

THE UNIVERSITY OF MANITOBA

A COMPARISON OF THREE METHODS OF WORD IMITATION TRAINING
WITH DOWN'S SYNDROME CHILDREN UNDER SIX YEARS OF AGE

by

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ABSTRACT

The present study had two main purposes: first, to compare the relative effectiveness of three procedures for teaching verbal imitation skills to young non-institutionalized children; and second, to determine if a procedure for teaching word imitation can have a facilitating effect on the later acquisition of more functional language skills.

The subjects were six Down's Syndrome children between the ages of $2\frac{1}{2}$ - 6. All were participating in an early education project in an elementary school, and all but one were residing at home. The children were each taught to imitate a minimum of 10 functional nouns. The nouns were taught, two at a time, in one of three possible conditions. Approximately the same number of nouns were taught in each condition.

The conditions were as follows: Imitation Alone in which the child was taught to imitate a noun after presentation of the stimulus word; Imitation plus Prompts in which the child was taught to imitate a stimulus word while physical and verbal prompts were systematically faded out; and Imitation plus Signs in which the child was taught to imitate a stimulus word paired with the appropriate manual sign. The object appropriate to the stimulus word was present in all three conditions.

The relative effectiveness of the three procedures was judged on the basis of the average trials to criterion for words learned,

generalization of words learned to a new setting and a new teacher, and maintenance of words learned over a minimum of 5 weeks. In addition, daily probes were presented in each of the conditions in order to determine the generalization of each procedure to untaught items.

Following this study, the children were placed on a language program designed by Guess, Sailor and Baer (1976). Trials to criterion for Step 1 and Step 2 of this program were examined to determine if prior imitation training might have a facilitating effect on the acquisition of functional language.

Results indicated that the overall most effective procedure to teach verbal imitation to these children was the simplest procedure - Imitation Alone. However, individual results varied from child to child. All three procedures were effective on the basis of generalization and maintenance data.

Results also indicated that the imitation procedures, taken as a whole, had a facilitating effect on the later acquisition of labeling and receptive language skills as assessed by performance on Steps 1 and 2 of the Guess, Sailor and Baer Language Program.

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CHAPTER I

INTRODUCTION

The development of language skills is a primary concern of educators and researchers in the field of Mental Retardation. This is not at all surprising, given the high incidence of language disorders in the retarded population and the importance of language in many areas of human endeavor.

Specific approaches to the study of language acquisition with the retarded are many and cut across a variety of disciplines. Bricker and Bricker (1974) suggested an integration of the best features of the various approaches within an applied behavior analysis framework: linguistic theory could specify the content or "what" of the instructional program while an applied behavior analysis framework could specify the instructional procedure.

The following research is concerned with the instructional programming of language skills and will deal mainly with an applied behavior analysis approach to language acquisition. Studies employing operant conditioning procedures to teach language skills are certainly not new. Given the premise that verbal behavior, like any other behavior, is under environmental control (Skinner, 1957), language training has been conducted with a variety of subjects including psychotics (Sherman, 1965; Isaacs, Thomas & Goldiamond, 1960), autistic children (Martin, England, Kaprowy, Kilgour & Pilek, 1968; McLean & McLean, 1974), severely retarded children (Guess, Sailor, Rutherford & Baer, 1968; Stephens, Pear, Wray & Jackson, 1975), and mildly

retarded children (Bondy & Erickson, 1976).

In a recent review of language training strategies for the retarded, Snyder, Lovitt and Smith (1975) came to four significant conclusions:

1. There is a need for increasing emphasis on antecedent conditions in language research.
2. More attention must be paid to variables affecting maintenance and generalization of language skills.
3. There is a need for investigation of younger subjects (under 8 years of age) in non-institutional settings.
4. There should be increased consideration of a broad range of reinforcing contingencies.

The following research was concerned with the development of a verbal imitative repertoire in non-verbal children and attempted to deal with the first three points. Verbal imitation may be considered as an antecedent condition to functional language acquisition. Maintenance and generalization data was collected on three methods of training verbal imitation. Finally, all of the children were under 6 years of age and all but one resided at home.

CHAPTER II

REVIEW OF THE LITERATURE

A. The Role of Imitation in Language Training

Language acquisition has been considered as either a comprehension-based or imitation-based process (Holdgrafer, 1975). One group of researchers in the area of language acquisition maintain that children do not learn generative or rule-governed verbal behavior through imitation of adult models. Slobin (1968) noted that children learned verbal behavior that they could not have heard before (usually involving the application of misrules, e.g., "goed" instead of "went"). He concluded that something other than imitation must have been involved in that instance of learning. Slobin and others are of the opinion that normal children learn language through comprehension of their parents' speech. Children come "pre-wired" or pre-disposed to extract rules from the language of those about them, then apply these rules to novel instances.

Within the applied behavior analysis framework, a comprehension-based view of language acquisition is not acceptable for at least two reasons. In the first place, if a child is indeed "pre-wired" to extract rules from his environment, then little can be done for the child who fails to learn language. These children may be viewed as permanently barred from acquiring language, since they lack a genetic makeup for language development (Guess, Sailor & Baer, in press). This does not seem to be a viable attitude for anyone in the business of teaching language to language-deficient children. In the second

place, it has been demonstrated that generative speech may be taught as a direct result of imitation training (Schumaker & Sherman, 1970; Sailor, 1971; Clark & Sherman, 1975).

Bricker and Bricker (1974) and Rees (1975) labelled issues such as "language as a comprehension-based process vs. an imitation-based process" as pseudo-issues. If everyone could agree that imitation may not be a necessary condition in normal language acquisition but it may be an effective tool in teaching language production to language-deficient children, then all concerned could concentrate their efforts on developing effective language intervention programs. This author is in complete agreement with the latter position. Imitation training is an effective technique for remediating language deficiencies and research to support this position is presented in the following section.

B. Imitation Research

Imitation training has been used for some time as an effective technique for remediating language deficiencies (Garcia & DeHaven, 1974; Snyder et al., 1975; Rees, 1975). These authors agree that imitation training is the precursor to functional speech for non-verbal individuals. Guess et al. (in press) found that of all entry skills to their language program, verbal imitation skill was the highest predictor of success in training. Approximately 40% of the children who entered the program with no verbal imitation skills failed to progress through the steps of the language program. Of the 60% who progressed through the steps, the majority required

nearly two years of imitation training before acquiring generalized verbal imitation skills. It seems clear that the importance of imitation training in language development cannot be overestimated.

Guess, Sailor and Baer (1974) specified three major procedures for developing imitative speech in essentially non-verbal children:

1. consecutive motor and vocal imitation;
2. concurrent motor and vocal imitation;
3. direct vocal imitation.

The behavioral research in the area of verbal imitation training will be presented using the above three categories as a format.

1. Consecutive Motor and Vocal Imitation Training

In this procedure, the child is trained to imitate a number of gross and fine motor behaviors prior to working on verbal imitation. The number of gross motor behaviors trained prior to vocal training varies with the researchers. Baer, Peterson and Sherman (1967) trained over 100 motor imitations, some of them very complex, before moving on to sound imitation; Bricker and Bricker (1970) trained 20 gross motor imitations and an unspecified number of fine motor imitations before moving on to sounds; Kysela, Daly, Hillyard, McDonald, Butt, Ahlsten, McDonald and Smith (1976) trained only four gross motor imitations and four fine motor imitations before moving on to sounds. To date, no research could be found that would suggest an optimal number of motor behaviors to train prior to introducing the child to vocal imitation training.

In a recent review of teacher modelling and student imitation,

York, Williams and Brown (1976) found that nine out of the 10 language programs studied began initial speech training with motor imitation training. The subjects involved in these language programs were non-verbal prior to speech training and motor imitation training provided a good starting point, so that in the beginning, they experienced some success in the language training environment.

There are some who question the validity of training motor imitation prior to vocal imitation, since there is no evidence that generalized motor imitation skills will facilitate the acquisition of vocal imitation skills. Garcia, Baer and Firestone (1971) conducted a study to determine whether or not motor imitation training would generalize to the learning of vocal imitative responses. They found that motor imitation training generalized to similar untaught motor responses, but it did not generalize to vocal imitation responses. However, Guess et al. (1974) pointed out that the motor imitation training conducted prior to the vocal training may facilitate the learning of vocal responses even though no direct generalization from the motor training may be traced.

The consecutive approach to the training of vocal imitative behavior may be a slow and frustrating process, depending upon the number of motor behaviors taught and the skill of the teacher and teaching program. The transition from motor imitation to vocal imitation is rarely an easy one, and some children never make this transition.

2. Concurrent Motor and Vocal Imitation Training

In concurrent imitation training, the vocal imitation training does not follow the motor imitation training. The two are carried on simultaneously. There are at least two ways to concurrently train motor and vocal imitation. The first method pairs motor imitation with vocal imitation with the hope that the motor response will act as a facilitator to the vocal imitation. Baer et al. (1967) taught a severely retarded girl to imitate sounds by imbedding a vocal response in a chain of imitative motor responses that the girl had already learned. In a more recent study, Stewart (1972) taught non-verbal preschool retarded children to imitate a gross motor response (e.g., raising an arm) paired with a vocal response (e.g., the word "arm"). In the first condition only the imitative motor response was reinforced regardless of whether or not the child accompanied the motor response with a vocal response. In the second condition, the imitation of motor and/or vocal behavior was reinforced. The author concluded that one should reinforce any verbal behavior emitted during imitative motor training or the verbal responses would extinguish during training sessions and would be more difficult to train later. These two studies represent a form of concurrent imitation training in which the motor and vocal responses are taught simultaneously or almost simultaneously imbedded in the same response chain.

A more common form of concurrent imitation training pairs the vocal response with a manual gesture or sign corresponding to that verbal response. Teachers of the deaf have known about this procedure for some time and refer to it as "total communication" (Stuckless & Birch, 1966). The spoken word and the manual sign corresponding to

that word are always paired during language training, hence the term "total communication".

Fouts (1972) brought sign language out of the domain of deaf education when he demonstrated that sign language could be taught to a chimpanzee. At about the same time, Bricker (1972) used sign language as a facilitator for receptive language training with "low functioning children". The manual sign for an object was paired with the object and the verbal label of the object prior to the child responding on a two-choice discrimination problem. For example, the teacher would show a toy rake, say "rake", and complete the manual sign for rake. The child was then required to point to the rake out of a possible two objects. Bricker concluded that the inclusion of the manual sign facilitated the discrimination in this receptive language procedure.

Manual signs have also been used concurrently with verbal behavior to facilitate expressive language development. A number of studies have been done using the "total communication" approach to teach expressive speech to non-verbal autistic children (Fulwiler & Fouts, 1976; Bonvillian & Nelson, 1976). In all of the studies encountered, the manual sign was taught using fading and shaping procedures until the child would consistently imitate any sign demonstrated. During training the approximate verbal response always accompanied the manual sign. For example, the teacher might say "car", move her hands in front of her as though she were steering a car, and then give the necessary prompts until the child imitated the sign. Closer and closer approximations to the desired response would be reinforced, and the

teacher would gradually fade out all prompts until the child would imitate the sign without the use of guidance. Some studies reported that the children not only learned to functionally use manual signs for communication using this procedure, but they also began to imitate the words accompanying the signs (Miller & Miller, 1973; Fulwiler & Fouts, 1976). As soon as a child began to imitate the word accompanying the sign, the sign was gradually faded out, until the child responded to verbal imitation. Other studies have indicated that the children learned to imitate the manual signs and use them expressively, but they failed to learn to imitate the accompanying words (Webster, McPherson & Sloman, 1973; Bonvillian & Nelson, 1976). In these studies manual signing was viewed as an alternate method of communication training for the children, although the authors continued to use the verbal responses in the hopes that the children would one day begin to imitate the words.

Concurrent manual sign and vocalization training has also been used successfully with retarded children (Owens & Harper, 1971). As with the autistic children, some children were reported to learn verbal imitative skills as well as the manual signs following concurrent imitation training (Stremel-Campbell, Cantrell & Halle, 1976; Grinnell, Detamore & Lippke, 1976). Other children appeared to learn only the imitative manual signs (Topper, 1975; Kopchick, Romback & Smilovitz, 1975).

The general concensus seems to be that the manual signs used in concurrent manual sign and verbal training may serve to facilitate the

imitation of verbal responses for some children, and in all cases, do not interfere with the development of verbal speech (Snell, 1974; Larson, 1971; Stremel-Campbell et al., 1976). This is in agreement with some of the research conducted on the use of "total communication" with the deaf. Stuckless and Birch (1966) found that the intelligibility of speech of deaf children using a total communication approach did not differ significantly from deaf children who were not taught sign language but only verbal communication skills. Concurrent manual sign and verbal imitation training, then, appears to facilitate the development of a verbal repertoire in some children, and serves to give other children a method of communication to be used until such time as a verbal repertoire develops.

A second method of concurrent motor/verbal imitation involves the simultaneous though separate training of imitative motor and verbal responses. Daly, Doxsey-Whitfield, Hillyard, McDonald, McDonald, Taylor and Kysela (1976) used such a procedure to teach verbal imitation skills to young retarded children under six years of age. During imitation training, one gross motor response was presented on a randomly-alternating schedule with one verbal response (sound). For example, a child might be working on the imitative motor response "push car" at the same time that he was working on the sound "oh". During a session, the action and the sound would be randomly alternated on a schedule posted on the data sheet. The number of gross motor imitative responses learned during sessions was not important. As soon as a motor response reached criterion, it was replaced by

another motor response. However, as soon as the child reached criterion on a sound, all motor training was eliminated from the language sessions and the child began to work on two sound imitations. This method of concurrent training appears to be a short cut procedure. Children taught verbal imitation using this procedure had fewer trials to criterion than similar children taught to imitate motor and verbal responses consecutively (Daly et al., 1976).

To summarize the concurrent method of teaching verbal imitation, this procedure involves either the simultaneous training of a verbal and motor response (may or may not be a manual sign) where the verbal response is paired with the motor response and the motor response is gradually faded out; or, the simultaneous training of a verbal and a motor response where the verbal and motor responses are taught at the same time but separately and the motor responses are eliminated as soon as the student begins to imitate verbal responses. As with consecutive imitation training, concurrent imitation training has been used mainly with children who have little or no vocal behavior and are essentially non-verbal prior to training.

3. Direct Vocal Imitation Training

The final procedure for developing imitative speech to be discussed is direct vocal imitation training. This procedure completely bypasses the training of imitative motor behavior and moves directly to vocal imitation training. Unlike the first two procedures, direct vocal imitation training is used mostly with children who already have some verbal skills. The problem with these children is to bring these

verbal skills under imitative stimulus control. Two studies (Risley & Wolf, 1967; Lovaas, Berberich, Perloff & Schaeffer, 1968) were conducted with echolalic autistic children and both were successful in bringing vocal behavior under imitative control. Additional studies involving verbal imitation training attempted to teach such skills as verbal inflections (Schumaker & Sherman, 1970), question asking (Twardosz & Baer, 1973; Bondy & Erickson, 1976), descriptive sentence usage (Lutzker & Sherman, 1974; Garcia, Guess & Byrnes, 1973), correct articulation (Bennett & Ling, 1972), and size and color adjectives (Martin, 1975). The children in these studies were retarded, "normal", hearing impaired, autistic, and disadvantaged. In all cases, the imitative training was used to teach the subject the required response so that the response could then come under control of more natural contingencies without imitative prompts.

York et al. (1976) found only one language program out of the ten reviewed that bypassed motor imitation training and moved directly on to vocal imitation.

It appears that the direct vocal imitation training is only done with an already-verbal population. This is in contrast with the first two methods of verbal imitation training which were used with essentially non-verbal children.

At this point in time, although there has been substantial literature on the role of imitation in speech training and on the three methods of developing imitative speech, there has been little research on specific variables involved in imitation training. Most studies

have mentioned the fact that shaping and fading procedures were used to teach the imitative behavior (Garcia & DeHaven, 1974). Striefle (1974) broke down the shaping and fading procedures into discreet steps. Unfortunately, no one to date has compared various shaping and fading procedures in order to find the most economical way of teaching a child to imitate.

Several studies have attempted to analyse the components of imitation training. Schroeder and Baer (1972) compared the efficiency of training single words to criterion during imitation training, vs. training three words concurrently. They found that there was no difference in the total number of trials to criterion for the two methods, however, concurrent training had consistently better probe accuracy than serial training. Risley and Reynolds (1970) conducted a study with six disadvantaged children. The children were required to imitate short sentences in which varying numbers of words were emphasized. They found that the children were more likely to imitate the words that were emphasized than the words that were not emphasized, especially when only a few words were emphasized. Carpenter (1976) compared acquisition rates of motor imitation items with and without manipulable consequences. He found that the subjects were more likely to imitate a motor response that involved manipulation of an object than a response of a similar topography which did not involve object manipulation. Garcia and Trujillo (1977) systematically removed experimenter facial orientation during imitative training. They found that the imitative responses of their subjects was dependent upon the

presence of experimenter facial orientation.

The studies presented above give some valuable clues to efficient methods of teaching motor and verbal imitation. If a motor response is being trained, as many of the responses as possible should involve object manipulation and responses should perhaps be taught concurrently rather than sequentially. If a verbal response is being taught, the specific verbal response desired should be stressed. In addition, teacher facial orientation to the student at all times is probably a necessary component in the imitative training procedure whether the response is motor or verbal. It is hoped that more studies of this nature will be forthcoming in the near future.