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Contingency Management in a Language Development Program

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CONTINGENCY MANAGEMENT IN A LANGUAGE

DEVELOPMENT PROGRAM

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by

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Chapter 1

Introduction

Programmed instruction is playing an increasingly significant role in education (Cram, 1961). Programs are usually designed for a specific field, i.e. reading, arithmetic, speech, and writing. It is the contention of the author that a person untrained in a specific field such as reading or speech should be able to administer a well planned program in that field so that a student can successfully learn with the program.

Children in the public schools in special education programs have many divergent problems. One of the most crucial and prevelent problems is a disability in the area of speech. Over half of all the children enrolled in special education programs are there because of defective speech (Dunn, 1964; Garrison & Force, 1965).

A speech disability is damaging not only because the child is limited in his education, but also because he is limited in his everyday life. Because of the importance of speech to the child and because of the magnitude of speech disabilities in the special education population, speech was chosen as the area in which to experiment with programmed instruction.

Review of the Literature

Sloane and McAulay (1968) describe speech as follows:

Speech is behavior. It is not a magical manifesta-
tion of something called "thought" which exists in a
mentalistic world, although the complexity of language
behavior certainly may make it appear to be such. As
behavior speech is learned, and can be taught by ex-
plicit procedures that focus upon speech itself (p.76).

There are many different terms applied to a child who
does not have sufficiently developed language structure.
Van Riper (1963) uses the term "delayed speech" and defines
it as failure to acquire normal speech as a usable tool
regardless of etiology (0. 103). He describes these children
as children who rely upon gestures, grunting, and sounds to
get attention. These children typically show little interest
in listening and verbalizing.

Schlanger (1959) reports that the children with
delayed speech in his project had organic problems, but that
social and cultural influences were so strong that it
obscured the etiology. The children that he worked with
were apathetic toward communicating. When he tried language
development training, he met with apathy and at times hostil-
ity, but at all times resistance of one form or another.

Gray (1970) refers to these children as linguistically
divergent. His definition of a linguistically divergent
child is one who "in the face of a presumed normal

intellectual potential, lacks sufficient expressive verbal
language [p. 99]." He characterizes the behavior of these
children as hyperactive, distractible, and exhibiting per-
severation.

In view of these characteristics, hyperactivity,
hostility, apathy, and distractibility, a delivery system
is needed that will control the behavior of the child so
that a language development program can be initiated. One
method of controlling the behavior of the children is to
use a program designed with the principles of behavior
modification as the delivery system. Behavior modification
not only controls the interfering behavior, but also provides
a method of shaping and maintaining desired responses
(Haring & Whelan, 1965; Gray, 1970; Gray & Fygetakis, 1968;
Hewett, 1968).

Because of these same characteristics, it is neces-
sary to have a very carefully designed sequential program.
The techniques involved in programmed instruction can be
used to great advantage to design a language development
program which is highly structured and which greatly in-
creases the child's chances of success (Spradlin, 1967;
Gray, 1970; Gray & Fygetakis, 1968).

In designing a language development program, the
first question that has to be answered is, is it necessary
to give the children an extensive battery of tests to
determine the etiology of the speech deficiency. Opinions
are split on this issue. However, the majority of the

opinions (Johnson & Harris, 1968; Hewett, 1968; Gray, 1970) is that observation and recording of the present level of speech behavior is the data upon which to build a speech program for the child.

The most important behaviors to take into consideration when designing a program are the desired terminal behavior and the behavior that the child currently displays (Hewett, 1968; Gray, 1970; Spradlin, 1967; Sloane et.al., 1968; Johnson & Harris, 1968).

Spradlin (1967) suggests that the terminal behavior be established by finding the language requirements of the community in which the child lives. This data gathering could be accomplished using procedures developed by linguists. .

As has been previously established in this paper, the current behavior or initial starting point of the program for the child would be determined by recording a sample of the child's current language behavior.

When actual construction of the steps of the program is started, two different appraoches are possible. One approach is to construct a single language program which is applicable to all children with delayed speech. One would then construct a test consisting of the major steps of the program. Each child would be given the test and would work only on those steps on which he showed a deficiency (Gray, 1970; Green, 1963; Spradlin, 1967).

The other approach (Johnson & Myklebust, 1967; Sloane et.al., 1968; Lovaas, 1968) is to determine an initial point for each child by taking a sample of his language and then constructing an individual program for the child based on some broad generalizations about how language is acquired.

Lovaas (1968) in describing some of the weaknesses of his language program says, "another major weakness of the program lies in its failure to specify the contents, and not just the format or process of the training [p. 152]."

A program which meets those criteria which have been mentioned so far, taught by explicit procedures that focus upon speech itself, provides a content which can be used with behavior modification as the delivery system, which does not depend on the etiology of the child's dysfunction, which is based on linguistics, and which is based on the techniques of programmed instruction is Gray's (1970) "language acquisition through programmed conditioning [p. 99]" program.

Another important criteria for this program, because of a lack of speech training, was that the program must be able to be administered by a person who has no formal training in speech development and correction. Gray's (1970) program also met this criteria. It was upon this program that this project was based.

Problem for Research

The problem was two-fold. The first part of the
problem was the investigation of whether a person with no
formal training in speech could successfully administer
Gray's (1970) language development program. The second part
of the problem was the investigation of whether the two
subjects involved would gain the ability to use new
language structures.

Hypotheses

Two hypotheses were made. The first hypothesis was
that a person with no formal training in speech could admi-
nister Gray's (1970) speech program successfully. By
successfully, it was meant that the students would proceed
through the programs meeting the specific criterion at each
step and that the students would maintain at least an
average of eighty percent correct responding.

The second hypothesis was that the students would
gain the ability to use new language structures as measured
by a pre-test and post-test consisting of administering the
language terms in Figure 1, page 7, which accompanies Gray
and Ryan's (1970) program.

TEST

NAME: _____   DATE: _____

AGE: _____   COMPLETED PROGRAM: _____

I. CURRICULUM

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

II. GENERALIZATION

18. <u>Who is riding</u> on the horse?
19. <u>Where is</u> the puppy <u>hiding</u>?
20. The dog <u>is not wagging</u> his tail.
21. <u>Where are</u> the children <u>sitting</u>?
22. <u>I am not talking</u> to the teacher.
23. The children <u>are not eating</u> their ice cream.
24. <u>Did</u> the girl <u>look</u> at the clown?
25. The dog <u>did not drink</u> his milk.
26. <u>Am I going to see</u> Santa Claus?

<u>Directions</u>: Say exactly what I say. If child doesn't repeat <u>underlined</u> word do that program. To obtain base rate of language record child's conversation.

Steps 18-26 are more important as measures to test if programs are generalizing.

Figure 1

Language Test (Gray & Ryan, 1970, p. 8)

Chapter 2

Method

Subjects

This study involved two students. The two subjects
were selected by the school administration. They were
selected because it was felt that these two individuals
were the most in need of language development training.

One student had no expressive language except for
one word. The other child spoke only with content words.
The two students scored zero on the language test.

Student A was six years old. He was a special
education student in a classroom for trainable children.
No formal language program was being administered to this
student. He had had only minimal formal language training.
He started on Series A, step one, of the content word
program (see Figure 2, page 9).

Student B was ten years old. He was in a special
education classroom for educable children. Examination of
his folder revealed that he had been subjected to a great
amount of formal speech training with little apparent
success. Student B started on Series E, step 1, of the con-
tent word program. He had already mastered a core of content
words, but it was decided to start him on the last part of

COMMENTS: np-vp repeated twice

	STEP	STIMULUS	RESPONSE	M	SCH	C	SM	RM	Cx
Series A	1	Picture, np-vp	N	I	C	10	V/V	V	1-1
	2	Picture, np-vp	N	I	50	10	V/V	V	1-1
Series B	1	Picture, np-vp	N	IE (art)	C	10	V/V	V	2-1
	2	Picture, np-vp	N	IE (art)	50	10	V/V	V	2-1
	3	Picture, np-vp	N	IE (art)	I	10	V/V	V	2-1
Series C	1	Picture, np-vp	N	D	C	10	V/V	V	1-1
	2	Picture, np-vp	N	D	50	10	V/V	V	1-1
	3	Picture, np-vp	N	D	I	10	V/V	V	1-1
Series D	1	Picture, np-vp	N	N	C	10	V/V	V	-
	2	Picture, np-vp	N	N	50	10	V/V	V	-
	3	Picture, np-vp	N	N	I	10	V/V	V	-
Series E	1	Picture, non-rep questions	N	N	C	10	V/V	V	-
	2	Picture, non-rep questions	N	N	50	10	V/V	V	-
	3	Picture, non-rep questions	N	N	I	10	V/V	V	-

Figure 2

Content Word Program Format from Gray & Fygetakis

the content word program so that success was maximized during the initial exposure to the program.

Procedure

The students were exposed to the language program for three hours a day. Three different instructors worked for one hour each. The students worked for twenty minutes and took a break for ten minutes. The actual instruction time was two hours each day.

The language acquisition procedure can be broken down into two distinct parts, the content, and the delivery system. The delibery system is taken from behavior modification and programmed learning techniques. The content is taken from linguistics (Gray, 1970).

The first part of the program was concerned with getting the children to respond to the verbal instructions of the teacher. During this phase, language instruction was not used. The children's behavior was shaped, through the use of food, from random responses to responding to the instructor's command, "show me that you are ready." When this command was given, the child was expected to sit down, put his feet on the floor, fold his hands on the desk, and establish eye contact with the instructor. When the children reached this point, they were ready for language training. Figure 3, page 11, shows the behavior program. No data was kept on this program since it is not an actual expressive language program.

COMMENTS: In all steps must respond within 10 seconds
In step 4 if necessary fold hands for child
In step 7 place reinforcer within vision of child, draw child's eyes to yours

STEP	STIMULUS	RESPONSE	M	SCH	C	SM	RM	Cx
1	Show me that you're ready	Sitting in chair	-	C	10	V	0/0	
2	Show me that you're ready	Sitting in chair with feet on floor	-	C	10	V	0/0	
3	Show me that you're ready	Sitting in chair with feet on floor	-	50	10	V	0/0	
4	Show me that you're ready	Sitting in chair with feet on floor, hands folded on desk	-	C	10	V	0/0	
5	Show me that you're ready	Sitting in chair with feet on floor, hands folded on desk	-	50	10	V	0/0	
6	Show me that you're ready	Sitting in chair with feet on floor, hands folded on desk	-	I	10	V	0/0	
7	Show me that you're ready	Sitting in chair with feet on floor, eye contact with teacher and hands folded	-	C	10	V	0/0	
8	Show me that you're ready	Sitting in chair with feet on floor, eye contact with teacher and hands folded	-	50	10	V	0/0	
9	Shoe me that you're ready	Sitting in chair with feet on floor, eye contact with teacher and hands folded	-	I	10	V	0/0	

Figure 3

Behavior Program Format from Gray & Fygetakis

The response rate was maintained throughout the entire program through the use of food.

The other part of the program was the content. The programs are listed in Table 1, page 13. The first program was a receptive program. The child identified by gesture an object which the teacher specified. This was the only receptive program. The next two programs dealt with content words: Program two with single words, and Program three with two word combinations. The rest of the programs dealt with function words.

The goal of the program was to get the child so that in a novel situation he could generate a sentence that he has never heard before and this sentence is both appropriate and correct.

In effect, the goal of the program was to construct an open mini-language system so that the child can incorporate new vocabulary words into his already operating system.

A sample program is shown in Figure 4, page 14. This was the "is" program, the first function word program in the set.

These programs were for the instructor to teach with and not for the child's use. The program gave, in symbolic form, all the information that was required to teach the program. The first column told the steps. The second column told what stimulus the instructor would present to

TABLE 1

List of Programs

1. Identification of nouns
2. Naming nouns
3. Two-word combinations
4. Is
5. Is verbing
6. What is
7. Is interrogative
8. He/she is verbing
9. I am
10. Present tense plural
11. Plural noun are verbing
12. You are verbing
13. They are verbing
14. We are verbing
15. What are verbing
16. Are interrogative
17. Cumulative is/are
18. Present tense singular
19. Present tense singular and plural
20. Infinitive to
21. Future tense/to
22. Past tense

Optional Programs

1. Prepositions in, on
2. The
3. Comparative and superlative adjectives

NOTE: Reprinted from Gray & Ryan (1970, p. 6)

COMMENTS: np-vp repeated twice

	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
	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	spontaneous language	sub-is-pred. nom-prep, noun	N	O	--	O/O	V	-

Figure 4

**Procedural Plan for Programmed Conditioning of the
Verbal-Linguistic Verb "is"
(Gray & Fygetakis, 1970, p. 268)**

the child. In Series A, step 1, the instructor presented an object and a noun-phrase-verb phrase.

In the next column is the response that the child was expected to make. In Series A, step 1, the child's response was the single word "is."

The next column is the model. This varied from the instructor modeling exactly what the child was to say, an immediate model, to giving the child no model. A list of the models used and an explanation of each is in Figure 5, page 16. The underlined portion of the sentence is the model.

The next column is the schedule. This told the instructor how often to reinforce the child. The reinforcement schedule varied from continuous reinforcement, C, to no reinforcement, 0.

The next column, C, deals with the criterion. This was the number of correct responses in a row necessary before going on to the next step.

The next two columns deal with the stimulus mode, S M, and the response mode, R M. This refers to whether the stimulus and response were visual or verbal or both.

The last column is the complexity. This told how many units were in the model as compared to the number of units in the child's response.

Data kept by each instructor indicated if each response the child made was right or wrong. This provided

RESPONSE

Immediate I

    The dog is big, the dog is big, Johnny, <u>dog</u>
      <u>is big</u>   dog is big

Immediate Expanded IE

    The dog is big, the dog is big, Johnny, <u>the</u>
      <u>dog is big</u>   dog is big

Delayed D

    The dog is big, the dog is big, <u>dog is big</u>,
      Johnny   dog is big

Delayed Expanded D/E

    The dog is big, the dog is big, <u>the dog is</u>
      <u>big</u>, Johnny   dog is big

Immediate Truncated IT

    The dog is big, the dog is big, Johnny, <u>dog</u>   dog is big

Delayed Truncated DT

    The dog is big, the dog is big, <u>dog</u>, Johnny   dog is big

None   N

    The dog is big, the dog is big, Johnny,

                                             dog is big

Figure 5

List of Models (Gray & Ryan, 1970)

a record of when the criterion was met, so that the child could go on to the next step, and also provided a record from which to compute the percentage of correct responses for each day's work.

Chapter 3

Results

Data was kept of each response that the students made on the program. It can be seen in Figures 6 and 7, pages 19 and 20 respectively, that the two students did progress successfully from step to step in the program. At no time was a child advanced until he had met the criteria on that step. On some days the children advanced more than one step. The days indicated are when the steps were completed, except in the case where only one program was worked on for more than one day. The last day that the step is listed is the day of completion.

Student B's daily percentage of correct responses are shown in Figure 8, page 21. Student B had an overall correct response average of 82%.

Student A's daily percentage of correct responses is shown in Figure 9, page 22. His overall correct response rate was 80%.

Both students, as seen in Table 2, page 23, scored zero on the pre-test. On the post-test, both students correctly responded to the first four items. Student A progressed from the point of having one expressive word to the point of using the "is interrogative" construction. Student
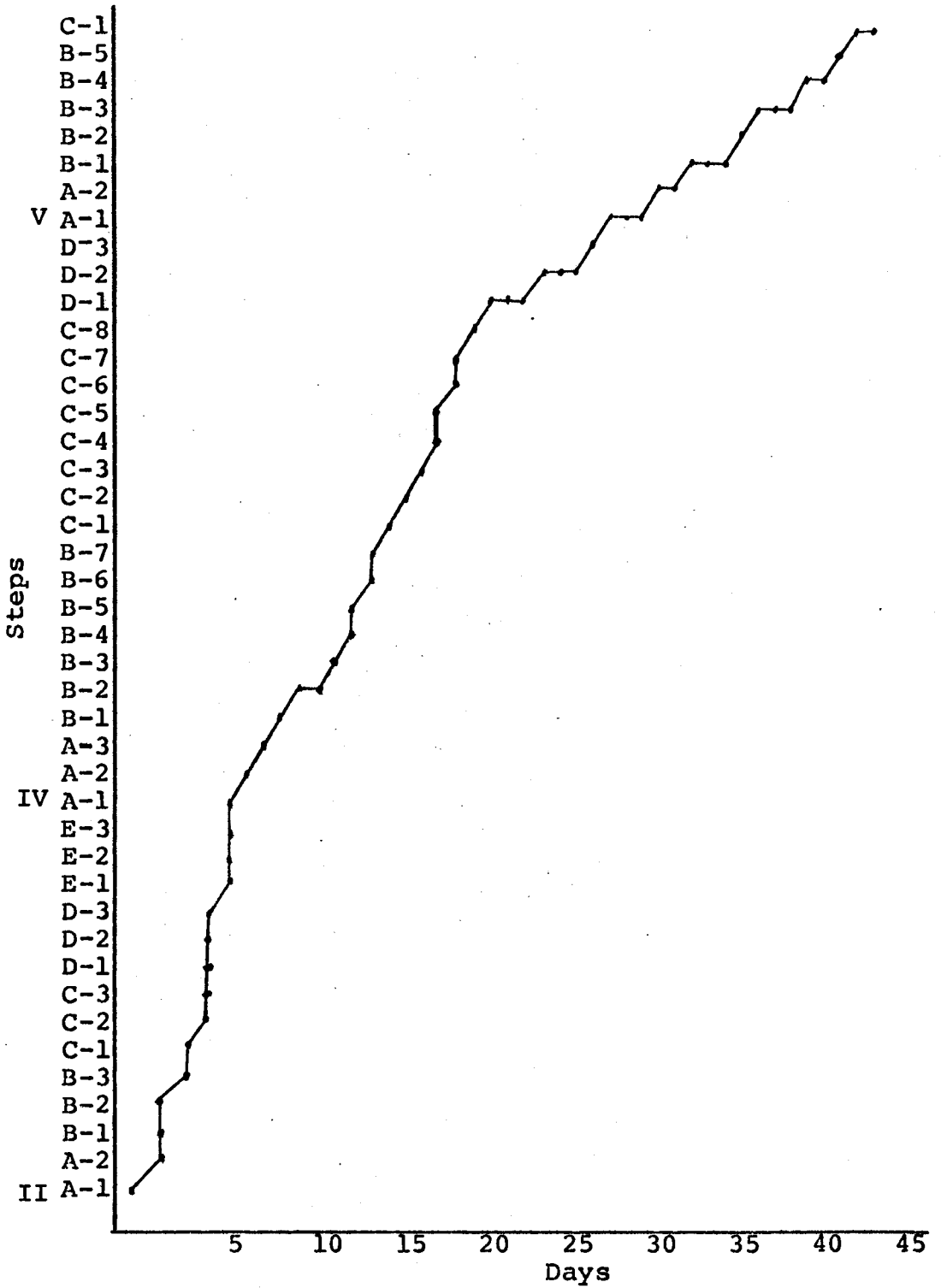
Figure 6

Graph of Progress Through Language Acquisition
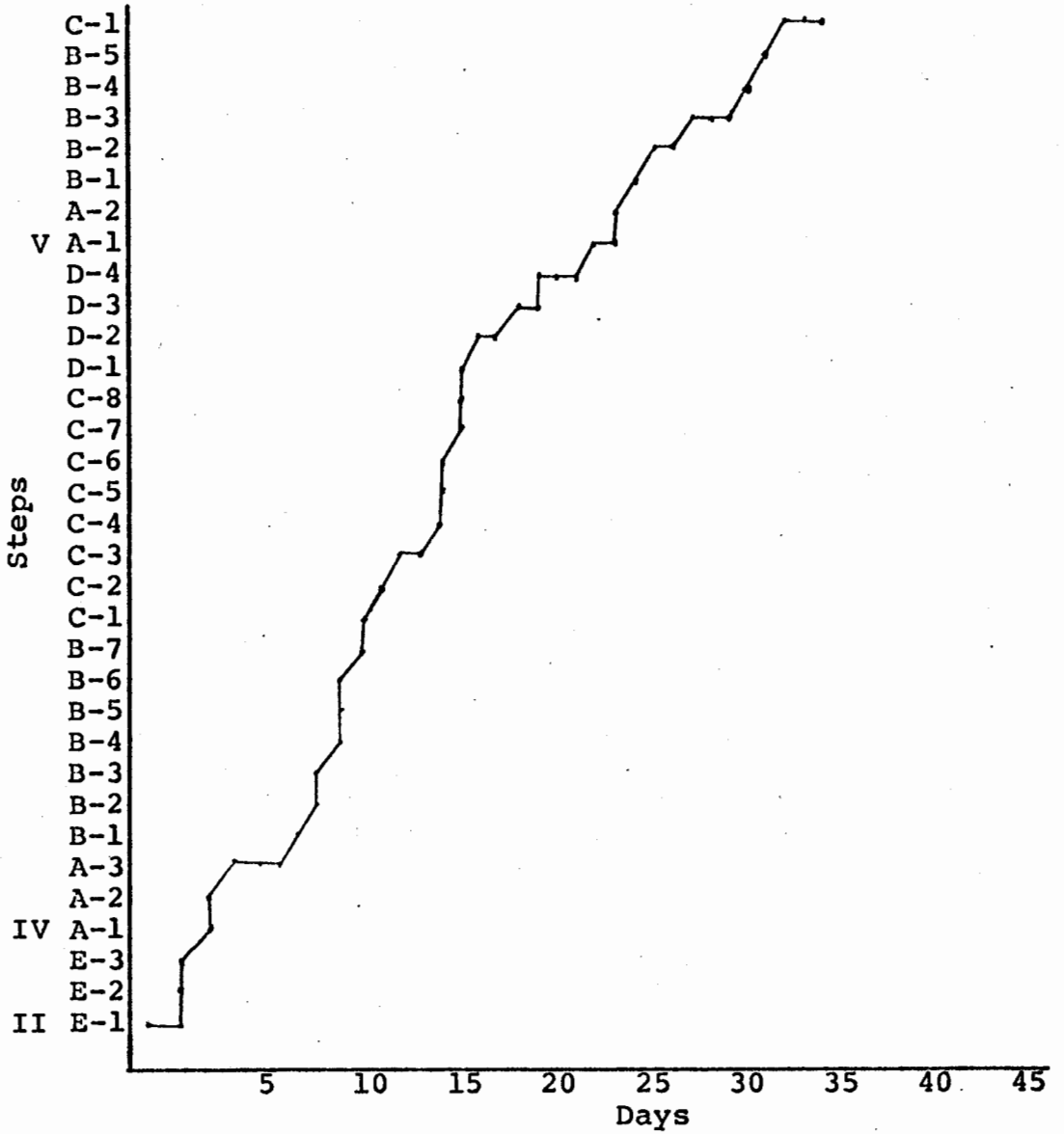Program For Student A

Figure 7

Graph of Progress Through Language Acquisition
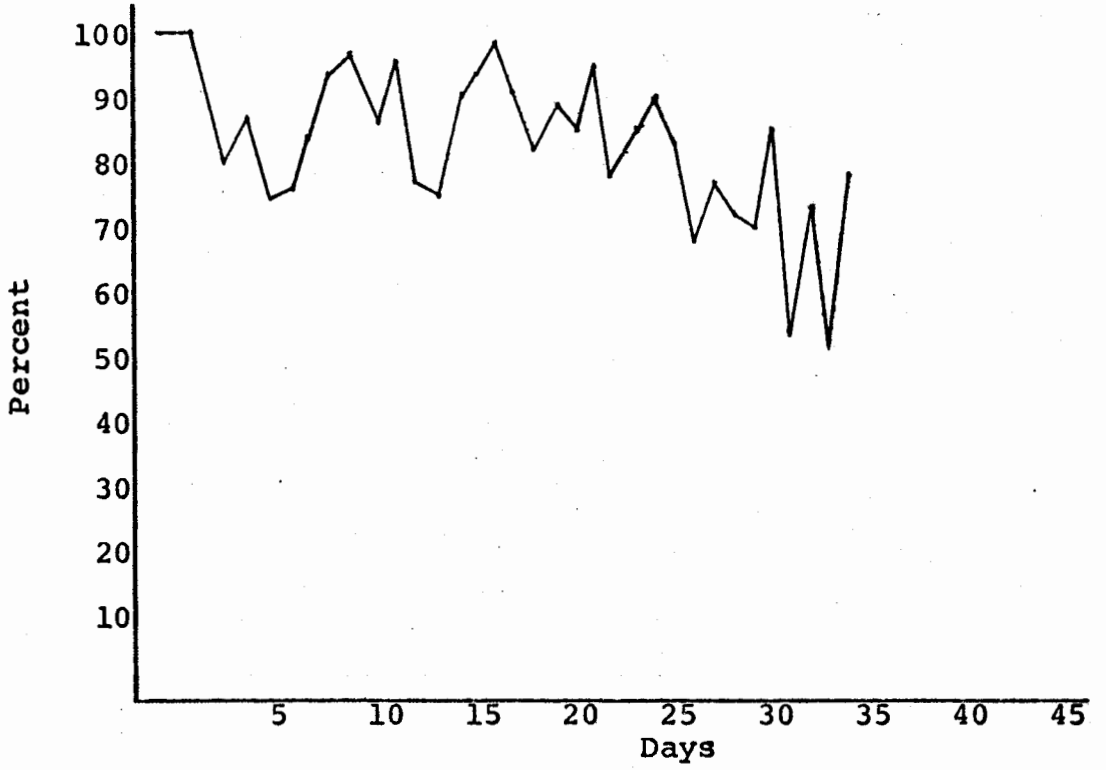Program for Student B

Figure 8

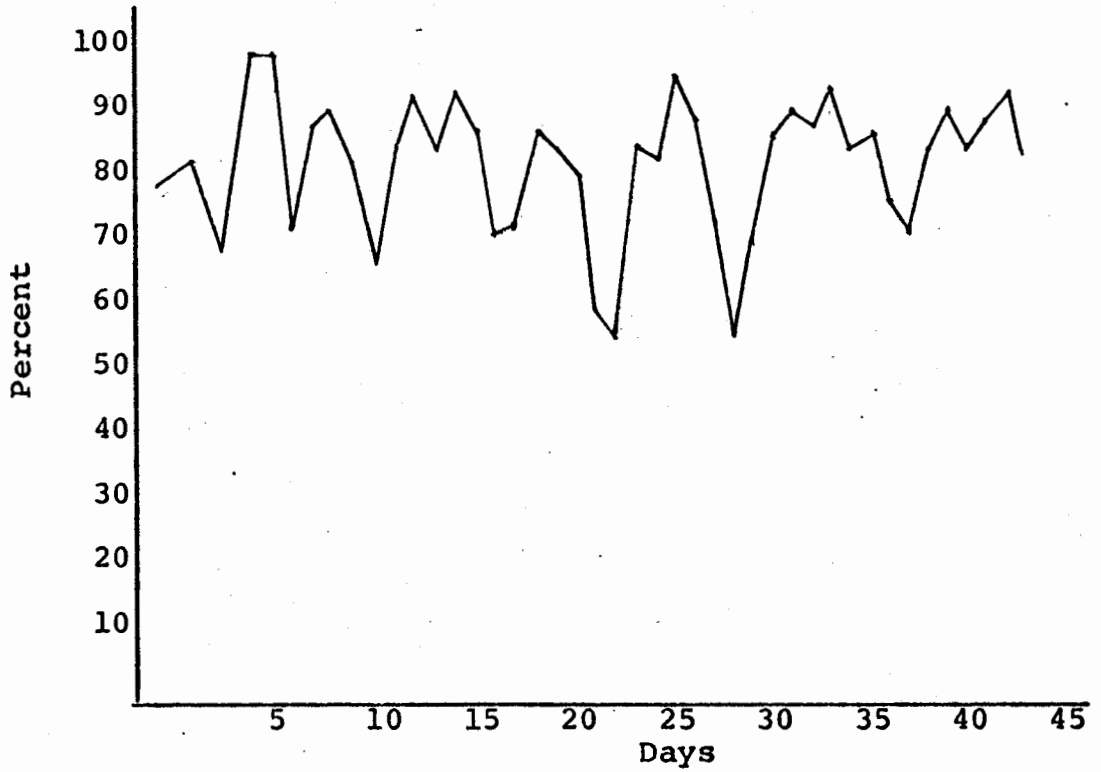Daily Percentage of Correct Responses
for Student B

Figure 9

Daily Percentage of Correct Responses
for Student A

TABLE 2

Pre-test and Post-test Results of Language Test
(Results for students A and B were the same.)

Steps of Test	Pre-Test	Post-Test
1. is	no	yes
2. is-verbing	no	yes
3. what-is-verbing	no	yes
4. Is-verbing (interrogative)	no	yes
5. She-is verbing	no	no

B progressed from using no verbs to being able to use the verb "is" in an interrogative construction.

Student A started on the first step of the content word program, Figure 2, page 9, which is using one word utterances. He progressed to Program five, Series C, step 1, (Figure 10, page 25) which is a sentence of four words in the form is-verb-ing-prep-noun.

The first hypothesis, that a person with no formal training in speech could administer Gray's (1970) speech program successfully, was accepted. The students did meet the criterion on each step and they did achieve at least an 80% average correct responding rate.

The second hypothesis, that the students would gain the ability to use new language structures was accepted. The students did improve on the language test.

COMMENTS: np-vp repeated twice   G: Food   DATE:

	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	action, np-vp	sub-is-verb-ing	I	C	10	V/V	V	3-3
Series B	1	picture, np-vp	sub-is-verb-ing	I	50	10	V/V	V	3-3
	2	picture, np-vp	sub-is-verb-ing-D.O.	I	50	10	V/V	V	4-4
	3	picture, np-vp	sub-is-verb-ing-D.O.	IE (art)	50	10	V/V	V	5-4
	4	picture, np-vp	sub-is-verb-ing-D.O.	DE (art)	50	10	V/V	V	5-4
	5	picture, np-vp	sub-is-verb-ing-D.O.	IT (sub)	50	10	V/V	V	1-4
Series C	1	picture, np-vp	is-verb-ing-prep-noun	I	50	10	V/V	V	4-4
	2	picture, np-vp	sub-is-verb-ing-prep-noun	I	50	10	V/V	V	5-5
	3	picture, np-vp	sub-is-verb-ing-prep-noun	IE (art)	50	10	V/V	V	7-5
	4	picture, np-vp	sub-is-verb-ing-prep-noun	DE (art)	50	10	V/V	V	7-5
	5	picture, np-vp	sub-is-verb-ing-prep-noun	IT (sub)	50	10	V/V	V	1-5
Series D	1	picture non-rep question	sub-is-verb-ing-D.O./prep-noun	N	C	10	V/V	V	-
	2	picture non-rep question	sub-is-verb-ing-D.O./prep-noun	N	50	10	V/V	V	-
	3	action non-rep question	sub-is-verb-ing-D.O./prep-noun	N	I	10	V/V	V	-
	4	story-pictures non-rep question	sub-is-verb-ing D.O./prep-noun	N	I	15	V/V	V	-
	5	spontaneous language	sub-is-verb-ing-D.O./prep-noun	N	O/ social	--	O/V	V	-

Figure 10

Procedural Plan for Programmed Conditioning of the Verbal-Linguistic
Construction "is + ing Verb" (From Gray, 1970)

Chapter 4

Discussion

Summary

In this study an attempt was made to test whether an instructor could successfully administer a program in a field in which he had no formal training except training in how to administer the program. Gray's (1970) language program was administered to two students. The students progressed successfully through a part of the program and learned to use new language structures.

Conclusions

The study indicates that, if a program is well constructed, it can be successfully administered by personnel who have no formal training in the field with which the program deals. Admittedly the study is based on experience with only two children. It also deals with only one area, that of delayed speech. Further research is indicated to test whether the results would be the same with a larger sample of students. Research might also be directed to other areas besides delayed speech.

This study indicated that Gray's (1970) language program could be used by instructors who are working with children with delayed speech.

This study also poses the question that perhaps highly trained specialists such as speech therapists, reading specialists, remedial reading teachers, and special education teachers should spend their time writing programs and refining programs for other non-skilled persons to administer, rather than interacting with the children full time themselves.

Observations

The three graduate students who administered this project were also enrolled in a full course of study. Two of the students were also employed as graduate assistants. Co-operation and exchange of information was not always what it should have been. It is an additional indication of the strength of language program that the project was successful in spite of this deficiency in communication.

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