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Immediate gains in four areas of language behavior of nine moderately retarded children, achieved through a systematic summer-camp-type activity program, remained significant one year later, report these authors.

an environmental language approach for increasing behavior of retarded children

By Mildred Odom, Rex R. Boatman,
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The ability to communicate verbally is increasingly being seen as an important goal in the education of mentally retarded children.¹ Deficient communicative skills are reflected in inappropriate social responses,² limited vocabulary, incorrect articulation, faulty grammatical structure, and other related problems.³

A number of writers (e.g., Schlanger,⁴ Wood,⁵ Dunn⁶) have noted that many programs for the mentally retarded provide too few challenges for verbalizations and require only minimal communicative skill. Guess, Rutherford, and Smith⁷ reported that an impoverished environment seriously impedes both the acquisition and maintenance of communicative skills. Schiefelbusch, et al.,⁸ stated that the retardate and his environment are not mutually self-adjustive, i.e., the retardate fails in the environment and the environment in turn fails the retardate. Spradlin⁹ observed that appropriate speech is too infrequently reinforced in typical classroom settings for the retarded.

Following an extensive review of the literature, Piens in 1962 reported innumerable suggestions for speech programs for the mentally retarded, but a paucity of studies concerned with the effectiveness of speech and language training procedures for the mentally retarded.¹⁰ A notable exception is Smith's 1962 study¹¹ in which he reported significantly improved language performance for mentally retarded children taught with a systematic language development program. His program, which was intended to be both stimulating and enriching, was directed toward developing the children's abilities to receive visual and auditory cues and then to relate to these cues through verbal or motor expressions.

It was the purpose of the present study to investigate both the immediate and long-range effects of a short-term summer environmental language development approach on the verbal behavior of moderately retarded children. It was hypothesized that the rate of verbal behavior of retardates would be increased substantially following a systematic program in which the retardates would experience an environmental event and concurrently verbalize the experience. It was reasoned that such an approach would in itself be stimulating and enriching as well as provide an abundance of opportunity for corrective language teaching and reinforcement not readily available in the typical classroom setting. It was further hypothesized that immediate gains in rate of verbal behavior would be dissipated over the course of a school year.

METHOD

Setting

This study was conducted in the environmental context of a medium-sized mid-western city under the auspices of an instructional materials center affiliated with the Kansas University Regional Special Education Instructional Materials Center. All training sessions were held out of doors for two and one-half hours daily over a six-week period during the summer months. The study staff consisted of two experienced special education teachers with the occasional assistance of various community resource persons.

Subjects

The subjects for this study consisted of nine children (six boys and three girls) selected from an intermediate level class for the educable mentally retarded. A description of the subjects is presented in Table 1. All subjects had Wechsler Intelligence Scale for Children (WISC) scores between 65 and 83; were between the ages of twelve and thirteen and one-half at the beginning of the study; and were free of obvious visual, auditory, or physical impairments.

TABLE 1
Description of Subjects

	Mean	Standard Deviation
C.A. (months)	154.22	4.45
I.Q. (WISC)	76.22	7.01

Instrument and Administration Procedure

In order to secure language corpi of sufficient magnitude for comparative analyses of rates of verbal behavior, a 72-item picture-stimulus instrument was developed which related directly to the content of the curriculum. The instrument was developed in response to Spradlin's observation,¹² reported in 1967, that five of the six subtests of the Parsons Language Sample (Spradlin, 1963)¹³ require only one-word responses, as do most of the nine subtests of the

Illinois Test of Psycholinguistic Abilities (McCarthy and Kirk, 1963).¹⁴

The instrument was designed to sample three language processes: receptive, integrative, and expressive. The ability of the instrument to sample these three processes has not yet been validated. There is, however, an expressive component to each of these processes and it is this component on which the findings of this study are based.

The administration of the instrument was standardized for all subjects. Each item dealing with receptive language was presented with the question: "What is in this picture?" Items dealing with integrative language were presented with the question: "What is he (she) doing?" Expressive language items were presented with either "What is happening?" or "What has happened?"

The test was individually administered to all subjects by the same examiner. The subjects were permitted to discuss each stimulus-item as long as they wished. The average time for each administration was approximately 30 minutes. The responses of each subject were tape-recorded and later transcribed to facilitate the analyses.

Experimental Design

In order to ascertain the within-group changes in rate of verbal behavior, as opposed to between-group differences, the experimental subjects served as their own controls. Each subject was individually pretested, post-tested, and retested one year later during the followup phase of the study

The dependent variables which were selected for analysis included the following four sources of data concerning rate of verbal behavior: (1) total number of words, (2) total number of sentences, (3) sentence length, and (4) total number of nouns. Interrater reliability in judging the verbal behavior of the subjects in terms of the four dependent variables ranged from 94 percent to 100 percent.

Training Procedure and Curriculum

The training program was designed to provide systematically a wide array of experiences with the natural environment. With each environmental encounter each subject was encouraged to verbalize what he was doing; smelling, feeling, tasting, etc. This procedure provided in-

TABLE 2
Descriptive Data of Group Pretest, Post-test, and Followup Language Performance

Language Sample	Pretest		Post-test		Followup	
	Median	Range	Median	Range	Median	Range
Total Number of Words	360	120-605	740	390-1475	729	407-1289
Total Number of Sentences	28	1-42	56	38-115	52	39-89
Sentence Length	5.7	2.7-7.8	11.0	4.0-14.0	10.7	4.7-14.8
Total Number of Nouns	123	55-155	210	170-375	197	136-451



Verbalizing the feel of bread dough is a new and different effort for class members, who have to grope for words to describe the sensation.

numerable natural opportunities for the staff to correct or to reinforce the verbalizations of each of the subjects.

Activities available in the immediate environment and which comprised the curriculum are listed in the box at right.

RESULTS AND DISCUSSION

The verbal response rates of the subjects to the picture-stimuli during pretesting, post-testing, and followup testing are summarized and presented as descriptive group data in Table 2, on page 16, opposite. It is interesting to note that the median rate of verbal responding doubled from pre- to post-testing for both total number of words and total number of sentences uttered. Also from pre- to post-testing, sentence length increased from a group median of 5.7 words to 11.0 words, while the number of nouns uttered increased from a median of 123 to one of 210.

From post-testing to followup testing one year later, the median rate of verbal responding showed a slight decrease for each of the four language samples. The medians and the lower limit of each of the ranges reported in Table 2 indicate that all the subjects increased in their rate of verbal responding to the picture-stimuli following the treatment period. Moreover, much of the increased rate was retained during the year following the environmental language training program.

Within the confines of the experimental design, all possible language performance changes or comparisons were tested for statistical significance by use of the nonparametric Wilcoxon matched-pairs test (Siegel, 1956).¹⁵ The results of these analyses are presented in Table 3, shown on page 19.

In the pretest-post-test analyses, the subjects' rates of verbal responding showed significant increases for each of

CURRICULAR ACTIVITIES

I. Water Safety

- A. Pre-swimming and swimming
 1. Bobbing and breathing
 2. Floating
 3. Treading water
 4. Swimming
- B. Safety Devices
 1. Lifejackets
 2. Other objects
- C. Boating
 1. Boarding boat
 2. Rowing
 3. Leaving boat

II. Food Production

- A. Gardening
 1. Planting
 2. Cultivating
 3. Irrigating
 4. Fertilizing
 5. Harvesting
- B. Orchard
 1. Picking strawberries
 2. Picking cherries
 3. Selling for profit
- C. Harvesting and Processing Wheat
 1. Combining and storing wheat
 2. Milling wheat
 3. Baking bread
- D. Dairy Products
 1. Milking cows
 2. Processing milk
 3. Producing butter
 4. Producing ice cream

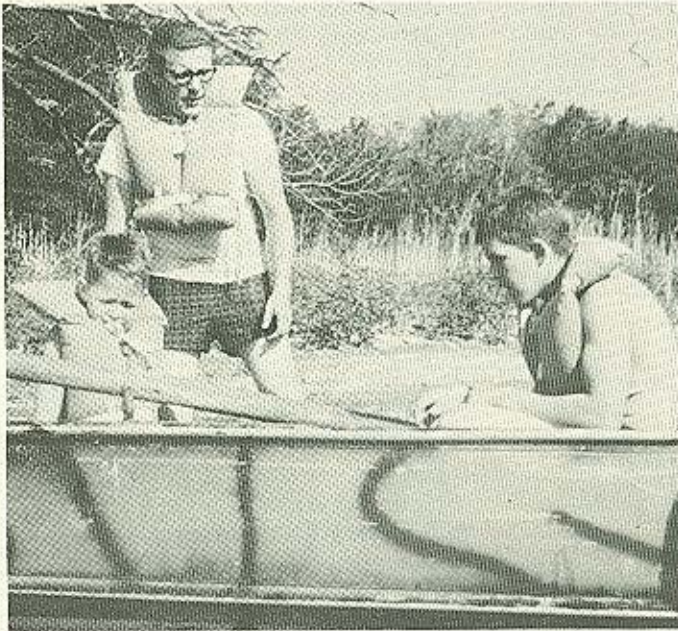
III. Outdoor Recreation

- A. Fishing
 1. Practice casting
 2. Obtaining bait
 3. Fishing at lake
 4. Shore lunch (fish fry)
- B. Camping
 1. Selecting campsite
 2. Providing for necessities
 3. Setting up tents
 4. Camping overnight
 5. Striking tents
- C. Hiking
 1. Selecting route
 2. Providing for necessities
 3. Identifying plants and animals



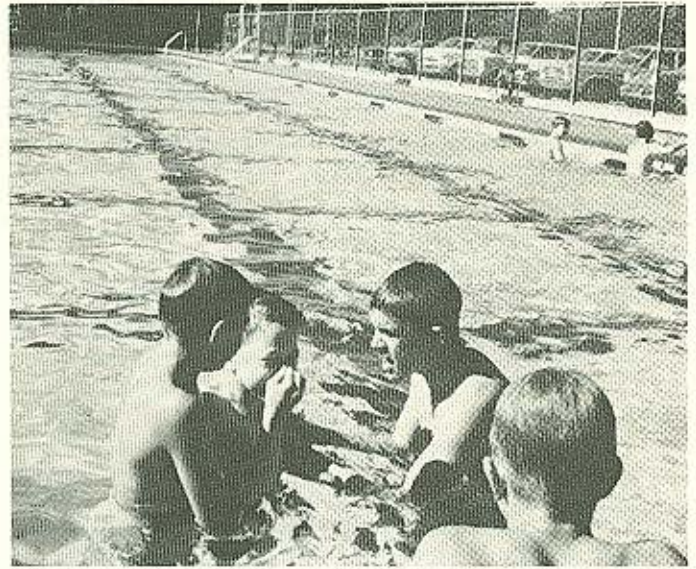
ABOVE: "What does a baby gosling say? How does he feel in your hand? What will he be when he grows up?" Mildred Odom poses these questions to an enthralled young man describing his observations and feelings.

BELOW: "I sit in the stern. Chris sits in the bow. There are two oars." Rex Boatman checks out one boy on boat operation and boat safety while the other awaits his turn.



the four language samples. These data confirmed the hypothesis that the rate of verbal responding of retardates would be significantly increased through a short-term language training program in which the retardates would experience an environmental event and concurrently verbalize the experience.

In the pretest-followup analyses, the subjects' rates of verbal responding showed increases basically equivalent to those observed in the pretest-post-test analyses. Verbal responding was further scrutinized by comparing post-test results with followup test results for each of the four language samples. Although the medians of the four language samples decreased slightly from post-test to followup testing, the changes in rate of verbal responding were not statistically significant. While no additional gains in rate of verbal responding were observed during the year



ABOVE: "Take a breath. Blow bubbles. Tell me how it feels." Boy helps boy express language as he experiences the water.

BELOW, LEFT: Propagation, irrigation; new words, new concepts, new language.

BELOW, RIGHT: Members of the class cultivate their crop of corn—for popcorn—while they cultivate their language.



TABLE 3
Comparative Analyses of Language
Performance Samples

Language Sample	Pretest-Post-test		Pretest-Followup		Post-test-Followup	
	Median Diff.	T	Median Diff.	T	Median Diff.	T
Total Number of Words	+380.0	0*	+369.0	0*	-11.0	22
Total Number of Sentences	+ 28.0	0*	+ 24.0	0*	- 4.0	10
Sentence Length	+ 5.3	0*	+ 5.0	0*	- 0.3	23
Total Number of Nouns	+ 87.0	0*	+ 74.0	0*	-13.0	14

*p < .01 one tailed

following the treatment, the decrease in rate of verbal responding was negligible. These data failed to support the hypothesis that immediate gains in rate of verbal behavior would be lost over the period of a year. To the contrary, the immediate gains were much in evidence one year later. Interestingly enough, the immediate gains remained relatively stable during the year following the treatment even though the subjects were assigned to teachers who had not participated in the treatment phase of the study.

Although the present investigation was primarily concerned with selected quantitative aspects of language performance, i.e., rate of verbal responding, certain qualitative aspects of language functioning may be inferred from the findings. For example, the significant increase in the use of nouns observed from pre- to post-testing would indicate that the subjects had learned to "name" or "label" objects and events rather than simply describe them in terms of function, a behavior peculiar to children with delayed or deficient language skills (Wood¹⁶). Also, the significant increase in median sentence length observed from pre- to post-testing suggests the subjects had learned additional language skills (e.g., vocabulary, syntactical rules) which facilitated their generating longer sentences.

In conclusion, the findings of this study suggest: (1) the language performance of moderately retarded children can be significantly improved in terms of rate of verbalization through planned language training in and with the natural environment, and (2) the typical classroom environment provided for moderately retarded children appears to be stimulating and reinforcing enough to maintain language skills learned in and through the natural environment of the community.

FOOTNOTES

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