

EMPHASIS AS A PROMPT FOR VERBAL IMITATION¹

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Four- and five-yr-old disadvantaged children were read sentences composed of varying numbers of short phrases. The children were asked to repeat each sentence, but the accuracy of their imitations was not differentially reinforced. The teacher stressed (emphasized) certain words as she read each sentence. The proportion of words that were stressed was systematically varied. In general, the children imitated only parts of most sentences. Stress was effective in influencing *which* parts of a sentence the children would imitate, but only when relatively few words were stressed. Stressing a word increased the probability of a child's imitating that word (and, to a large extent, the entire phrase containing that word) as an inverse function of the proportion of the words that were stressed.

Several recent studies have investigated the role of reinforcement in producing, increasing, and maintaining children's imitative behavior, (Baer and Sherman, 1964; Sherman, 1965; Lovaas, 1966; Baer, Peterson, and Sherman, 1967; Brigham and Sherman, 1968; Peterson, 1968). In these studies, although a variety of behaviors were used as model stimuli to be imitated, the characteristics of the stimuli themselves or the role of variables other than reinforcement in altering the probability of imitation were not specifically examined. Bandura and his colleagues (*cf.* Bandura and Walters, 1963) examined the role of other stimulus events in influencing imitation. They found that, in general, when behaviors are observed to result in "reinforcement" for the model they are somewhat more likely (and those observed to result in "punishment" less likely) to be imitated by children.

However, in natural settings even a highly "imitative" child is likely to imitate only a small proportion of the diversity of actions of other people that he sees and hears. Investigations of other aspects of the model stimuli

that may determine which of many behaviors exhibited by a model would more likely be imitated, might lead to a better understanding of the role of imitation in children's learning and to more efficient uses of imitation in teaching.

When a child omits, misarticulates, or mispronounces a portion of a word or statement, correction is almost invariably attempted by the parent, teacher, or therapist who says it correctly while *stressing* the portion on which the child erred. Public speakers and lecturers similarly emphasize phrases and statements that they intend to be quoted, or repeated on exams. In most of our own behavior modification endeavors (*e.g.* Risley and Wolf, 1967; Hart and Risley, 1968) the therapist or teacher is observed to stress particularly those portions of a prompt or instruction they wish the child to imitate. The general use of stress or emphasis to increase the likelihood of imitation recommends an investigation of its actual function.

The present study investigated the role of stressing or emphasizing certain words in a verbal presentation in determining which aspects of that presentation preschool children would imitate.

METHOD

Subjects and Settings

Three 5-yr-old disadvantaged children (two boys and one girl) who attended kindergarten in the morning served as subjects in Exp. I.

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These children would come to the Turner House Preschool immediately after their kindergarten class and play with the preschool materials. (After the imitation sessions they were served lunch and taken home). Three 4-yr-old disadvantaged children (two girls and one boy) who attended the Turner House Preschool each day served as subjects in Exp. II. The children were removed from the preschool activities one at a time and taken to a side room where the imitation sessions were conducted. The children sat on a rug facing the teacher for the duration of the session (usually 5 to 10 min).

Procedures

During the first few sessions, the children were brought into the room by a second teacher and instructed to do just what the first teacher did. During the later sessions, no further instructions were given.

In the imitation sessions, the teacher read a series of sentences to the child. After reading each sentence, the teacher waited for the child to respond. When the child had said something following each sentence, the teacher placed half an M&M in a cup in front of the child. The M&Ms were delivered irrespective of what the child had said and approximately 5-sec after he had stopped verbalizing.

The "sentences" were composed of varying numbers of phrases from the following "pool" of phrases:

My brother watched TV; Hurry and get the tickets;
Leaves fall in the Autumn; I ate my cereal;
He talked to my uncle; The pen wrote on paper;
We saw the early show; Streetlights come on at night;
He will make some cake; I shouted to everyone;
I opened the doors; Go operate the machine;
He bought me an apple; The baby took her bath;
I whispered to my mother; I pulled the shades;
She laughed with the children; Coffee perked on the stove;
She listened to the rain; You ride in the car;

I got up this morning; I put on my shoes;
Flowers bloom in the Spring; I cooked potatoes;
My father came home; I swept the stairs;
Go ride in the car; You look out the window;
I said to my brother; He can go shopping;
She baked the cookies; I telephoned a neighbor;
She works at the factory; He read a story;
I told my sister; I called my cousin;
She gave me a dime; The cat slept in the sun;
She made some cake; They directed the traffic;
Stay and write the names; Go look out the window;
They read from a book: He gave me a penny;
She watered the flowers; He sprinkled the grass;
Bring me a cup; I cleaned up my room;
They stopped to the ground; The boy shared his orange;
They came to the kitchen; I scrubbed the walls;
He watched me ride; Children ran through the yard;
Bring me a spoon, cousin; Snow falls in the Winter;
He raced my new bike; The boy scrambled up the hill;
I washed my hands; He talked to my aunt;
Children can swim in the Summer; She can show the pictures;
Girls walked to the playground; I talked to my brother.

Before the experiments, the key words in each phrase (the italicized words) had been marked by the teacher. New sentences were constructed each day by randomly selecting phrases from this pool. As each phrase was selected, it was not returned until the pool had been exhausted.

In Exp. I, 10 such sentences—two one-phrase, two two-phrase, two three-phrase, two four-phrase, and two five-phrase sentences—were presented in random order to each child each day. After selecting the phrases for each sentence, the teacher would rearrange the order of the phrases, insert conjunctions, alter the tense of the verbs, and change the pro-

Table 1

	% Words Stressed	Sessions	% Words Imitated			
			All Words	Stressed Words	Unstressed Words	
					In Same Phrase as Stressed Word	All
<i>Exp. I</i>						
Lottie	32%	1-33	62%	63%	62%	62%
	32%	34-42	63%	63%	63%	63%
	11%	43-48	60%	90%	85%	57%
Leo	32%	1-33	64%	65%	63%	63%
	32%	34-39	66%	67%	65%	65%
	11%	40-45	67%	92%	85%	64%
Dan	32%	1-33	59%	60%	58%	58%
	32%	34-42	57%	56%	60%	57%
	11%	43-48	62%	83%	81%	60%
<i>Exp. II</i>						
Rhonda	32%	1-10	47%	50%	46%	46%
	8%	11-17	50%	81%	82%	47%
Bonnie	32%	1-9	42%	45%	40%	40%
	8%	10-19	42%	53%	56%	41%
	4%	20-24	45%	73%	64%	43%
Tommy	32%	1-10	55%	61%	53%	53%
	8%	11-15	62%	96%	76%	59%
	16%	16-22	64%	75%	70%	62%
	8%	23-24	68%	100%	89%	65%

nouns to construct a "meaningful" sentence. In Exp. II, six such sentences—two three-phrase, two four-phrase, and two five-phrase sentences—were presented in random order to each child each day. These 'sentences' were simply groups of grammatical phrases and not, in fact, "meaningful" sentences. In a given session, the same set of sentences was read to all three children in each experiment.

When constructing each sentence, the teacher would randomly select the key word or words to be stressed. When the teacher read the sentences to a child, she would stress (emphasize) these words by raising her voice as she read the word. As a check on this definition of stress or emphasis, a third teacher was asked to listen to the tapes of two sessions of Exp. II and to write down the words that the experimental teacher emphasized. She wrote all of the words that the experimental teacher had stressed, and none others.

Experimental Conditions

During each experimental condition, differing proportions of the key words were stressed:

32% of the words were stressed in both experiments by stressing one key word in *all* the phrases of each sentence.

16% of the words were stressed in Exp. II by stressing one key word in only *two* phrases of each sentence.

11% of the words were stressed in Exp. I and 8% of the words were stressed in Exp. II by stressing one key word in only *one* phrase of each sentence.

4% of the words were stressed in Exp. II by stressing one key word in only *half* of the sentences.

The portions (per cent) of the key words that were stressed and the number of sessions for each child are presented in Table I.

Recording

Tape recordings of the sessions were transcribed by the teacher. The words in the children's responses were matched (excluding number and tense of nouns and verbs) to identical key words in the sentences that had been presented. When a word in a child's response could be matched to more than one identical

key word it was matched according to the greatest similarity of the preceding and following words. The per cent of key words imitated was then computed by dividing the number of matched key words by the total number of key words in the sentences presented.

RESULTS

Recording

The reliability of the recording procedures was examined in six sessions during each study. Both the experimental teacher and a second teacher independently transcribed the tapes and matched the children's responses to the sentences presented. Several months later, the experimental teacher again transcribed the tapes of two sessions. Reliability on a word-by-word basis—computed by dividing number of agreements by number of agreements plus number of disagreements—averaged 0.96 (range 0.79 to 1.00) per session on words said by a child, and 0.98 (range 0.88 to 1.00) per session on words said and not said by a child, between the two teachers; and 0.96 (range 0.91 to 1.00) on words said, and 0.98 (range 0.95 to 1.00) on said and not said, between the first and second transcriptions by the experimental teacher.

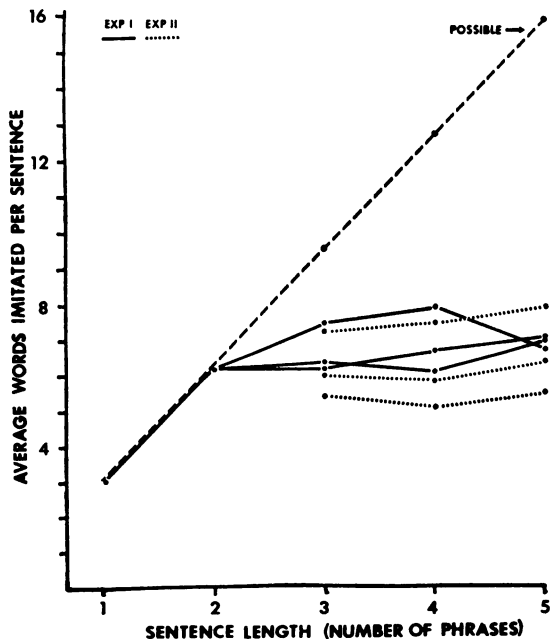


Fig. 1. Average number of key words imitated by each child across all conditions in both experiments as a function of the length of the sentence presented.

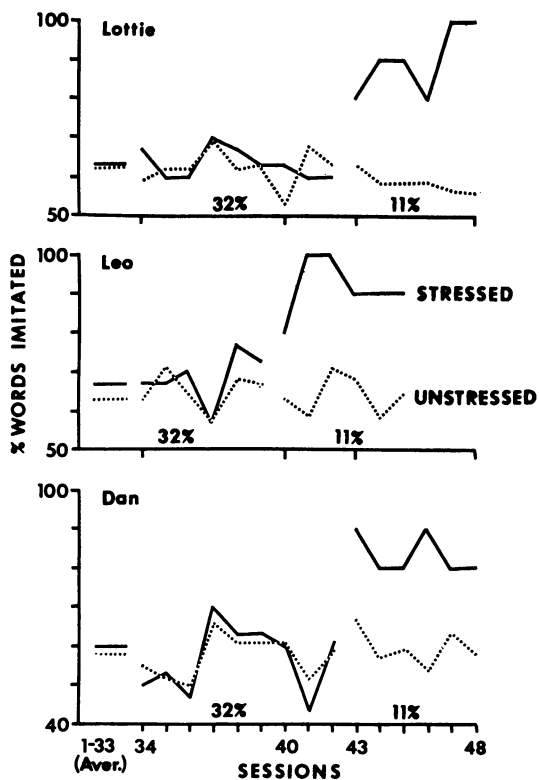


Fig. 2. Per cent of the key words imitated by each child in Exp. I when one word in each phrase (32% of the key words), and one word in each sentence (11% of the key words) were stressed by the teacher.

In both experiments there was little change in overall proportion of words imitated across the experimental conditions. (See "all words", Table 1). Figure 1 shows the average number of words imitated, during all conditions as a function of the length of sentence presented. In Exp. I, the children imitated all the words presented in one and two-phrase sentences; in both experiments, irrespective of the number of words presented or the proportion of words stressed, each child imitated a nearly constant average number (between five and eight words, or approximately two phrases) of the key words in the longer sentences. Under all conditions the children generally imitated complete phrases; between 70 and 90% of the key words imitated by any child occurred as part of an accurately imitated phrase.

Experiment I

Stressing a word produced no increase in the probability of the children imitating that

word when one word in every *phrase* (32% of the key words) was stressed. Throughout the first 33 sessions of this condition, the children imitated approximately 60% of both the stressed and unstressed words. (See Sessions 1 to 33, Fig. 2 and Table 1, Exp. I.) However, when only one word in every *sentence* (only 11% of the key words) was stressed during Sessions 40 to 45 for Leo and Sessions 43 to 48 for Lottie and Dan, stressing a word produced a marked increase in the probability of the children imitating that word. During this condition, the children imitated approximately 90% of the stressed words while continuing to imitate only approximately 60% of the unstressed key words. (See 11% condition, Fig. 2 and Table 1.)

Experiment II

When one key word in each *phrase* (32% of the key words) was stressed, none of the chil-

dren exhibited any marked difference in their probability of imitating stressed or unstressed words (see 32% condition, Fig. 3 and Table 1). However, when only one word in each *sentence* (8% of the key words) was stressed, two of the children imitated nearly all of the stressed words and the remaining child imitated somewhat more stressed words. (See 8% condition, Fig. 3 and Table 1.) When only one word in only *half* of the sentences (4% of the key words) was stressed for this latter child (Bonnie), she then began imitating all of the stressed words. (See 4% condition for Bonnie, Fig. 3 and Table 1.) When, for one child (Tommy), the proportion of stressed key words was increased from 8% to 16%, the percentage of the stressed words that he imitated accordingly decreased from 100% to approximately 80%. When only 8% of the key words were again stressed for this child, he again imitated 100% of the stressed words (see 8%, 16%, and 8% conditions for Tommy, Fig. 3 and Table 1).

Thus, stressing a word decreased the probability of the child imitating that word as an inverse function of the proportion of the words that were stressed: the lower the proportion of stressed words, the greater the likelihood of the child imitating them. In both experiments, the increased probability of imitation associated with a reduced proportion of stress was not specific to the stressed words; the probability of imitation also increased for the unstressed words that occurred in the same phrase as the stressed words. (See "unstressed words in same phrase", Table 1.)

Thus, the children generally imitated approximately two phrases of the longer sentences, irrespective of the number of phrases presented or the proportion of words stressed. The lower the proportion of stressed words the greater the influence of stress in determining *which* phrases would be imitated.

DISCUSSION

The random selection of phrases and stressed words within the phrases resulted in the same words being stressed in one session and unstressed in another session. Each phrase reappeared on the average of every 2.1 sessions in Exp. I and every 2.6 sessions in Exp. II. The function of stress on the probability of imitation can therefore be determined precisely by

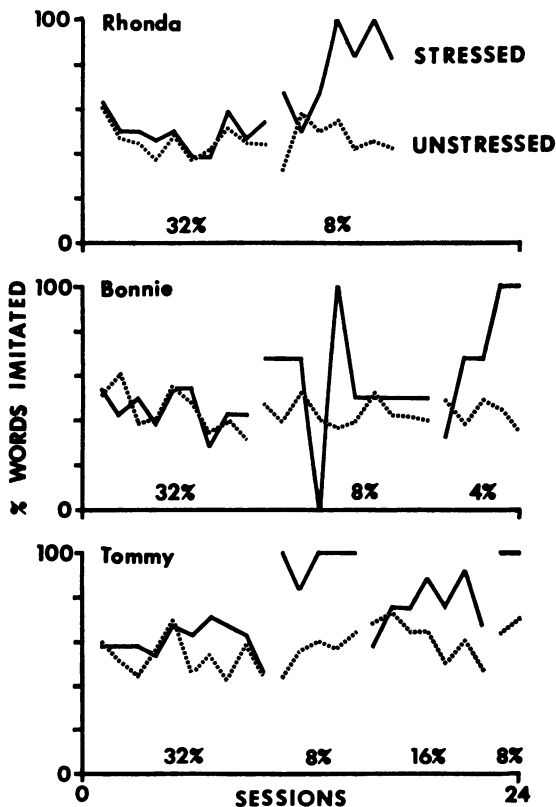


Fig. 3. Per cent of the key words imitated by each child in Exp. II when one word in each phrase (32% of the key words), two words in each sentence (16% of the key words), one word in each sentence (8% of the key words), and one word in every sentence (4% of the key words) were stressed by the teacher.

comparing, for any child, the per cent of stressed and unstressed words imitated during any block of four to five sessions. Stress had little (or no) function in increasing probability of imitation during some portions of the experiments and a great deal of function during other portions. This increase in the function of stress was with each child, correlated with a decrease in the proportion of stressed words.

The proportion of words that were stressed was decreased at different times for the children in the experiments (in Session 10 for Bonnie, Session 11 for Rhonda and Tommy, Session 40 for Leo, and Session 43 for Lottie and Dan). The observed increase in the function of stress when only one word in every sentence was stressed for one child can therefore be compared with the unchanged function of stress for any other children who were still receiving one stressed word per phrase on the same sentences during those same sessions. This "multiple baseline" comparison (*cf.* Baer, Wolf, and Risley, 1968; Risley, 1969; Wolf and Risley, in press) adequately demonstrates that the decrease in proportion of stressed words, from one per phrase to one per sentence, was the relevant variable in the increased function of stress, rather than other variables correlated with a particular sequence of stimulus materials, a particular time of the year, or a particular number of sessions.

For two of the children, proportions of words stressed, other than one per phrase and one per sentence, were subsequently used. Their results indicate that the inverse relationship between the proportion of stressed words and the influence of stress in determining which words would be imitated was not restricted to the two proportions of stressed words originally presented to all children.

The children in Exp. I were presented "meaningful" sentences, while unrelated groups of phrases were presented to the children in Exp. II. The proportion of stress was decreased after only a relatively brief experience with the experimental setting (9 to 10 sessions) in Exp. II, but was decreased only after extended experience (39 to 42 sessions) for the children in Exp. I. The similarity of the results of the two experiments indicates that these differences were relatively unimportant in determining the function of stress.

In summary, when children imitated only parts of a verbal statement, stress was effective

in influencing *which* parts of the statement the children would imitate. Stressing a word increased the probability of a child's imitating that word (and, to a large extent, the entire phrase containing that word) as an inverse function of the proportion of the words that were stressed; the fewer the stressed words, the greater the probability of the child imitating them.

This study indicates that the almost universal use of stress or emphasis to facilitate imitation of specific aspects of verbal behavior, is, in fact, markedly functional—if not used too frequently.

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