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A TRAINING SEQUENCE DESIGNED TO TEACH VOCAL IMITATION
TO A RETARDED CHILD EXHIBITING A STEREOTYPED
VOCAL RESPONSE PATTERN

by

Patricia Ann Martin

A Project Report
Submitted to the
Faculty of The Graduate College
in partial fulfillment
of the
Specialist in Education Degree

Western Michigan University
Kalamazoo, Michigan
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INTRODUCTION

The purpose of the study presented here was to develop a vocal imitation training procedure for a severely retarded 13-year-old boy who, prior to training, uttered only a single stereotyped vocal response, /dæ/. This response pattern had rendered previous attempts to teach vocal imitation ineffectual; i.e., regardless of what sound the trainer uttered, the child uttered back only the stereotyped sound. The stereotyped response was invariant both phonetically and with respect to the motoric aspects of the production. This situation, while not typical, is common enough among severely retarded children to justify the development of a specialized training procedure designed to enable a child with such a response pattern to ultimately acquire the generalized vocal imitative skills usually considered to be prerequisites for the acquisition of further expressive language skills. The procedure developed is based on some of the principles of Reinforcement Theory.¹ The principles involved and the terminology intrinsic to them are described below.

The principle of positive reinforcement says that the strength of a response is affected by the stimulus event that immediately follows its occurrence. If a response is strengthened, the stimulus event that follows it is called a positive reinforcer. The principle of immediacy of reinforcement says that in order for a reinforcer to

¹Keller, Fred S., Learning: reinforcement theory. Random House, New York, 1969.

be maximally effective it must be delivered immediately after the occurrence of the response to be reinforced. If each occurrence of the response is reinforced, reinforcement is said to be delivered on a continuous reinforcement schedule; if some of the responses are reinforced and some are not, reinforcement is said to be delivered on an intermittent schedule of reinforcement. New behaviors are learned most efficiently through the use of a continuous schedule of reinforcement.

If the response to be reinforced or strengthened is not in the subject's response repertoire, the response must be taught by modifying responses that are in the subject's repertoire. This modification process is called shaping and involves the differential reinforcement of responses that are similar to the desired response and the non-reinforcement of others. The trainer gradually becomes more and more selective, reinforcing only those responses that more and more closely approximate the desired response until, finally, the desired response is emitted. Once the response has been shaped, it is considered to be a new response of low strength; therefore, it should be reinforced initially on a continuous reinforcement schedule.

During the shaping process physical prompts are often used to increase the likelihood of occurrence of the response being shaped. A physical prompt may be any form of physical assistance provided to the subject by the trainer which increases the likelihood that the subject will emit the response to be shaped. Once the desired response is obtained, the physical prompts are gradually withdrawn; and

the response is strengthened by means of a schedule of continuous reinforcement. The gradual withdrawal of physical prompts during the shaping process is called fading. When shaping an imitative response, the trainer often initially exaggerates his performance of the behavior to be imitated. Once the response has been shaped and all physical prompts faded, the trainer's exaggerated performance is gradually faded.

As indicated above, new behaviors are most readily shaped and strengthened when continuous schedules of reinforcement are used. At first, edible reinforcers are frequently used in working with children. In order to prevent the possibility of satiating the subjects and thus losing the effectiveness of the reinforcer, it is desirable to switch from edible to token reinforcers. Tokens can be dispensed on a continuous schedule of reinforcement and can be exchanged for edible reinforcers intermittently. If reinforcement for some behavior ceases to occur, the behavior in question will weaken or undergo extinction. Extinction occurs much more rapidly for behaviors which have been maintained on continuous schedules of reinforcement than for those which have been maintained on intermittent schedules of reinforcement. Therefore, a second reason for switching from edible to token reinforcers is to build up resistance to extinction.

The procedure described in the present study involves the use of extinction to weaken a stereotyped vocal response and positive reinforcement to shape and to strengthen three new vocal imitative responses. At first, edible reinforcers were used on a continuous

reinforcement schedule; later, tokens were used and were intermittently exchanged for edibles. The shaping process involved the use of physical prompts and the presentation of exaggerated models which were gradually faded. The specific goals of the training procedure were two: (a) to extinguish the subject's stereotyped vocal response /dæ/ and (b) to teach the subject to imitate three vowel sounds /a/, /o/, and /i/.

PROCEDURE

The subject. The subject used in this study was a thirteen-year-old male classified as severely retarded. This classification was based on the functioning level of the child and on a Stanford Binet IQ of 23. He had been institutionalized for five years prior to the onset of training in a residential institution for the mentally retarded. Mental retardation was assumed to be due to familial factors since three brothers and three first cousins of the subject were also residents of institutions for the retarded. The subject's birth history was negative; his visual and auditory acuity appeared normal; and his motor development appeared adequate. As indicated above, the subject exhibited no vocal behavior other than the stereotyped utterance /dæ/ which he emitted frequently and under a variety of different circumstances.

The setting for training. The training sessions were conducted in a small room in a training building within easy walking distance of the subject's living unit. The room was equipped with a table and two chairs. Edible reinforcers, tokens, and the data sheets used by the trainer were placed on the table.

Duration of training. The 78 training sessions extended from May 21, 1970, to January 27, 1971, as described in Tables 1, 2, and 3.

Training Procedure. The training procedure consisted of four phases. The first phase was directed toward the extinction or

elimination of the stereotyped vocal response /dæ/. Each training session in this phase lasted for about 15 minutes. At first the child was reinforced with an edible at the end of each three-second interval during which he remained silent; gradually, the time interval was lengthened to 15 minutes. During this phase of training the trainer recorded each instance of the child's saying /dæ/. The trainer did not speak to the child during this phase of the training. The criterion for entrance into the second phase of training was three consecutive sessions, each of 15 minutes duration, during which the child remained silent.

The second phase of the training involved the child's learning to imitate the mouth positions associated with the three vowels /a/, /o/, and /i/. The trainer said, "Do this, ..." followed by a demonstration of the mouth position to be imitated. At first the trainer exaggerated the mouth positions and provided physical prompts; these were faded as training progressed. At first each correct or near correct response was reinforced with an edible such as an M & M; gradually the edible reinforcers were replaced with tokens which were redeemed at the end of each training session. Each training session in this phase of the training consisted of at least 50 trials on one mouth position. The mouth positions were taught in the order indicated above. When the first three trials in any one session on the position being taught were correct, the trainer began training on the next position. However, at the beginning of each subsequent training session at least three trials on each previously taught position were administered. When the child was able to imitate

correctly the first three out of three trials presented on each of the mouth positions in the same session, the third phase of training was initiated.

The third phase of training involved the child's learning to imitate the trainer's productions of the sounds /a/, /o/, and /ɪ/.² The trainer said, "Do this, say ..." followed by a production of the sound to be imitated. Each correct or near correct response was reinforced with a token which could be redeemed for a choice of edibles at the end of the session. Each training session consisted of at least 50 trials on the sound being taught. The sounds were taught in the order indicated above. When the first three trials in any one session on the sound being taught were correct, the trainer began training on the next sound. At the beginning of each training session, however, three trials on each previously taught sound were administered; if the child failed to achieve at least three out of three correct responses on the previously taught sound(s), the trainer re-trained on this previously taught sound for the 50 trials of the session. When the child was able to imitate correctly the first three out of three trials presented on each of the three sounds in the same session, the fourth phase of training was initiated.

The fourth and final phase of training involved the strengthening of the imitative responses taught in the third phase. Each session

²Vocal imitation training on /i/ was discontinued due to the child's failure to produce a single correct or near correct response in fourteen sessions involving 700 trials. The sound /ɪ/ was substituted because the mouth position for /ɪ/ is the same as for /i/.

consisted of the presentation of three trials on each of the three sounds to be imitated. Each correct response was reinforced with a token; and tokens were redeemed at the end of the session. Although the child was not able to earn as many tokens in this fourth phase as in the previous phases of training, the reinforcers for which the tokens could be redeemed at the end of the session were not altered qualitatively or quantitatively.

RESULTS

The extinction of the stereotyped response /dæ/ was accomplished in six, 15-minute sessions extending over nine days. The data are presented below in Table 1.

Imitation of the mouth positions associated with the sounds /a/, /o/, and /i/ was accomplished in a total of 17 sessions extending over 77 days. The data are presented in Table 2. From the table, it can be seen that imitation of the first position to be taught (/a/) was accomplished in 14 sessions; the second, that for /o/, was accomplished in six sessions; and the third, that for /i/ (or /ɪ/), was achieved in five sessions.

Training on vocal imitation was accomplished in 47 sessions which extended over almost five months. The data are presented in Table 3. Vocal imitation of /a/ was achieved in six sessions. For /o/, 22 sessions were required. Subsequent performance on /o/ was not maintained at criterion level; and three additional sessions were required to re-establish the response. Imitative training on /i/ was discontinued after 14 sessions failed to yield a single correct response. The sound /ɪ/ was substituted for /i/ and imitation of this sound was established in only four sessions.

After criterion had been met on all three sounds /a/, /o/, and /ɪ/, nine additional sessions were conducted which involved the maintenance of a criterion performance on each of the sounds. In each of these sessions, each of the three sounds were presented three

TABLE 1

Extinction of Stereotyped Response /dæ/

Session Date	Session Number	Number Responses Emitted
5-21-70	1	43
5-23-70	2	21
5-25-70	3	4
5-27-70	4	0
5-28-70	5	0
5-29-70	6	0

TABLE 2

Acquisition of Imitation of Mouth Position for /a/, /o/, and /i/
Without Accompanying Vocalization

Session Date	Session Number	Number of Correct Responses		
		/a/	/o/	/i/
6-1-70	7	7		
6-9-70	8	6		
6-12-70	9	22		
6-15-70	10	6		
6-16-70	11	13		
6-17-70	12	14		
6-25-70	13	17		
6-26-70	14	(test) 3/3	10	
7-1-70	15	"	20	
7-2-70	16	"	45	
7-4-70	17	"	38	
7-8-70	18	"	41	
7-11-70	19	" (test) 3/3		33
7-13-70	20	"	"	39
8-10-70	21	"	"	46
8-13-70	22	"	"	46
8-16-70	23	"	"	(test) 3/3

TABLE 3

Acquisition of Vocal Imitation of /a/, /o/, /i/, and /r/

Session Date	Session Number	Number of Correct Responses			
		/a/	/o/	/i/	/r/
8-16-70	23	0			
8-17-70	24	0			
8-18-70	25	0			
8-19-70	26	0			
8-20-70	27	30			
8-21-70	28	(test) 3/3	24		
9-08-70	29	"	8		
9-11-70	30	"	42		
9-13-70	31	"	25		
9-16-70	32	"	32		
9-18-70	33	"	28		
9-23-70	34	"	35		
9-24-70	35	"	31		
9-25-70	36	"	34		
9-26-70	37	"	27		
9-27-70	38	"	42		
9-29-70	39	"	41		
9-30-70	40	"	49		

TABLE 3 (continued)

Session Date	Session Number	Number of Correct Responses			
		/a/	/o/	/i/	/ɪ/
10-06-70	41	(test)	3/3	29	
10-08-70	42		"	42	
10-11-70	43		"	34	
10-14-70	44		"	38	
10-15-70	45		"	38	
10-20-70	46		"	34	
10-21-70	47		"	42	
10-22-70	48		"	49	
10-23-70	49		"	38	
10-25-70	50		" (test)	3/3	0
10-27-70	51		"	"	0
10-28-70	52		"	"	0
11-03-70	53		"	"	0
11-04-70	54		"	"	0
11-06-70	55		"	40	
11-08-70	56		"	36	
11-10-70	57		" (test)	3/3	0
11-12-70	58		"	"	0
11-18-70	59		"	"	0
11-19-70	60		"	"	0

TABLE 3 (continued)

Session Date	Session Number	Number of Correct Responses			
		/a/	/o/	/i/	/ɪ/
11-24-70	61	(test) 3/3	(test)3/3	0	
12-01-70	62	"	"	0	
12-04-70	63	"	"	0	
12-07-70	64	"	"	0	
12-08-70	65	"	"	0*	
12-10-70	66	"	"		36
1-06-71	67	"	"		45
1-07-71	68	"	"		45
1-08-71	69	"	"	(test) 3/3	
1-10-71	70	"	"		"
1-11-71	71	"	"		"
1-12-71	72	"	"		"
1-14-71	73	"	"		"
1-18-71	74	"	"		"
1-19-71	75	"	"		"
1-24-71	76	"	"		"
1-26-71	77	"	"		"
1-27-71	78	"	"		"

*Discontinued training on /i/.

times. The data for these nine sessions are presented in the last nine sessions in Table 3.

DISCUSSION

Although the training procedure is extremely time-consuming, the results presented above demonstrate that a stereotyped vocal response can be eliminated and that other vocal responses can be brought under imitative control. The length of time involved might have been shortened considerably had the subject been continuously available to the trainer. All major time lapses between training sessions were due to the subject's leaves of absence from the institution to visit in his natural home.

It is considered to be significant that it was possible to establish three new imitative vocal responses. By bringing three different sounds under imitative control, it was felt that an important foundation had been laid for extending variability among vocal responses that would compete with the previous pattern of stereotyped vocalization.

The failure to establish /i/ in the vocal imitative repertoire was unexpected. The substitution of /ɪ/ for /i/ was made on the basis of (a) similar motoric elements and (b) similar phonemic elements, the major difference between /i/ and /ɪ/ being that of duration.

It is interesting to note that performance on /o/ deteriorated while training on /i/ was being attempted. This suggests that the repetitious lack of reinforcement on /i/ may have affected performance on /o/. Because the inability to establish /i/ was not anticipated, no limit for the number of unsuccessful training

sessions was established in advance. Judging from the data presented in Table 3, a limit of four sessions, or 200 trials, would seem reasonable in any future training design.

From Table 2 it can be seen that each successive mouth position took fewer training sessions to teach. This was not the case when vocalization was added. The sound /a/ was established in five sessions; however the next sound attempted, /o/, took a total of 22 sessions to reach criterion the first time. This suggests that while the training of an imitative motoric response may facilitate that of another, the training of a vocal imitative response does not appear to facilitate that of another vocal imitative response. This is an interesting question which might be pursued in another study using a group of subjects.

CONCLUSIONS

The following conclusions are drawn from the results presented above:

- (a) Reinforcement Theory principles can be successfully applied to the vocal imitative training of severely retarded children.
- (b) It is possible to eliminate a stereotyped vocal response from the repertoire of a retarded child by differentially reinforcing successively longer intervals of silence on the part of the child.
- (c) It is possible to add vocal imitative responses to previously shaped motor imitative responses without evoking the stereotyped vocal response previously eliminated.

BIBLIOGRAPHY

BOOKS

Keller, Fred S., Learning: reinforcement theory.
New York: Random House, 1969.

Sloane, Howard N., Jr. and Barbara D. MacAulay,
Operant Procedures in Remedial Speech and Language
Training. Boston: Houghton Mufflin Co., 1968.

PERIODICALS

Fay, W. H. "Childhood Echolalia." Folia Phoniatica,
Vol. XIX, No. 4, 1967. Pp. 297-306.

Lovaas, O.I., J.P. Perloff, B.F. Perloff, and
B. Schaeffer. "Acquisition of Imitative Speech
by Schizophrenic Children." Science, Vol. CLI
No. 3711. Pp. 705-707.

Rheingold, Harriet L. "The Development of Social
Behavior in the Human Infant." Child Development
Monographs, Serial 107, Vol. XXXI, No. 5, 1966.
Pp. 1-16.

PAPERS

Baer, D.M., R.S. Peterson, and J.A. Sherman.
"Building an Imitative Repertoire by Programming
Similarity Between Child and Model as Discriminative
for Reinforcement." Paper read at the Biennial
Meeting of the Society for Research in Child Develop-
ment, Minneapolis, Minn., 1965.