GENERALIZING THE USE OF DESCRIPTIVE ADJECTIVES THROUGH MODELLING¹

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Two retarded children were exposed to daily imitation training in which teacher or nurse modelled and instructed each child to imitate 12 sentences containing one of six animal names. The subjects were praised for correct verbal imitation. Across three phases of a multiple-baseline design, sentences varied as to the presence or absence of size and/or color adjectives describing the animals. In probe sessions at another time of day and in a different setting, the experimenter twice asked each subject to describe 12 different animal pictures. The subjects' use of descriptive adjectives (color and/or size) greatly increased during probe sessions as a function of the sentence content (presence or absence of color and/or size adjectives) in modelling and imitation training sessions. Generalization to descriptions of animals also not used in imitation training sentences was also obtained.

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A combination of imitation and reinforcement techniques has commonly been used to train generative language repertoires, including the use of plurals in retarded children (Guess, 1969; Guess, Sailor, Rutherford, and Baer, 1968; Sailor, 1971), the use of past and present tense (Schumaker and Sherman, 1970), the use of comparative and superlative adjectives (Baer and Guess, 1971), the use of the verb "is" (Bennett and Ling, 1972; Fygetakis and Gray, 1970), the use of noun suffixes (Baer and Guess, 1973), and finally, the use of complete sentences by children (Lutzker and Sherman, 1974; Wheeler and Sulzer, 1970).

In none of these experiments was generalization examined in other settings, on different

tasks, or with a different experimenter present. Rather, generalization tasks have included the same experimenter, in the same experimental room, using a task similar to the training task (typically, identifying pictures or objects different from the training pictures or objects). The present study attempted to move the examination of language beyond such restricted procedures.

The production of descriptive adjectives by preschool children has been increased through contingent access to free play (Hart and Risley, 1968) and through modelling without reinforcement (Lahey, 1971). The present experiment used a simple verbal modelling, imitation, and reinforcement procedure, with one adult in one setting, to determine whether or not the production of descriptive adjectives could be altered in another setting, on another task, and with another adult who did not use reinforcement. Although the experiment could have research implications for the study of generative grammar, it also examined the applied issue of whether or not a simple verbal modelling and imitation procedure could be effective in altering verbal behavior in other settings.

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METHOD

Subjects

Subject 1 was an 8-yr-old mentally retarded boy who had a Stanford-Binet IQ of 51. He attended school weekdays at a University-Affiliated Training Center located at a state school for the retarded. Subject 2 was 6 yr old and had a Stanford-Binet IQ of 70. She was an in-patient in a rehabilitation center for interdisciplinary assessment, diagnostic teaching, and management of her maladaptive behavior. Questioning the subjects' teachers revealed that the children only occasionally used color or size adjectives in their speech. Additionally, the experimenter observed each subject for a total of 60 min at various times during the day over five days. Frequency of the use of size and/or color adjectives modifying nouns was recorded. During that time, neither subject produced a color adjective modifying a noun; Subject 1 produced two size adjectives and Subject 2 produced one size adjective. A pretest was given by a teacher or nurse to establish that the children had receptive use of colors and of the size adjectives "big" and "little". The color pretest consisted of presenting two different-colored plastic chips (red, blue, green, yellow, white, black, brown, or orange) and asking the subject to point to one of the two colors. Each subject was given 40 different trials on this task. Subject 1 was correct on 39 of 40 trials, Subject 2 on all 40. To assess for the receptive use of "big" and "little" size adjectives, big and little examples of the same object (block, rubber band, token, or file card) were placed before the subject, who was asked to point to either the big or the little one. Each subject was given 40 different trials on this task, and both were correct on all trials.

Procedure

Two types of sessions were conducted daily. In the first, the subjects were asked to repeat each of 12 sentences that were verbally modelled for them. The subjects were praised for correct repetition of the sentences and were

prompted or corrected if necessary. A response was counted as correct if the subject repeated the whole sentence without a mistake. If a mistake was made, the subject was told what it was, the sentence modelled again, and the subject asked to repeat the sentence. If a subject was unable to complete the sentence or stopped in the middle, he was prompted by presenting the rest of the sentence. When the subject completed the rest of the sentence, the entire sentence was modelled again and the subject was asked to repeat it. These procedures continued in each session until all 12 sentences were imitated without error. The head teacher conducted these sessions for Subject 1 during the middle of the morning in an office adjacent to the classroom. A nurse conducted these sessions in the hospital room of Subject 2 in the late afternoon. Each of the 12 sentences contained one of six animal names corresponding to the animals in six of the 12 animal pictures in the Peabody Language Development Kit, Level #P. Table 1 contains a list of the animals in these pictures used for each subject. The same six animal nouns were used in every session. No pictures of these animals were presented. Examples of these sentences can be seen in Table 2.

The second (or probe) session each day was conducted by the experimenter in a small teaching room (near the classroom of Subject 1 or adjacent to the hospital ward of Subject 2). Probe sessions were in the afternoon for Subject 1 and in the morning for Subject 2. Here, the experimenter showed the subjects each of the 12 animal pictures (X-1 through X-12) from the Peabody kit and asked them to describe

Table 1
Animal Pictures in Peabody Language Development Kit, Level #P Home and Family Cards.

<i>Subject 1</i>		<i>Subject 2</i>	
X-1	Bears	X-2	Birds
X-4	Chickens	X-3	Cats
X-5	Cows	X-7	Ducks
X-6	Dogs	X-8	Fish
X-9	Frogs	X-10	Horses
X-12	Sheep	X-11	Pigs

Table 2
Examples of Imitation Training Sentences

<i>Subject 1</i>	<i>Subject 2</i>
PHASE I: Baseline; no color or size adjectives in imitation sentences.	
I see a bear.	There goes a duck.
I see a sheep.	I see a bird.
There goes a frog.	I see a fish.
There goes a sheep.	There goes a horse.
PHASE II: Size adjectives in imitation sentences for Subject 1, and color adjectives in sentences for Subject 2.	
I see a little cow.	There goes a yellow cat.
I see a big chicken.	There goes a brown duck.
There goes a big dog.	I see a green fish.
I see a big frog.	I see a white pig.
PHASE III: Both size and color adjectives in imitation sentences.	
There goes a little white sheep.	I see a little yellow cat.
I see a little white cow.	There goes a big white duck.
I see a big black bear.	There goes a big brown horse.
There goes a big brown cow.	I see a little white cat.

what was in each picture. Each picture had both big and little animals of that type. With each picture, the experimenter would point to both the big and the little animal and ask the subject what each one was. The experimenter made no response to the subject's verbal responses; he merely presented the next picture to the subject. The 12 cards were presented twice in random order in each session.

The sentences modelled by the teacher or nurse varied across three phases as to whether or not color and/or size adjectives were included. (See Table 2.) The dependent variable was the subject's use of size and color adjectives in describing the 12 animal pictures to the experimenter during probe sessions. There was no requirement that these adjectives had to be used in complete sentences, only that the subject produce adjective (size and/or color)—noun combinations. Color or size adjectives used in isolation were scored as incorrect responses. Adjective-noun combinations were scored as correct because this "phrase" form was thought to be the normal verbal response to the question, "What is this?" accompanied by the experimenter's pointing to an animal in a picture. Six of these pictures (designated training ani-

mals) contained animal names used in sentences during the daily imitation training sessions and, as an additional generalization measure, the other six pictures (designated generalization animals) contained animals not used or named in the imitation training sessions. Daily probe sessions with the experimenter were tape-recorded to obtain data.

RESULTS

An independent observer scored each subject's production of color and size adjectives in the description of the animal pictures during two sessions in each of the three experimental phases. The experimenter-observer agreement exceeded 98% for each subject. Figures 1 and 2 indicate the percentages of pictures in each probe session in which animals were described with color and/or size adjectives. These are shown for all three phases. Since the experimenter pointed to the animals in a picture twice when each picture was presented (to both the big and the little animal), and since each picture was presented twice in every probe session, the subjects could use size and/or color adjectives 48 times during a session.

Fig. 1. Percentages of animals in pictures described by color and size adjectives by Subject 1 in probe sessions in each of the three phases of the experiment. Squares and solid lines indicate adjectives describing training animal pictures; circles and dashed lines indicate adjectives describing generalization animal pictures.

Fig. 2. Percentages of animals in pictures described by color and size adjectives by Subject 2 in probe sessions in each of the three phases of the experiment. Squares and solid lines indicate adjectives describing training animal pictures; circles and dashed lines indicate adjectives describing generalization animal pictures.

During the eight baseline sessions for Subject 1 and five for Subject 2, color adjectives were never used to describe animals. Size adjectives were used less than 25% of the time in any given session.

When sentences containing size adjectives were modelled to Subject 1 during imitation sessions of Phase II, he began to exhibit size adjectives in describing both training and generalization animal pictures during probe sessions. Similarly, when sentences containing color adjectives were modelled to Subject 2 during imitation sessions, she began to use color adjectives in her descriptions of training and generalization animal pictures in probe sessions. With Phase III, sentences containing both size and color adjectives were modelled to the subjects during imitation sessions; both subjects began to emit both size and color adjectives in their descriptions of animal pictures during probe sessions.

During baseline conditions, there was no difference between the percentage of adjectives modifying training and generalization animal pictures. For Subject 1, only a slight difference in favor of training animal pictures can be seen during Phases II and III. However, Subject 2 produced many more adjective-noun combinations for training animal pictures during both Phase II and III. The number of complete sentences during probe sessions was also recorded, although increasing the use of adjective-noun phrases was the primary concern of the experiment. Subject 1 used complete sentences during probe sessions to describe animals 23%, 29%, and 31% of the time during Phases I, II, and III, respectively. Subject 2 used complete sentences during Probe sessions to describe animals 8%, 15%, and 13% of the time during Phases I, II, and III, respectively.

DISCUSSION

This experiment demonstrated that it was possible to alter the generalized verbal behavior of two retarded children through a few model-

ling and verbal imitation training sessions. Unlike generative grammar experiments, generalization measures were obtained on different tasks, with a different experimenter, in a different setting. Reinforcing simple verbal repetition of sentences was sufficient to alter the verbal behavior of the subject in the presence of another adult, in another room, at another time of the day, and with a completely different task. Additionally, the subjects' production of adjectives generalized to descriptions of animal names not used in the training sessions.

Generally, the production of adjectives that modified training animals proceeded more rapidly during Phases II and III than did the production of adjectives that described generalization animals. For Subject I, this difference was slight, as was the absolute difference at the end of Phases II and III. The difference was more marked for Subject 2, and a greater absolute difference between training and generalization adjective production was observed at the end of Phases II and III, especially, for the production of color adjectives.

Although adjective-noun combinations were modelled and imitated in complete sentences, the purpose of this experiment was not to try to alter the frequency of complete sentence usage. This certainly would have been a beneficial byproduct; however, the probe sessions were not well-suited for this. Pointing to an object and then asking someone what it is does not commonly result in a complete sentence for a response. The average person would reply with a phrase, just as did the children in the present experiment. The procedure used here merely examined whether or not modelling and verbal imitation training could alter children's descriptions of pictures so that they would use more size and color adjectives. Indeed, the children's verbal behavior was easily changed. The procedure has the advantage that little time or effort was necessary to effect large changes. Also, it is a simple procedure that can be readily used in homes, schools, and a variety of other applied settings.

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