, was the source of the work sessions. The student responded generally verbally to the stimulus. The number of correct responses necessary to move to the next step are defined in Column "C", Figure 1. A typical unit in this sequence can be found in the following example:

Teacher: "The car is blue. The car is blue.
Billy, car."
(The stimulus has been supplied by the teacher in the repeated sentences and has provided a model, "car".)

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

G: Candy

Comments: Fold hands for child
if necessary

Date: 2-26-70

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	

Figure 3. Sub-program for conditioning attending behavior (Gray, 1970).

Subject: "Car." (This is the correct response to the stimulus using the model.)

At the beginning of the program candy was the reinforcement and then a token system using poker chips that could be traded in for candy at the end of the day was employed.

The subject was moved immediately to the next program topic level when the entire program sequence was completed.

Subject

The subject for this study was a ten year old, non-verbal boy who had never developed expressive language. He could use a few words in isolation from each other, but not with sentence structure.

The subject was in the special education program in the Ellensburg Public Schools. There had been very little improvement in language since he started school.

Material and Apparatus

The Gray's language acquisition program as outlined above was the basic tool used in this study. Implementation of the program took place in the speech and hearing room at Mt. Stuart Elementary School in Ellensburg, Washington. A table and chairs, one for the subject and one for the teacher, were the materials used.

Stimulus materials consisted of objects that were familiar to the subject--such as, familiar names and pictures of familiar things. Also included were three children's picture books.

Various candies and/or poker chips were used as reinforcement materials.

The response of the subject, correct or incorrect, was duly recorded on recording sheets.

Chapter 4

Results

Figure 4 is the pre and post test given to the subject in the initial phase of the training and was re-administered at the end of the study. There were no correct answers on the pre test but on the post test four correct responses were made over the programs covered in the study.

The following figures show the exact programs that were used in this study:

Figure 5, program topic 1.

Figure 6, program topic 2.

Figure 7, program topic 3.

The data shows that consistent improvement was made by the subject in the language development program.

Figure 8 is a cumulative graph of the subject's progress throughout the program of thirty-four days and the exact series and steps accomplished each day.

TEST

NAME: _____ DATE: _____

AGE: _____ COMPLETED PROGRAMS: _____

I. CURRICULUM

1. The ball is on the table.
2. The dog is barking at the man.
3. What is the cat eating?
4. Is the dog running in the grass?
5. She is sitting in the chair.
6. I am looking at mommy.
7. The boys want a popsicle.
8. The children are walking to school.
9. You are looking at the puppy.
10. They are riding on the horse.
11. We are sitting in the chair.
12. What are the children eating?
13. Are the children talking to mommy?
14. The dog wants a bone.
15. The girl likes to play ball.
16. I am going to see Santa Claus.
17. The boy looked at the horse.

II. GENERALIZATION

18. Who is riding on the horse?
19. Where is the puppy hiding?
20. The dog is not wagging his tail.
21. Where are the children sitting?
22. I am not talking to the teacher.

Figure 4. Pre and post test.

23. The children are not eating their ice cream.
24. Did the girl look at the clown?
25. The dog did not drink his milk.
26. Am I going to see Santa Claus?

Figure 4. (continued)

Goal: Identification of pictures G: Candy
in response to questions.

Comments: np-vp repeated twice Date: 3-4-70

	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	"	"	I	50	10	V/V	V	1-1
Series 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
Series 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
Series 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
Series 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

Figure 5. Program topic 1, common nouns and other content words (Gray, 1970).

Goal: Use of is in spontaneous language

G: Candy and/or poker chips

Comments: np-vp repeated twice

Date: 3-11-70

	Step	Stimulus	Response	M	Sch	C	SM	RM	Cx
Series 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
Series 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	-
Series 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
	4	"	"	DE	50	10	V/V	V	6-4

Figure 6. Program topic 2, "is" (Gray, 1970).

	Step	Stimulus	Response	M	Sch	C	SM	RM	Cx
Series C	5	pictures np-vp	sub-is- prep-noun	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	-
Series 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, questions	"	N	I	15	V/V	V	-
	4	spon- taneous language	"	N	0	-	-	V	-

Figure 6. (continued).

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

G: Candy and/or poker
chips

Comments: np-vp repeated twice

Date: 4-27-70

	Step	Stimulus	Response	M	Sch	C	SM	RM	Cx
Series 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
Series 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
Series 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

Figure 7. Program topic 3, "is-verb-ing" (Gray, 1970).

	Step	Stimulus	Response	M	Sch	C	SM	RM	Cx
Series 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	-

Figure 7. (continued).

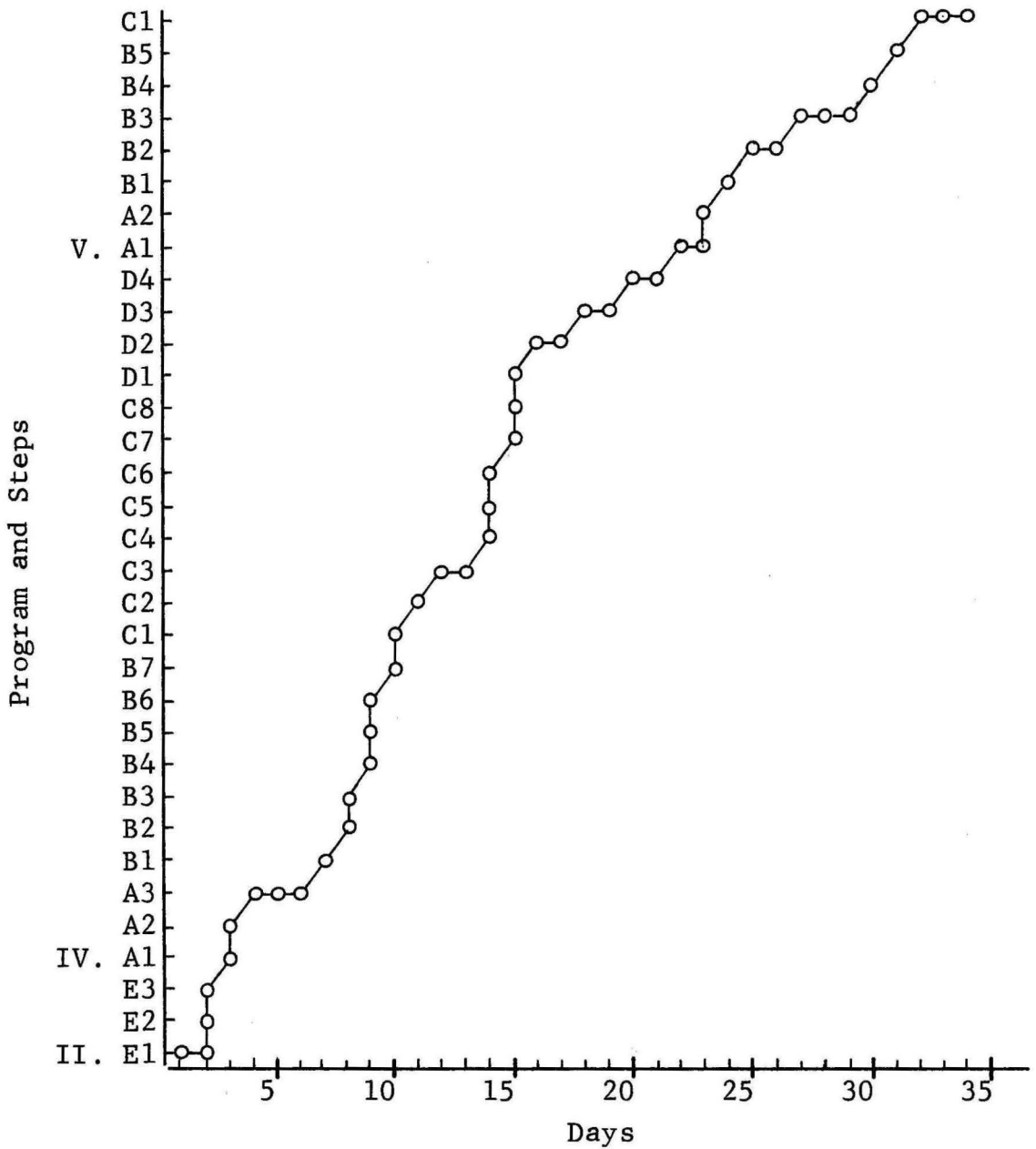


Figure 8. Graph of progress through language acquisition program for student.

It can also be noted that the lack of special training in speech or language development did not seem to affect the administration or outcomes of the program.

Whatever the reader obtains from this study one thing should be clear. However incomplete this study might be, the experience of programmed conditioning points quite clearly to the value of approaching language acquisition from a multidimensional perspective. The linguist cannot provide all the answers, neither can the behaviorist, nor the educator, nor any single discipline; but when the critical information from the various sources is combined the result can be a viable procedure leading to a meaningful solution to the problem (Gray and Fygetakis, 1968).

Chapter 5

Discussion

Programmed conditioning is quite new and there are many unanswered questions about it but at this point in time it does seem to be effective in working with language problems. At least the results obtained so far seem to have enough merit to warrant its consideration and use.

One of the main premises of this system is that by giving children certain function words through programmed conditioning that they will be able to generate spontaneous constructions and also be able to acquire additional basic language structure without further specific training. Without this premise the entire concept of programmed conditioning becomes nonfunctional (Gray and Fygetakis, 1968).

The workability of this system when it is first encountered gives the impression that it is very clumsy to use. Yet after it has been used one finds that it is very workable and suited to the learning situation.

According to Gray (1968) this program appears to work effectively with a wide range of problem areas. In other words, programmed conditioning appears to be a performance related activity rather than a diagnostically or disease related activity. These same procedures are being used with deaf, autistic children, and articulation problem children.

The results of this study with a ten year old non-verbal child using programmed conditioning seem to have shown that this program can be used in a public school setting successfully even when used by a teacher not specifically trained in speech or language. The positive findings of this study must be taken in view of the fact that it is a new system and according to Gray (1968) new systems need additional testing and experience; but they often hold encouragement and lead to information and understanding.

Implications for Education

The results of this study showed that even though this program was initially developed and operated under very strict laboratory conditions, that it is adaptable for use in a public school setting.

REFERENCES

REFERENCES

- Eysenck, H. J. Behavior therapy and the neuroses. London: Pergamon Press, 1960.
- Eysenck, H. J. Experiments in behavior theory. New York: The Macmillan Company, 1964.
- Eysenck, H. J. and Rachman, S. The causes and cures of neuroses. Oxford: Pergamon Press, 1965.
- Gray, B. B. and Fygetakis, L. Mediated language acquisition for dysphasic children. Behavior Research and Therapy, 1968.
- Gray, B. B. and Fygetakis, L. The development of language as a function of programmed conditioning. Behavior Research and Therapy, 1968, 6, 263-280.
- Gray, B. B. Language acquisition through programmed conditioning. In R. H. Bradfield (Ed.), Behavior modification: the human effort. San Rafael, California: Dimensions Publishing Co., 1970.
- Hendershot, C. H. A bibliography of programs and presentation devices. Saginaw, Michigan: Scher Printing Co., 1964.
- Krasner, L. and Ullmann, L. P. (Eds.) Research in behavior modification. New York: Holt, Rinehart and Winston, Inc., 1965.
- Patterson, G. R. An application of conditioning techniques to the control of hyperactive child. In L. P. Ullmann and L. Krasner (Eds.), Case studies in behavior modification. New York: Holt, Rinehart and Winston, 1967.
- Risley, T. and Wolf M. Establishing functional speech in echolalic children. Behavior Research and Therapy, 1967, 5(2), 73-83.

- Skinner, B. F. Science and human behavior. New York: The Macmillan Company, 1953.
- Sound Production Associates. An automated program in speech therapy. Washington, D. C.: Institute of Modern Languages, 1967.
- Ullman, L. P. and Krasner, L. Case studies in behavior modification. New York: Holt, Rinehart and Winston, 1966.
- Ulrick R., Stachnic, T. and Mabry, J. Control of human behavior. Glenview: Scott, Foresman and Company, 1966.
- Wolpe, J. and Lazarus, A. Behavior therapy techniques. London: Pergamon Press, 1966.

ADDITIONAL REFERENCES

- Braine, M. D. S. On learning the grammatical order of words. Psychological Review, 1963, 70, 323-348.
- Brannon, J. B. Linguistic word classes in the spoken language of normal, hard of hearing, and deaf children. JSHR, 1968, 11, 279-287.
- Chomsky, N. Review of Skinner's verbal behavior. In L. Jakobovits and M. Miron (Eds.), Readings in the psychology of language. Englewood Cliffs: Prentice-Hall, 1967.
- Dixon, T. R. and Horton, D. L. (Eds.) Verbal behavior and general behavior theory. Englewood Cliffs: Prentice-Hall, 1968.
- Garret, M. and Fodor, J. Psychological theories and linguistic constructs. In T. R. Dixon and D. L. Horton (Eds.), Verbal behavior and general behavior theory. Englewood Cliffs: Prentice-Hall, 1968.
- Jakobovits, L. and Miron, M. (Eds.) Readings in the psychology of language. Englewood Cliffs: Prentice-Hall, 1967.

- Jenkins, J. J. and Palermo, D. S. Mediation processes and the acquisition of linguistic structure. In U. Bellugi and R. Brown (Eds.), The acquisition of language. Monographs of Social Research and Child Development, 1964, 29, 141-169.
- Johnson, D. J. and Myklebust, H. R. Learning disabilities. New York: Grune and Stratton, 1967.
- Karlin, I. and Kennedy, L. Delay in development of speech. Amer. J. Dis. Chldr., 1966, 51, 1138-1149.
- Lee, L. L. Developmental sentence types: a method for comparing normal and deviant syntactic development. Journal of Speech and Hearing Disorders, 1966, 31, 311-330.
- Lovas, O. I. A program for the establishment of speech in psychotic children. In H. N. Sloane and B. D. MacAulay (Eds.), Operant procedures in remedial speech and language training. Boston: Houghton Mifflin Company, 1968.
- MacAulay, B. D. A program for teaching speech and beginning reading to nonverbal retardates. In H. N. Sloane and B. D. MacAulay (Eds.), Operant procedures in remedial speech and language training. Boston: Houghton Mifflin Company, 1968.
- McNeill, D. Developmental psycholinguistics in the genesis of language. Cambridge: The MII Press, 1966.
- McNeill, D. On theories of language acquisition. In T. R. Dixon and D. L. Horton (Eds.), Verbal behavior and general behavior theory. Englewood Cliffs, N. J., Prentice-Hall, 1966.
- McReynolds, L. V. Verbal sequence discrimination training for language impaired children. Journal of Speech and Hearing Disorders, 1967, 32, 249-255.
- Menyuck, P. Comparison of grammar of children with functionally deviant and normal speech. Journal of Speech and Hearing Research, 1964, 7, 109-121.

- Miller, G. A. Language and communication. New York: McGraw-Hill, 1951.
- Miller, G. A. Some preliminaries to psycholinguistics. American Psychologist, 1965, 20, 15-20.
- Orton, S. T. Reading, writing and speech problems in children. New York: W. W. Norton and Co., 1937.
- Schiefelbusch, R. L. and Copeland, R. H. Language and mental retardation. New York: Holt, Rinehart and Winston, Inc., 1967.
- Schlanger, B. B. A longitudinal study of speech and language development in brain damaged children. Journal of Speech and Hearing Disorders, 1959, 24, 358-359.
- Sloane, H. N., Johnson, N. K., and Harris, F. R. Remedial procedures for teaching verbal behavior to speech deficient of defective young children. In H. N. Sloane and B. D. MacAulay (Eds.), Operant procedures in remedial speech and language training. Boston: Houghton Mifflin Company, 1968.
- Van Riper, D. Speech correction principles and methods. Englewood Cliffs, N. J.: Prentice-Hall, 1963.
- Wolpe, J. Psychotherapy by reciprocal inhibition. Palo Alto: Stanford University Press, 1958.
- Wood, N. E. Delayed speech and language development. London: Prentice-Hall, 1964.