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ABSTRACT

The article describes language development techniques used with a 5-year-old autistic boy to increase his verbal behavior. Intervention consisted of 1.5 hour sessions four times a week over an 8-month period. The intervention focused on increasing nonvocal imitation, vocal imitation, verbal labeling, and verbal discrimination. Development of nonvocal imitation required physical guidance and immediate rewards. Then vocal imitation of sounds in gradually increasing complexity was encouraged through shaping and immediate reinforcement. Verbal labeling began with responding to symbols and pictures progressing to labeling with a sound an object or person. The child learned to label about a dozen pictures and objects. Verbal discrimination was developed by having the child respond appropriately to a variety of commands differing in the object to be obtained or placed. After the intervention the child was able to imitate words with up to four phonemes, to copy letters and figures, and to follow more complex verbal commands. (DB)

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The efficacy of behavior modification techniques with children has been recently summarized by Bijou and Baer (1966). Our efforts in applying the principles for developing language behavior in an autistic child we called Kipper have been described (Schell, Stark, Giddan, 1967). At the outset, Kipper was virtually unresponsive to all types of environmental stimuli. After 45 sessions, he began to attend to people as a means of reinforcement; respond differentially to visual and auditory stimuli; and evidence an increase in the extent and rate of vocal and nonvocal behavior.

The purpose of this article is to describe some additional techniques which we have found useful during a five-... nth period. Kipper, who was five

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years old, was usually seen four days a week for one-and-a-half hour periods. This description is organized under four subheadings: nonvocal imitation, vocal imitation, verbal labeling, and verbal discrimination.

NONVOCAL IMITATION

We assumed that children learn many activities, including speech, by imitating the behavior they observe. Kipper was a child who had previously shown little interest in looking at or copying the behavior of others, hence an early goal of the training was to teach imitation. Since our previous attempts at vocal imitation "did not seem natural for him and showed little indication of becoming any more frequent" (Schell, Stark, Giddan, 1967), we felt it necessary to introduce more gross nonvocal responses. We focused Kipper's attention on the relevant aspects of the clinician's behavior by presenting gross body movements which would be easy to discern. More discrete stimuli, such as movements of the tongue, lips and jaw, could then be introduced and a gradual transition from nonvocal imitation of mouth movements to imitation of sounds could be accomplished.

Kipper was seated directly opposite the clinician. At first, the clinician prompted Kipper by physically moving him through the required motion. For example, in teaching an "arms up" gesture, the clinician first modeled the behavior and then lifted Kipper's arms above his head. The clinician provided immediate reinforcement by saying "Good boy!" and giving him a piece of candy or cereal. A technique which facilitated Kipper's response was to hold two M&M's above his head so that he had to raise his arms to get them. It was sometimes necessary to use other methods in order to achieve the desired behavior. In teaching him to imitate hand-clapping, the clinician first held Kipper's hands and brought them together; she then began to bring them together but released her grasp immediately upon impact; and, finally, she placed his hands in the "starting position" and pushed slightly.

At first the imitative responses were difficult to establish and Kipper responded only about half the time. Gradually it became easier to introduce new items as Kipper learned to pat his knees, feet, and head. He was able to touch his nose with his index finger on the first trial. By the seventh session, sequences of two previously established imitative responses were introduced. The clinician would clap her hands then pat her knees, and Kipper was reinforced only after he successfully executed both of these movements. By the tenth session, Kipper was correctly imitating sequences of three movements on the first trial. In addition, it was not necessary to use food as a reinforcer after each correct response.

Children who are already able to imitate will not need training with nonvocal imitation. In Kipper's case, the rationale for starting with nonvocal imitation was based upon his exceedingly low rate of imitative responses. Our primary concern was to make the transition from nonvocal imitation to vocal responses. We accomplished this

by gradually directing the discriminative stimuli toward the face and mouth. These included nodding the head vertically and horizontally, stroking the cheek, and protruding the tongue in lateral and vertical planes. As soon as Kipper showed that he could copy more discrete motor movements, and especially oral movements, vocal imitation was begun.

VOCAL IMITATION

In our first report, we described the game-like procedures which we used to prompt and shape Kipper's vocal behavior. The approach was successful in increasing the frequency and variety of Kipper's vocalization and bringing it under more precise stimulus control. In selecting sounds for Kipper to imitate we took several factors into consideration. These included sounds which Kipper emitted during spontaneous play; those which have easily discernible features that could be contrasted; sounds which could be prompted by manipulation of the tongue, lips, and jaw; and those which are in the presumed order of articulatory maturation for normal children. The most important consideration was to introduce them in a hierarchy of gradually increasing complexity. We began with singles and gross contrasts. At this level, a primary opposition was introduced and contrasts were between consonants and vowels, such as [m], [ɑ], [u] and [p]. As soon as Kipper acquired the ability to imitate single sounds, they were presented in CV and VC combinations. The stimuli were a series of phonemes where one element remained constant.

TABLE 1. Typical imitative responses at different stages.*

Sessions	*Type*							
	C/V	*CV*				*CVC*		
		C (V)	*(C) V*	*(V) C*	*V (C)*	*C (V) C*	*CV (C)*	*(C) VC*
1-15	m ɑ b i g u n oʊ p aɪ							
15-30		mɑ mi mu moʊ maɪ	fɑ mɑ nɑ pɑ gɑ	ɑm im um oʊm ɑɪm	ɑm it ʊk ap aɪ			
30-45						moʊt mit maɪt mat	maɪk maɪp maɪt maɪm	mam kam pam fam

*The stages are representative of the level at which Kipper was able to imitate vocal utterances of this type successfully. Additional phonemes were combined only after they were mastered in isolation.

For example, a typical exercise was to require Kipper to imitate /mɑ/, then mu/, /mi/, and /moʊ/. Table 1 presents a list of some of the vocal stimuli which were successfully imitated by Kipper at various stages in the training.

While Kipper did not learn to imitate all of the English phonemes and many of his productions were only gross approximations, by the twenty-eighth session he correctly imitated combinations such as /bɑ/, /nɑ/, /kɑ/, pɑ/, and /lɑ/. During the next phase, the stimuli were of the CVC type. These included a series such as /moʊt/, mit/, /mɑt/, /mɑt/, and /mʊt/.

Many of these sounds had to be shaped by successive approximation techniques. For example, in getting Kipper to imitate /n/, the clinician first reinforced him for producing a sound with his tongue held between his teeth. Then the response was reinforced only when he began to move the tongue closer to the edge of the incisors. Three sessions after the sound was first introduced Kipper was able to produce an acoustically and visually acceptable /n/.

The procedures involved considerable patience and hundreds of trials. Imitation of many of the sounds seemed to be facilitated when the clinician exaggerated the movements of the oral musculature and intensified the differential visual cues.

VERBAL LABELING

In addition to increasing Kipper's rate of imitative responses to sound and movement stimuli, we wanted him to use these sounds and movements to name things. Our goal was to teach him that "things" have labels and the movements and sounds he produced could represent action and objects.

As soon as he was able to produce imitative responses to /m/ and /ɑ/, letters representing these sounds were printed on 3″ × 5″ cards in different colors. The Phonovisual Symbols (Schoolfield and Timberlake, 1944) were used to represent sounds. Kipper was taught to imitate /m/ with the M card on the table. The clinician placed a piece of candy on the card and he received it as soon as he imitated the sound. Soon he began to anticipate the clinician and produce the sound when the candy was placed upon the card. By the tenth trial, he was 'reading" the letter. The same procedure was followed with /ɑ/.

After he successfully produced each of these sounds, both cards were placed before him and a piece of candy was put on the card to be labeled. However, he was unable to determine which of the two was the discriminative stimulus. The clinician then placed one kind of candy on the M card when it was to be labeled and a different kind of candy on the O card when Kipper was to say its sound. We found that Kipper would still repeat the /ɑ/ after it was presented a number of times and the discriminative stimulus was changed to /m/. We further modified the procedure so that candy was placed upon the M card. Kipper's desire to get that specific kind of candy enhanced his discriminative ability. In subsequent sessions, the cues were gradually removed until Kipper could read M and O

printed in black ink with no candy present.

When he was able to imitate CV combinations, training to establish associations with pictures and objects was begun. For example, the word card MO was placed below a picture of his mother and another word card PO was placed below a picture of his father. Once again a piece of candy was placed upon the card to be read. When Kipper was able to discriminate the pictures by producing the appropriate sound, the clinician had his mother hold the picture in front of her and then it was gradually faded until Kipper was continually identifying her with the verbal label /mɑ/. In a similar fashion, Kipper was taken through a stepwise procedure which enabled him to learn other nouns. The responses were consistent with the sounds already mastered. Earliest labels were for *knee, eye, pie, bow,* and *mop.*

VERBAL DISCRIMINATION

In addition to teaching Kipper to label more than a dozen pictures and objects, we wanted to bring more of his behavior under the control of verbal stimuli. Therefore, we had Kipper place a marker, such as a poker chip or wooden block, on the printed M or O when these were spoken by the clinician. The stimuli became increasingly complex. Kipper soon was able to discriminate /mɑ/ and /pɑ/ and placed a block on the appropriate picture or word card. This technique was also expanded to include about 30 nouns.

Once these responses were established, they were incorporated into the phrase "Get the _____"; Kipper received additional practice at home with a variety of objects. Discriminative responses to many different types of verbal stimuli could now be expected without an intermediate "reading" step.

At this point we reintroduced some of the verbal commands we had attempted to teach earlier. Table 2 shows the marked improvement in his responses. Each new verbal command was introduced in isolation. For hand-clapping, the clinician first said "clap" and modeled the action. Kipper would imitate her hand clapping as well as approximate her vocal utterance. Soon he was responding to the verbal stimulus without a demonstration. By the end of the training period he had mastered a variety of verbal commands.

PRESENT STATUS

It has been eight months since imitation training was first introduced and progress has continued in all areas. Vocal imitation has become easier for Kipper and he can now reproduce new words which have four phonemes. His nonvocal imitation includes the copying of letters and figures. Verbal labeling and discrimination activities have been extended and lexical items are

presented in longer sequences with a greater number of choices. For example, he can now respond to the command, "Put the red bow on the box" where a discrimination must be made between red-blue, bow-car, and on-off.

TABLE 2 Responses to verbal commands *

Verbal Stimulus	*Trials*	*Performance (Sessions)*		
		1-5	*15-20*	*35-40*
Clap	149	69*	51	99
Stand	120	53	50	98
Open	55	—	—	91
Push	80	—	—	95

*Percentage of correct responses.

Kipper's progress has been further enhanced by the additional training he has received at home. His mother observed many of our procedures and was able to practice with him for several hours each day. In addition to language learned at the clinic, more functional responses to commands, such as "brush your teeth," "get your coat," and "close the door" were continually reinforced.

At this point, the use of language has acquired secondary reinforcing properties. Kipper no longer needs to be given a candy reward during training sessions. He can now be taught with more traditional methods employed for deaf and aphasic children, especially those which maximize visual cues.

While Kipper still remains a profoundly disturbed child who is functioning significantly below his age level in all areas of performance, his progress has been dramatic. In the light of his behavior at the outset, we would have hardly expected him to be as alert and responsive as he is now. The future is unpredictable.

The problems and progress we have described are special to Kipper. The training of any nonverbal child should be viewed as a characteristically unique and highly individual program. We would like to reemphasize that regardless of the numerous complicating factors, or diagnostic labels, the language behavior of nonverbal children who present problems which are similar in kind to Kipper's can be modified.

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