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ON GENERALIZED IMITATION.

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THE EFFECT OF SOCIAL CONTROL AND INSTRUCTIONS
ON GENERALIZED IMITATION

by

James Carl Petersen

A Dissertation Submitted to the Faculty of the

DEPARTMENT OF PSYCHOLOGY

In Partial Fulfillment of the Requirements
For the Degree of

DOCTOR OF PHILOSOPHY

In the Graduate College

THE UNIVERSITY OF ARIZONA

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THE UNIVERSITY OF ARIZONA

GRADUATE COLLEGE

I hereby recommend that this dissertation prepared under my direction by James Carl Petersen entitled THE EFFECT OF SOCIAL CONTROL AND INSTRUCTIONS ON GENERALIZED IMITATION be accepted as fulfilling the dissertation requirement of the degree of Doctor of Philosophy

Dr. Wayne Carroll
Dissertation Director

April 13, 1972
Date

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ABSTRACT

This research attempted to evaluate the role of social and instructional variables in the development of generalized imitation. Recent research has suggested that both social and instructional variables are important in the maintenance of generalized imitation; however, there is little data to support the importance of either variable in the development of generalized imitation. It was hypothesized that if social and instructional variables were minimized in a generalized imitation paradigm, that generalized imitation would not be produced until social and/or instructional controls were increased in their saliency; thus establishing a case for the importance of social and/or instructional variables in the development, as well as in the maintenance, of generalized imitation. Experiment I demonstrated that two out of three subjects responded differentially with the third subject responding differentially after being reinforced for not responding to the S-delta stimuli. However, the introduction of social control did not appreciably effect the frequency of responding to the S-delta stimuli. Consequently, it was concluded that social control (i.e., the presence of the experimenter) is not a sufficient condition for the development of generalized imitation. Experiment II was an attempt to evaluate the role of instructions in the development of generalized imitation. Once differential responding was

produced, instructions were sufficient to produce generalized imitation. Since some subjects demonstrated generalized imitation, even though social and instructional controls were minimized, it was concluded that other variables may be functional in the development of generalized imitation. A suggestion was made that the means of establishing imitative responding in the present study (i. e., prompt) might have functioned to produce generalized imitation. Since prompts are usually a form of instructions to respond in a particular manner, one might conclude that the only way in which generalized imitation was developed in the present study was by the use of instructions.

INTRODUCTION

In a recent study by Baer, Peterson and Sherman (1967) on generalized imitation, a particularly concise definition of imitation was presented. These authors state that imitation may be construed as:

" . . . any behavior (which) . . . temporarily follows behavior demonstrated by someone else, called a model, and if its topography is functionally controlled by the topography of the model's behavior. Specifically, this control is such that an observer will note a close similarity between the topography of the model's behavior and that of the imitator. Furthermore, this similarity to the model's behavior will be characteristic of the imitator in responding to a wide variety of the model's behaviors (p. 405)."

Metz (1965), in somewhat different words, states that the subject must respond differentially to the behavior of the model. For example, the subject touches his head, toes, mouth depending upon which of those behaviors the model demonstrated. If the subject touches his head when the model touches his toes, one could assume that the subject is using the behavior of the model as a discriminative stimulus (S^D) for when to respond but not for the topography of the response.

Garcia, Baer and Firestone (1971) point out that it is important to emphasize the role of control when discussing imitation. Unless the topography of the response is controlled by the topography of the model's behavior, one cannot rightfully employ the term imitation.

To illustrate this point, at least two additional types of "imitation" have been reported and will be briefly discussed. The first type of

nonimitative behavior which is often confused with imitation is the instance in which people are taught identical responses to the same cues. An impression is thus given of imitation as previously defined by Baer et al. (1967) but which is, in fact, quite different. In this case the behavior is not imitative because the topography is not under the control of the behavior topography of the model. For example, class recitation of multiplication tables is usually nonimitative but appears to be when one looks merely at the topography of the responses.

A second type of behavior which is often confused with imitation is called "matched-dependent" behavior (Miller and Dollard 1941). Matched-dependent behavior occurs when two or more people have learned the same response but one person uses the behavior of the other as a means of discriminating when to exhibit the learned behavior. In matched-dependent behavior ". . . one organism responds to the behavior of another merely as a discriminative stimulus with respect to the timing of his own behavior (p. 406)."

The concept of generalized imitation was first described by Baer and Sherman (1964). The term, generalized imitation, is used to describe the relationship between a controlling variable (e.g., reinforcement) and a class of behaviors (e.g., imitation). One of the central issues in generalized imitation research is the degree to which reinforcement is necessary for the development and maintenance of imitative behavior.

Steinman (1970a) states that "although it has been found that imitative behavior will develop if the child is rewarded for imitating, it has also been found that imitative behaviors that have never been reinforced can be developed and maintained as long as other imitative responses continue to be reinforced . . . (thus), the nonreinforced imitations, maintained under these conditions, have been termed 'generalized imitation' (p. 159)."

The impetus for research into mechanisms governing the acquisition of nonreinforced modeled responses was the criticism that reinforcement theory was incapable of explaining this phenomenon. Reinforcement theories generally assume that some form of reinforcement is necessary for learning to occur. How, then, could reinforcement theories explain the acquisition of responses when no reinforcement follows either the model's demonstration of the behavior or the imitator's reproduction of it. Research into the generalized imitation phenomenon has generally attempted to evaluate one or more of several theories or hypotheses concerning the development of generalized imitation. In order to give some perspective into the research which has preceded this study, an analysis of those hypotheses and the data which either support or refute them will be presented in the next section.

THEORIES OF GENERALIZED IMITATION

Conditioned Reinforcement

The conditioned reinforcement hypothesis was first delineated by Baer & Sherman (1964) and subsequently extended by Metz (1965), Lovaas, Berbrich, Perloff and Schaeffer (1966), and Baer, Peterson and Sherman (1967). The hypothesis is stated as follows: Imitation, generally speaking, is the act of reproducing the behavior of the model. Occasionally, the act of duplicating the behavior of a model is accompanied by direct or indirect reinforcement. The pairing of this act of behavioral similarity between the model and the subject with reinforcement results in the development of conditioned reinforcing qualities to the act of behaving similarly; thus, an intrinsic reinforcement mechanism can be assumed to account for the acquisition of nonreinforced responses.

In order to demonstrate that similarity could be a functional variable in nonreinforced imitation, Baer and Sherman developed a task in which a child could observe a small animated puppet. The puppet was capable of nodding, making nonsense verbalization, mouthing words, or bar-pressing. The subject was reinforced for imitating all responses except bar-pressing. If the frequency of bar-pressing increased when

reinforcement was presented contingently for other imitative responding, then one might conclude that the act of responding similarly took on secondary reinforcement qualities.

The data presented by Baer and Sherman are equivocal. Four of the eleven children showed no imitative bar-pressing. Of the seven children who exhibited some bar-pressing, at least two of those subjects showed only a slight increase when compared to their baseline performance. Two subjects showed a great increase in bar-pressing which might be due to the contingent presentation of reinforcement for other imitative responses and three subjects' data were not presented. Subjects who did demonstrate an increase in bar-pressing during reinforcement conditions also demonstrated a decrease in imitative responding to all stimuli during extinction.

Several other studies have demonstrated the acquisition of nonreinforced responses. Metz (1965), using two nonimitative autistic children, demonstrated that reinforcement of some imitative motor responses facilitated the imitation of other nonreinforced but similar responses. Lovaas et al. (1966) developed imitative responses in two autistic children to verbal stimuli using shaping and fading procedures. When nonreinforced Norwegian words were interspersed with the reinforced English words, subjects imitated the Norwegian words as well as the English ones. Both Lovaas et al. and Metz concluded that similarity of responding to the model was the relevant variable in the production of

generalized imitation. As Lovaas et al. state: "Since the child was rewarded whenever he responded like the adult, similarity was consistently associated with food. Because of such associations, similarity should become symbolic of reward (p. 707)."

In another study of the conditioned reinforcement hypothesis, Baer et al. (1967) taught three mentally retarded and nonimitative children to imitate the behavior of a model. Each subject was taught a series of discriminative operants consisting of a discriminative stimulus, i.e., the model's statement to "Do this," followed by a demonstration of some behavior which, if imitated, was reinforced. Again, when nonreinforced responses were interspersed with reinforced ones, they were imitated as frequently as the reinforced responses. Baer et al. conclude that "a correspondence between two stimuli is not too esoteric a stimulus to consider as functional in controlling behavior (p. 415)."

Several investigators have criticized the conditioned reinforcement hypothesis on logical as well as empirical grounds. Peterson (1968) attempted to evaluate the role of "similarity of behavior between subject and model" as an essential variable in the continued performance of nonreinforced responses.

Although Peterson does not discuss it, some evidence against the conditioned reinforcement hypothesis is presented in Experiment I of that study. Experiment I was designed to demonstrate a procedure for removing a response from an imitative response class. This was

accomplished by using two different extinction procedures which Peterson called massed and interspersed evocation. Massed evocation is the continued presentation of a nonreinforced imitative stimulus until a criterion of ten consecutive failures to imitate is met. Interspersed evocation is the presentation of a nonreinforced imitative stimulus among eleven reinforced imitative stimuli. Peterson attempted to remove six responses from the subject's imitative responses repertoire. All six responses were eventually extinguished under massed evocation but continued to be performed under interspersed evocation. It should be pointed out that interspersed evocation is procedurally identical to the procedures of most generalized imitation studies, which, incidentally, have consistently shown a lack of extinction of nonreinforced responses.

From the data presented by Peterson, one might conclude that response similarity is not a functional variable in the maintenance of nonreinforced responses, since imitative behaviors extinguish under massed evocation but not under interspersed evocation. Similarity of response, which was a constant could not have produced extinction if it were functional in the maintenance of nonreinforced imitation. As Peterson concludes, one possible explanation may be that the differential reinforcement procedure used is the relevant variable which maintained generalized imitation. It may be that "some reinforcement is necessary for the performance of all imitative responses."

In Experiment II, Peterson reasoned that if similarity is essential for the performance of nonreinforced responses, then nonimitative behaviors should extinguish under both massed and interspersed evocation. A nonimitative behavior is one in which the topography of the discriminative stimulus is completely different from the topography of the response. For example, an S^D for nonimitative behavior might be the model's placing of his hand on his knee. The nonimitative response might be the closing of a door. Peterson further reasoned that if similarity was not a necessary variable for the maintenance of nonreinforced responses, then unreinforced responses should extinguish under massed evocation but continue to be performed under interspersed evocation. The data from this experiment were deemed inconclusive because ". . . nearly all nonreinforced responses, both imitative and nonimitative" were extinguished. These findings are in contrast to previous research on generalized imitation.

In Experiment III, Peterson attempted to "reestablish the performance of unreinforced imitation" and then attempted to evaluate the role of similarity as in Experiment II. The results indicated that nonimitative responses extinguished under massed procedures but were continually performed under interspersed evocation. The data from this experiment were very similar to the data from Experiment I. The author concludes that it is not likely that similarity is a necessary variable in the maintenance of nonreinforced responses.

Another researcher who criticizes the conditioned reinforcement hypothesis is Steinman (1970a). He states that if this hypothesis were true, how could one explain the effect of differential reinforcement in other situations. "Response-produced stimuli occur in every operant situation and they are frequently followed by reinforcement. How can stimulus control be developed under these other conditions and yet not be developed under generalized imitation situations (p. 159)?"

Steinman (1970a), in a discussion of the relevance of his research findings to various theories of generalized imitation, states that since there is now good evidence that the subject clearly discriminates between S^D and nonreinforced (S -delta) responses (in his study), then the imitation of S -delta responses should not be reinforcing. Furthermore, there is ample evidence that stimuli which are "discriminated as occasions for nonreinforcement have been found to develop either neutral or aversive properties, rather than reinforcing properties (p. 64)."

According to Bandura and Barab (1971), the conditioned reinforcement hypothesis explains more than has ever been observed. They state that if responding similarly is intrinsically reinforcing, then there should be wide scale imitation of all types of behaviors exhibited by different models. Of course, there could be consequences in the natural environment which prevent such indiscriminate responding. However, the conditioned reinforcement hypothesis has not been presented with such restricting considerations.

Discrimination Hypothesis

Bandura (1968, 1969a, 1969b) has proposed an alternative explanation to the conditioned reinforcement hypothesis. This hypothesis, called the discrimination hypothesis, is stated as an inability on the part of the subject to discriminate between the S^D and the S-delta stimuli. Apparently, generalized imitation is not a function of conditioned reinforcement but of a lack of discriminability.

To test this hypothesis, Bandura and Barab (1971) attempted to demonstrate that if discriminability between the S^D and S-delta stimuli were improved, then subjects would differentially respond to those stimuli. Discriminability was facilitated by using models instead of the traditional one. One model was designated as the S^D model (i.e., all imitative responses were reinforced) while the other model was designated as the S-delta model (i.e., all imitative responses were never reinforced).

During baseline no imitative responding was reported. The authors concluded that failure to respond was a function of an unawareness of the reinforcement contingencies. In the second phase, information regarding the contingencies was communicated to the subjects by using a peer model. The subjects observed the model engaging in the appropriate behavior and being reinforced. This observation was sufficient to develop nondifferential imitation in all of the subjects; however, it should be pointed out that in both Phase I and II a single model was used.

In Phase III, the dual model situation was invoked and differential responding produced. In the last phase, Bandura and Barab introduced five new nonreinforced motor responses and five new nonreinforced verbal responses, in an attempt to assess the degree of generalized imitation produced as a function of topographical similarity between new responses and the previous ones. Since all previous responses were motor, the greatest similarity should be between new motor and old motor responses. The greatest dissimilarity should be between old motor and new verbal responses. As expected, when the new responses were exhibited by a single model, generalized imitation was produced between new motor and old motor responses but not between old motor and new verbal responses. In the latter case there was a tendency for the subjects to respond differentially. Thus, the greater the similarity, the less the discriminability and vice versa.

In a recent study by Steinman (1970a) the discrimination hypothesis was further evaluated using both single and dual models. On single presentation trials, in which one model presented either the S^D or S-delta stimuli, nondifferential responding was produced. On dual model trials, in which the subject was given a choice between responding to the S^D or S-delta model, differential responding occurred. Also, when the subject was told not to respond to the stimuli for which no reinforcement was given, the subjects again responded differentially. After this last

condition, the model told the subject that it did not make any difference whether the subject said those words or not. According to Steinman, the data for this segment are inconclusive, because subjects tended to respond differentially.

Steinman concludes that the discrimination hypothesis is untenable in view of the ability of the subjects to respond differentially either on choice trials or when requested not to respond to the S-delta stimuli. Steinman also concludes that the scheduling of reinforcement hypothesis, which is to be presented in the next section, is also untenable, since an inability to discriminate between S^D and S-delta trials is essential to that hypothesis.

Steinman (1970b) presents further evidence against the discrimination hypothesis. In this study an attempt was made to increase discriminability between modeled stimuli. Again evidence was presented which indicated that subjects can clearly discriminate between the S^D and S-delta stimuli and, when requested to make a choice or stop responding to the S-delta stimuli, the subjects showed a preference for non-differential responding. These data were subsequently replicated by Steinman and Boyce (1971). Thus, other variables than discriminability must be important in the production of generalized imitation.

Scheduling of Reinforcement

Another explanation for generalized imitation is presented by Gewirtz (1968) and Gewirtz and Stingle (1968). They state that generalized

imitation is a "class of diverse but functionally equivalent behaviors (which are) acquired and . . . maintained by extinsic reinforcement on an intermittent schedule (p. 379)." Thus, generalized imitation is a function of the intermittent schedule of reinforcement. No studies to date have attempted to directly evaluate this hypothesis; however, the research by Steinman (1970a, 1970b) presents some indirect evidence against the scheduling of reinforcement hypothesis.

Instructional Control

Several authors have pointed out that instructions often play an important role in the development and maintenance of both imitation and generalized imitation. Bandura and Barab point out that typically the subject is asked to respond in a particular manner. Usually the model says "Do this," or "Say" to the subject either before each stimulus presentation, or at the beginning of the trial. These instructions may be so strong that the likelihood of producing differential responding is considerably reduced. In fact, except for Bandura and Barab, every generalized imitation study has used some form of instruction to cue the subject when to respond appropriately. Bandura and Barab used peer modeling instead of instructions and found that subjects differentially responded to the stimuli. However, Bandura and Barab interpreted the data somewhat differently than most researchers who have attempted to evaluate the role of instructions.

Usually the model requests the subject to do the behavior which he (the model) is about to demonstrate, then demonstrates the behavior and reinforces the subject if the response was a correct imitation. Steinman (1970a) attempted to evaluate the role of instructions in the production of imitation and generalized imitation and in the evaluation of the validity of the discrimination hypothesis. In one segment of that study Steinman asked the subjects to stop responding to those behaviors for which reinforcement was not given. The subjects stopped responding to the S-delta stimuli; thus, indicating the importance of instructions in the reduction of imitative responding.

Bufford (1971) presents further evidence for the importance of an instructional hypothesis of generalized imitation. During the first phase of his study instructions to respond were presented only at the beginning of the first session after which no instructions were given. In the next phase the subjects were instructed not to respond to the S-delta stimuli. The subjects stopped responding to those stimuli, and when told they could respond as they pleased, the frequency of generalized imitation increased.

Interestingly, the data presented by Bufford (1971) closely resembles those of Steinman (1970a) even though the instructions to respond were given only during the first session. Bufford concludes that a single presentation of an instruction to respond is equivalent to

presenting the instructions on every trial. As Schoenfield and Cumming (1963) point out, the instruction perseverates throughout an experiment thereby acting as a setting event (i. e. , an antecedent environmental change that alters the probability of a large number of subsequent responses).

Bandura and Barab attempted to evaluate the discrimination hypothesis; however, by removing instructions from the experiment, further evidence for the importance of instructions in the production of generalized imitation was obtained. Bandura and Barab's study is the only one to have demonstrated some differential responding when a dual model situation is used. They attribute this differential responding to an increase in discriminability between modeled stimuli. A more logical explanation would be that by removing all instructions, a very strong controlling variable was also removed; thus, increasing the likelihood that subjects would respond differentially. It may be that discriminability does play a role in the degree of differential responding, or in some other capacity; however, the importance of instructional variables in the production of generalized imitation should not be overlooked.

Social Control

A final hypothesis for the occurrence of nondifferential responding in the midst of differential reinforcement has recently been presented by Peterson and Whitehurst (1971). According to these authors the presence

of the model may function as a setting event, such that the absence of the model functions to alter the frequency of imitative responding.

In order to test this hypothesis, Peterson and Whitehurst presented several experimental manipulations to subjects who displayed non-differential responding; for example, no consequences for responding, differential consequences, delayed consequences, removal of instructions to respond. However, none of these conditions were sufficient to alter the frequency of generalized imitative responding. The only variable to effect imitative responding to any degree was the presence or absence of the experimenter or model. When the model left the experimental room before the subject was to imitate his behavior, the actual frequency of imitation and generalized imitation decreased.

Another attempt at the evaluation of the social control hypothesis was performed by Peterson, Merwin, Moyer and Whitehurst (1971). These authors attempted to explore the role of the presence or absence of the model, discriminative training and the complexity of the stimulus situation on the maintenance of nonreinforced imitative behaviors. When the model was absent from the experimental chamber, three out of four subjects responded differentially to the S^D and S-delta stimuli. However, when the model remained in the room while the subjects either responded or did not respond, as the case may be, the frequency of imitations increased and nondifferential responding was produced.

Some final variables which have been recently considered as important in the production of generalized imitation and which are of a social nature are eye contact and head movements. Burgess, Burgess and Esveldt (1970) have suggested that these variables may be, in part, responsible for generalized imitation. No studies to date have brought evidence to bear on the relative importance of these variables. In addition, no studies to date have been reported which in any way refute or negate the social control or instructional control hypotheses.

Although social and instructional control are usually considered as separate, there is some evidence that they function as setting events (Kantor 1958; Bijou and Baer 1961, 1965). That is they are both antecedent environmental events such that a change in their presence or absence results in a change in a large number of subsequent responses.

In addition to the term, setting events, Peterson and Whitehurst have pointed out that the broader term of "demand characteristics" may also apply to the presence of the experimenter and, I would add, the use of instructions. "Demand characteristics refer to those discriminative stimuli or setting events present in an experimental situation which influences a subject's behavior in addition to the experimental variables under study (p. 8), " which also influence subject's behavior.

CONCLUSIONS AND STATEMENT OF PROBLEM

As Peterson et al. (1971) state, there appears to be little support for the conditioned reinforcement hypothesis (Peterson 1968; Steinman 1970a, 1970b), the discrimination hypothesis (Steinman 1970a; 1970b; Steinman and Boyce 1971) or the scheduling of reinforcement hypothesis (Steinman 1970a, 1970b).

However, there does appear to be good evidence that variables such as instructions and social control (Peterson and Whitehurst 1971) play a very important role in the production of nondifferential responding. Peterson and Whitehurst have concluded that at least three variables are important and should be considered in a discussion of generalized imitation; they are: (1) setting events, (2) discriminative stimuli and, (3) reinforcement consequences. The relationship between these variables is, unfortunately, not clear.

The role of reinforcement in generalized imitation research is perhaps the most unclear. As Steinman and Boyce (1971) state, "the procedures used in generalized imitation research involve repeated differential reinforcement of particular responses, generalized imitation procedures are discriminative procedures (p. 262)." The role of reinforcement remains obscure, often hidden by other controlling variables such as social and instructional control.

Bandura and Barab have demonstrated that the increased discriminability between the S^D 's (along with the reduction of instructional controls) facilitates "some" differential responding. Likewise, Peterson et al. (1971) demonstrated that in the absence of the model, differential reinforcement produced varying degrees of differential responding. In both studies, the degree of differential responding was quite variable.

Reinforcement control can also be measured in terms of reversal of contingencies and DRO schedules. Unfortunately, the results of studies employing these evaluative means are also unclear. Baer et al. (1967) demonstrated that DRO (i.e., Differential Reinforcement of Other behaviors) contingencies dramatically reduced the frequency of imitative responding. However, as Steinman (1970a) points out, the subjects employed were mentally retarded, probably somewhat unresponsive to social control and setting events, and very hungry (i.e., food was used as a reinforcer). Other studies employing DRO schedules (e.g., Steinman 1970b; Steinman and Boyce 1970) have reported DRO to be totally ineffective or only minimally effective in producing a change in imitative responding. Steinman (1970a) states that "with these gross differences in DRO effects, the question of whether direct contingent reinforcement is necessary for the maintenance of imitative behavior must be considered as unanswered at this time. Thus, the contribution of contingent reinforcement for S^D imitations in generalized imitation experiments also is still open to question."

Steinman goes on to say that the differential effects of DRO among generalized imitation studies becomes more understandable if instructional and social setting events are operative in generalized imitative research paradigms. It may be that when social control is weak and reinforcement control strong that DRO procedures are more effective than when the opposite is true.

The purpose of this experiment was to evaluate the effects of social and instructional variables on generalized imitation. It was predicted that a decrease in both social control (defined as the presence of the model) and instructional control would facilitate the differential responding of subjects exposed to differential reinforcement. It was also assumed that the operant rate of imitation during baseline would be quite low or nonexistent and that the introduction of differential reinforcement would produce, at first, generalized imitation; however, over time, differential responding would eventually result due to the lack of control exerted by social and instructional controls. Once differential responding occurred, the introduction of a reversal in contingencies would produce a reversal in differential responding; thus, demonstrating the controlling power of reinforcement. Finally, the introduction of either social control or instructional control would result in a decrease in differential responding and an increase in generalized imitation; thus, further verifying the importance of these variables in the production of

generalized imitation. Finally, the effects of a DRO procedure (i.e., pre-delivery of reinforcement) should produce a decrease in imitative responding.

EXPERIMENT I

The main purpose of Experiment I was to evaluate the effects of social control, which was defined as the presence or absence of an adult in the experimental room, on imitative behavior. It was predicted that the removal or minimization of social and instructional control from the generalized imitation paradigm would have pronounced effects on imitative responding. The frequency of imitation during baseline was expected to be low. Differential consequences was expected to produce differential responding and reinforcement control over imitation would be further supported by reversing the contingencies and by a return to the original differential contingencies. Also, the introduction of an adult into the experimental room was expected to effect the differential responding to such an extent that generalized imitation would be produced. Thus, the importance of social controlling factors in the production of nondifferential responding could be substantiated independently of instructional factors.

Subjects and Apparatus

Two girls and two boys served as subjects. The children were second graders unsystematically selected from the experimental school in the University of Arizona's Psychology Department. One of the girls

did not complete Experiment I because she responded nondifferentially during baseline. All children would be considered above average or average in intelligence and related skills. All subjects were highly verbal.

The model in this study was the voice of a twenty-three year old female undergraduate student. The study was conducted in a room in the Psychology Department's Child Development Laboratory where the experimental school was located. The experimental room consisted of a one-way mirror, two large speakers, a portable incandescent light bulb, a 3' x 2' table, three chairs, a tube through which marbles could be dispensed, containers to hold the marbles that each subject collected and a microphone to monitor the subject's verbalizations. The table separated the speakers and was directly under the one-way mirror; thus, the child faced the mirror which was about 4' in front of him and approximately 10" above his head. The tube was also directly in front of the subject with its terminal end about 5" above the top of the table. A large pot was placed directly under the tube to collect the marbles as they rolled down.

The observation room contained two tape recorders; one to present the verbal stimuli to either one of the speakers in the experimental room, and one to record the subject's verbalizations. In addition, a microphone was connected to one of the speakers in the experimental room so that the experimenter could communicate with the subject. After

each session the marbles were taken from the large pot and put into the subjects personalized containers by the subjects.

The modeling stimuli, which were one syllable nouns, were presented in a random order through either the speaker to the left or right of the subject. A trial was the presentation of one stimulus word to either one of the speakers. A session usually consisted of from forty to sixty trial presentations. The stimulus words were presented in five second intervals. One speaker was always designated as the S^D speaker and all imitations of those words were reinforced with a marble and verbal praise. Words from the S-delta speaker were never reinforced. See Appendix A for a list of the three different stimulus sequences used.

General Procedures

The subjects were selected one at a time and in an unsystematic order each morning between 9:00 and 9:45. Each session lasted approximately ten to twelve minutes. Usually, the experimenter selected the first subject and brought him or her to the experimental room. A friendly approach was taken by the experimenter; however, there was little conversation and no statements made regarding the nature of the experiment. On the first day of the experiment one experimenter brought the subject to the experimental room and said; "Today, _____, I would like you to sit right here (experimenter points to chair in front of the speakers). You are going to hear some words. Some of the words will come from this

speaker (experimenter points to speaker on subject's left side) and some words will come from that speaker (experimenter points to the speaker on the subject's right side). I'm going to leave now, but I'll tell you when you can go back to your class room. Bye." The experimenter left the room, closed the door and went into the observation room. If the subject looked calm and undisturbed by the situation, the experimenter said, through the speaker system, that he was going to start now. The tape recorders were turned on and the stimulus words presented through the subject's speakers. During reinforcement conditions, marbles were dispensed and at the end of the session they were transferred to the subject's own container. If the subject had earned enough marbles, he was told that something special had been earned for himself and the whole class. He was praised for doing a good job. After all subjects had completed that day's sessions, the experimenter went into the classroom and announced who had won something special that day, after which he gave the treats to the teacher, who also praised the children who had won. The teacher then gave the treats to one of those children and asked him or her to pass them out to the class members.

After the first day's instruction in the experimental room, and except for the Pre-delivery Condition, no further instructions were given in the experimental room. All instructions, when given, were presented through the speaker system.

The following is a list of procedures used in Experiment I, although not every subject experienced all of them:

Baseline (B)

During baseline the subject heard the words presented from each of the speakers. No light S^D was used nor was any reinforcement dispensed. At the end of the session the subject was told that he could return to his classroom.

Differential Consequences (DC)

In this phase reinforcement was dispensed for imitating the words from the speaker with the light on it. For all conditions, except reversal, this was the speaker to the subject's right side. When the light was on, a word was presented through that speaker and if imitated, it was reinforced. The light went off when a word was about to be presented from the S-delta speaker. Any imitation of those words was not followed by reinforcement. The speakers were thus designated as S^D or S-delta speakers.

Prompt (PR)

If the subject did not respond under differential consequences, a verbal prompt was given to respond. This prompt was: "Maybe if you say some of the words you'll get some marbles." This prompt was given once.

Reinforcement For Not Responding (RNR)

If the subject did not respond differentially during DC, he was reinforced, with marbles only, for not responding to the S-delta stimuli. This reinforcement was rapidly faded until there was no reinforcement given for not responding and the imitative behavior was differential responding to the two stimulus conditions.

Reversal (R)

In this phase the reinforcement contingencies were reversed such that the previous S^D speaker (i.e., the one to the subject's right) became the S-delta speaker and vice versa.

Social Control (SC)

During this condition the experimenter entered the experimental room with the subject and told the subject that he would be sitting in the experimental room during the session. No other comments were made to the subject by the experimenter.

Results

Throughout the experiment reliability checks were made. All sessions were recorded on tape and, in addition, most sessions were recorded by an observer during the course of the session. Reliability was 100 per cent on all occasions. A correct imitation was defined as an approximation to the topography of the modeled stimulus. If, for

example, the subject said "all" when the modeled stimulus was "hall," then it was scored as an imitative response. If the subject said "cat" when "hall" was presented, it was scored as a nonimitative behavior. The latter case only occurred once.

The data for Subjects 1, 2, and 3 are presented in Figures 1, 2, and 3, respectively. In Figure 1, the operant level of responding during baseline was initially zero; however, eventually some imitative responding was reflected in latter trials. The delineation of the data into responses to the left or right speakers served only to indicate a propensity to respond to one speaker versus another. During differential consequences a response to the stimulus presented through the speaker to the subject's right was always reinforced. A high degree of variability was demonstrated by Subject S-1 during the first half of this condition. Eventually, differential responding was produced, although the subject continued to perform some of the nonreinforced stimuli. A reversal was put into effect with the result that responses to previously nonreinforced and nonimitated stimuli were reinforced and, thus, imitated. Again a considerable amount of variability was demonstrated in responses to the S-delta stimuli. However, the frequency of imitations decreased to a low level with some small amount of variability being produced. A return to differential consequences resulted in a return to the previous mode of responding. The introduction of social control had little effect on the frequency of responding to either the S^D or S-delta stimuli.

Fig. 1. Percentage of responses imitated by Subject S-1.

Circles represent responses to the right speaker and squares to the left speaker stimuli. The experimental conditions are: (1) B=Baseline, (2) DC=Differential Consequences, (3) R=Reversal and (4) SC=Social Control. Except for the R condition, reinforcement presented contingent on responses to the right speaker.

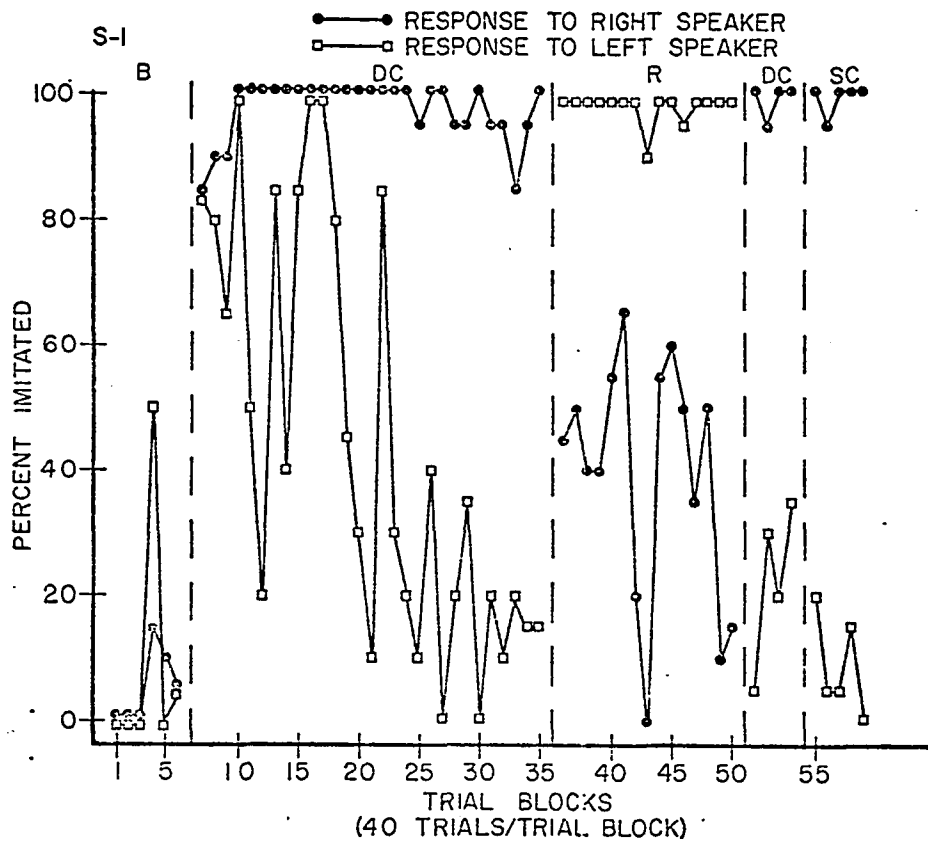


Fig. 1. Percentage of responses imitated by Subject S-1.

In Figure 2 the behavior of Subject S-2 can be observed. During baseline, no imitative responding was observed. The introduction of differential consequences also had no effect on imitative responding. With the introduction of prompt, along with differential consequences, a high degree of nondifferential imitative responding was produced. Thus, for the first time, clear generalized imitation was evidenced. Under the reinforcement for not responding condition, differential responding was eventually produced. During the last trial blocks no reinforcement was dispensed. A return to differential consequences, and social control conditions produced results almost identical to Subject S-1.

Subject 3's behavior is reflected in Figure 3. No baseline data were obtained with this subject. Differential consequences produced almost immediate differential responding at a minimal level. Eventually, this difference increased to greater proportions. Reversal of reinforcement contingencies produced a reverse in differential responding, as was the case with Subjects S-1 and S-2. The last condition was a combination of a return to differential consequences and social control. Consistent with the data from other subjects, the effect of the introduction of social control was to maintain differential responding.

Discussion

Relative to previous generalized imitation research, two variables, i.e., social and instructional control, were initially minimized

Fig. 2. Percentage of responses imitated by Subject S-2.

Circles represent responses to the right speaker and squares to the left speaker. Except for the R condition, reinforcement presented contingent on responses to the right speaker stimuli. The experimental conditions are: (1) B=Baseline, (2) DC=Differential Consequences, (3) PR=Prompt, (4) RNR=Reinforcement for Not Responding, and (5) SC=Social Control.

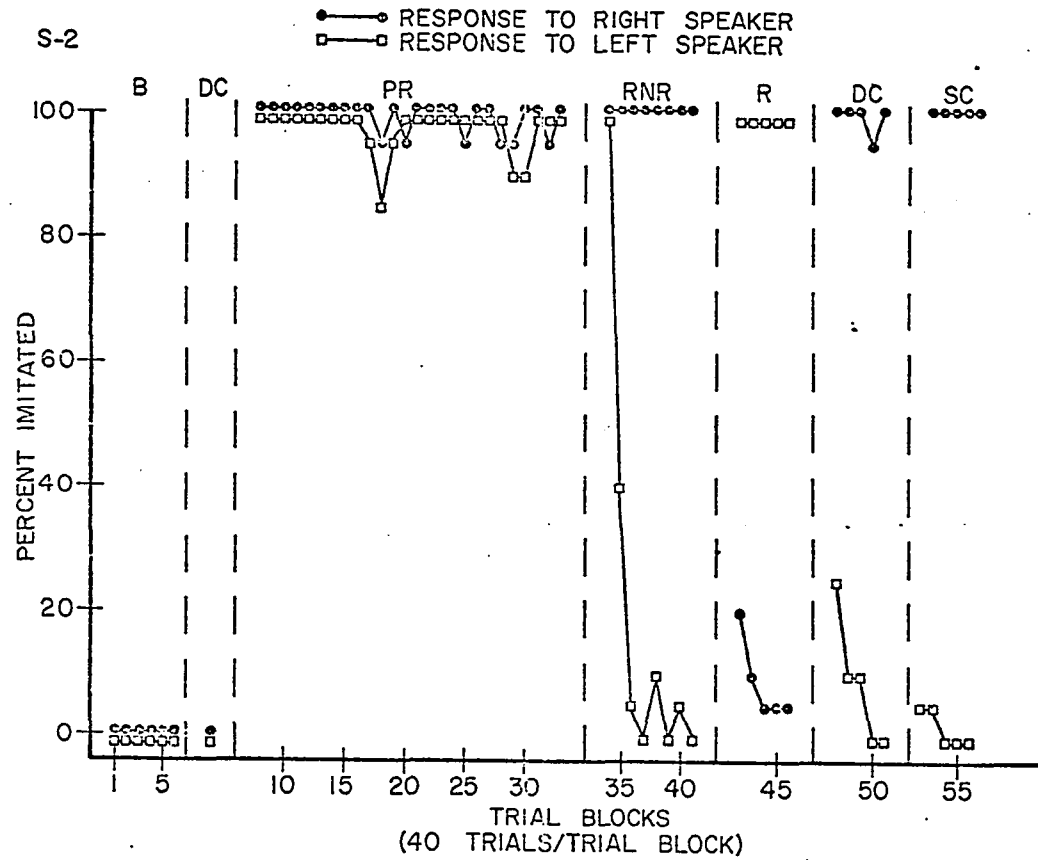


Fig. 2. Percentage of responses imitated by Subject S-2.

Fig. 3. Percentage of responses imitated by Subject S-3.

Circles represent responses to the right speaker and squares to the left speaker stimuli. The experimental conditions are: (1) DC=Differential Consequences, (2) R=Reversal and (3) SC=Social Control. Except for the R condition, reinforcement presented contingent on responses to the right speaker.

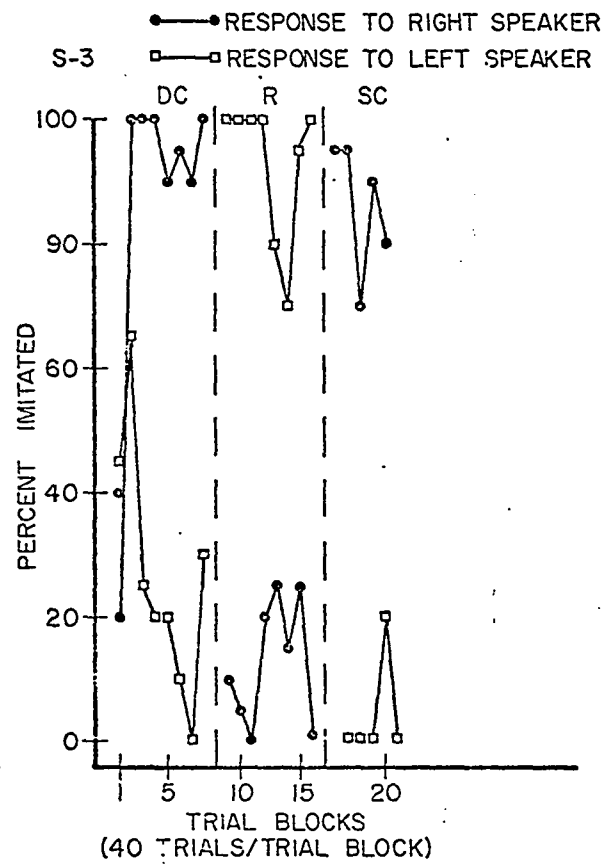


Fig. 3. Percentage of responses imitated by Subject S-3.

or reduced in their potential influence over imitative responding in this study. Differential responding was produced in all subjects under these conditions; however, Subject S-2 demonstrated differential responding only after being reinforced for not responding to the previously nonreinforced stimuli. One might conclude from these data that instructions and/or social controlling conditions are responsible for the differential responding.

Experiment I was an attempt to determine whether social control was sufficient for the development of generalized imitation once differential responding had been developed. According to the data from Experiment I, the effect of increasing social control, in a situation in which both social and instructional control had been minimized, has no appreciable effect on imitative responding. None of the three subjects demonstrated nondifferential responding when social control was increased. These data are in contrast to those of Peterson and Whitehurst (1971) and Peterson et al. (1971).

Peterson and Whitehurst (1971) demonstrated that the removal of social controlling factors such as the presence of the experimenter appreciably effected the frequency of imitative responding (i.e., imitation decreased in frequency). However, these data only indicate the relative importance of social controlling variables in the maintenance of generalized imitation once developed. Little can be said about the

importance or necessity of social control in the initial development of generalized imitation from the data presented by Peterson & Whitehurst.

The only study in the literature on generalized imitation to have demonstrated differential responding when social controls were minimized was by Peterson et al. (1971). Three of four subjects demonstrated some differential responding when the social control was minimized. Again, it should be pointed out, both the Peterson and Whitehurst and the Peterson et al. studies have a greater bearing on the effects of social control on the maintenance of generalized imitation than on its development. The present study has a greater bearing on the variables which influence the development of generalized imitation than on its maintenance. The data from Experiment I indicates that social controlling variables (i.e., the presence of the experimenter) is not sufficient for the development of generalized imitation.

EXPERIMENT II

Experiment II was designed to determine whether instructions are capable of producing generalized imitation independently of social controlling factors. It was predicted that given the same conditions and methodology of Experiment I, instructions to respond would function to increase or decrease generalized imitation once differential responding had been produced, depending upon the experimental condition. In addition, Experiment II was an attempt to evaluate a specific DRO procedure (i.e., Pre-delivery of Reinforcement) on generalized imitation, and the effects of Peer Modeling and Reinforcement for Not Responding to the S-delta stimuli on differential responding.

Subjects and Apparatus

The subjects used in Experiment II were one male and two females drawn from the same population as were the subjects in Experiment I. The apparatus and experimental conditions were the same as in Experiment I.

Procedures

The procedures used in Experiment II were identical to those of Experiment I with a few exceptions. The following is a list of experimental conditions used in Experiment II that were identical in function to

Experiment I: Baseline, Prompt, Differential Consequences, Reversal and Reinforcement for Not Responding.

The following is a description of the additional procedures used in Experiment II:

Peer Modeling (PM)

In this condition the subject observed a peer differentially responding to the S^D and S -delta stimuli. Usually, the subject observed the peer model only once; however, Subject S-5 observed a model on two separate occasions.

Instructions-1 (INS-1)

In this condition the subject was instructed to "say all of the words" at the beginning of each session. No other instructions were given and no change in reinforcement contingencies were made.

Instructions-2 (INS-2)

In this condition Subject S-5 was instructed not to respond to the S -delta stimuli. The specific instruction was: "Today, _____, I want you to say only the words for which you get a marble. Don't say any of the other words." This instruction was presented twice on the first session of this condition.

Instructions-3 (INS-3)

During this condition the subject was instructed to say anything he wanted. The specific instruction was: "Today, _____, you can say all of the words, or, if you want, you can say some of the words."

Pre-delivery (P-D)

In this condition the subject received all the marbles before the experiment began.

Results

The data from Subjects S-4, S-5, and S-6 are presented in Figures 4, 5, and 6, respectively. In Figure 4 it can be seen that Subject S-4's baseline performance was quite different from all other subjects in both Experiment I and II. During the initial sessions no imitative responding occurred. However, eventually S-4 began to demonstrate nondifferential imitative responding without prompts or instructions to respond. It was decided to implement the differential consequences condition to determine if differential responding could be produced. Differential responding was produced. A reversal was put into effect with a reversal in responses to the modeled stimuli being produced. A return to differential consequences produced responses which were similar to the previous level of responding under that condition. With the introduction of instructions to say all of the words (i.e., INS-1)

Fig. 4. Percentage of responses imitated by Subject S-4.

Circles represent responses to the right speaker and squares to the left speaker. Except for the R condition, reinforcement presented contingent on responses to the right speaker stimuli. The experimental conditions are: (1) B=Baseline, (2) R=Reversal, (3) D-C=Differential Consequences, (4) INS-1=Instruction-1, (5) INS-3=Instruction-3, and (6) P-D=Pre-delivery.

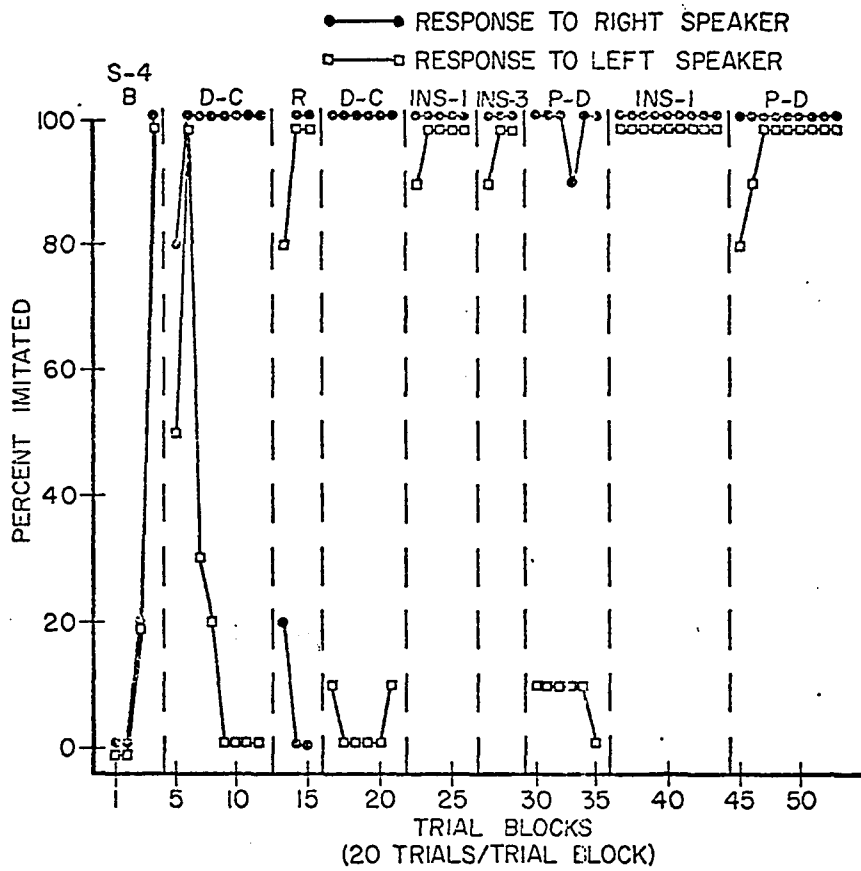


Fig. 4. Percentage of responses imitated by Subject S-4.

generalized imitation was produced. In the next condition the reinforcers (marbles) which were usually dispensed contingently, were given to the subject before the start of the session (i.e., P-D). The effect of this condition was to immediately produce differential responding. A return to INS-1 again produced generalized imitation. Finally, an attempt to reconfirm the findings of the first P-D phase was unsuccessful. No differential responding or even a complete reduction in imitation was produced as in the previous P-D phase.

The next subject's data (i.e., Subject S-5) is presented in Figure 5. During baseline no imitation was reported. On trial block 5 differential consequences had no effect on the level of imitative responding. Therefore, on trial block 6, the subject was prompted to respond imitatively (i.e., PR); consequently, generalized imitation was developed and maintained through that condition. In the next phase (i.e., PM) the subject observed a peer who modeled differential responding; however, the subject continued to exhibit nondifferential responding. During the course of this condition the subject was frequently observed to have made comments regarding the nature of the contingency. There was no doubt that the subject knew which stimuli were the S^D 's and which were the S-delta's. In the next condition (INS-2) the subject was told to say only S^D words and not say S-delta's; differential responding was produced. An attempt was then made to determine if a reversal could demonstrate reinforcement control over differential

Fig. 5. Percentage of responses imitated by Subject S-5.

Circles represent responses to the right speaker and squares to the left speaker stimuli. Except for condition R, reinforcement presented contingent on responses to the right speaker. The experimental conditions are: (1) B=Baseline, (2) DC=Differential Consequences, (3) PM=Peer Modeling, (4) INS-2=Instruction-2, (5) R=Reversal, (6) INS-1=Instruction-1, (7) INS-3=Instruction-3, and (8) P-D=Pre-delivery.

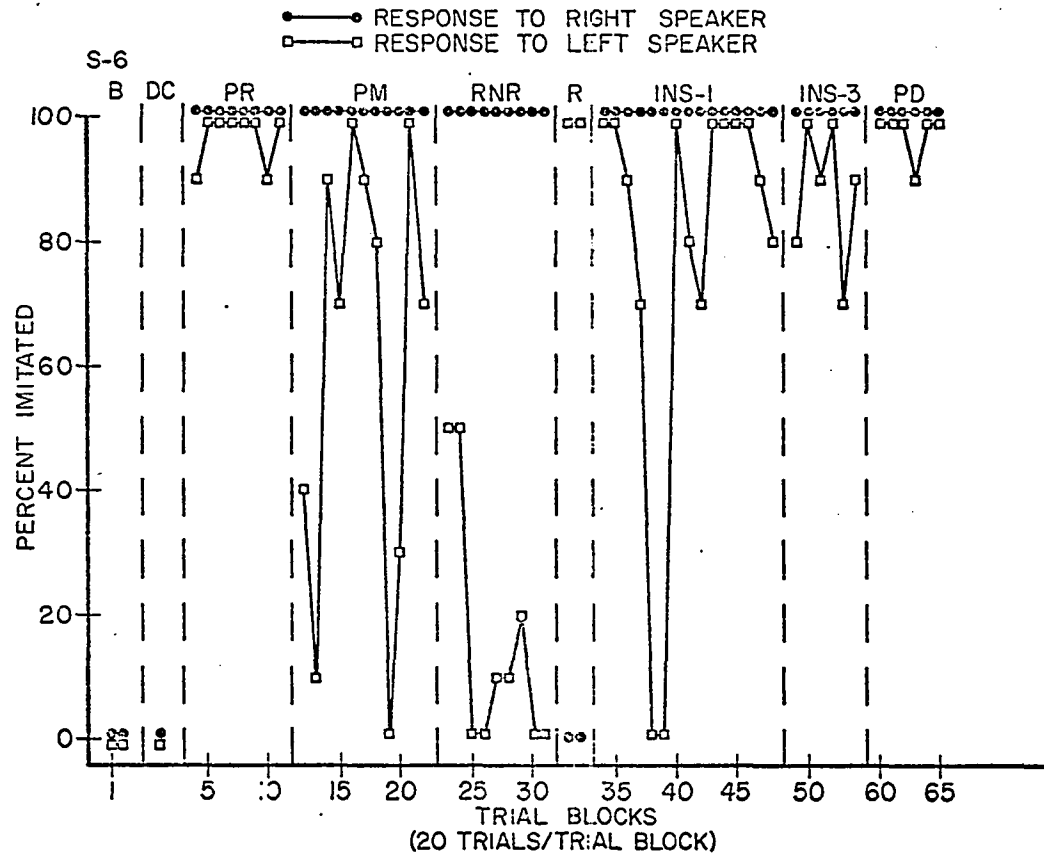


Fig. 5. Percentage of responses imitated by Subject S-5.

responding. Although the behavior was initially quite variable, a reversal in responding was produced and again differential responding was observed. In the next condition (INS-1) the subject was instructed to say all the words. Generalized imitation was once again produced. During INS-3 the subject was given instructions to say anything that he wanted to say. In effect, this should have removed or provided an alternative to INS-1. Initially, differential responding was evidenced; however, after a short period of time generalized imitation was exhibited once again. Condition P-D was implemented with generalized imitation continuing to be performed.

Figure 6 presents the data of Subject S-6. During baseline no imitative responding was produced. With the introduction of the differential consequences condition there was still no imitation produced. A prompt was given at the beginning of trial block 4. This prompt was sufficient to develop nondifferential responding. In an attempt to produce differential responding a peer modeling (i.e., PM) situation was introduced. The results of this manipulation was a high degree of variability in the responses to the S-delta stimuli. In order to reduce variability and produce differential responding, the subject was reinforced for not responding to the S-delta stimuli (i.e., RNR). Low variability and differential responding was exhibited. Reinforcement control was established by reversing the contingencies of reinforcement (i.e., R). A return to the initial contingencies was accompanied by the instructions to say

Fig. 6. Percentage of responses imitated by Subject S-6.

Circles represent responses to the right speaker and squares to the left speaker stimuli. Except for condition R, reinforcement was always presented contingent on responses to the right speaker. The experimental conditions are: (1) B=Baseline, (2) DC=Differential Consequences, (3) PR=Prompt, (4) RNR=Reinforcement for Not Responding, (5) R=Reversal, (6) INS-1=Instructions-1, (7) INS-3=Instructions-3, and (8) PD=Pre-delivery.

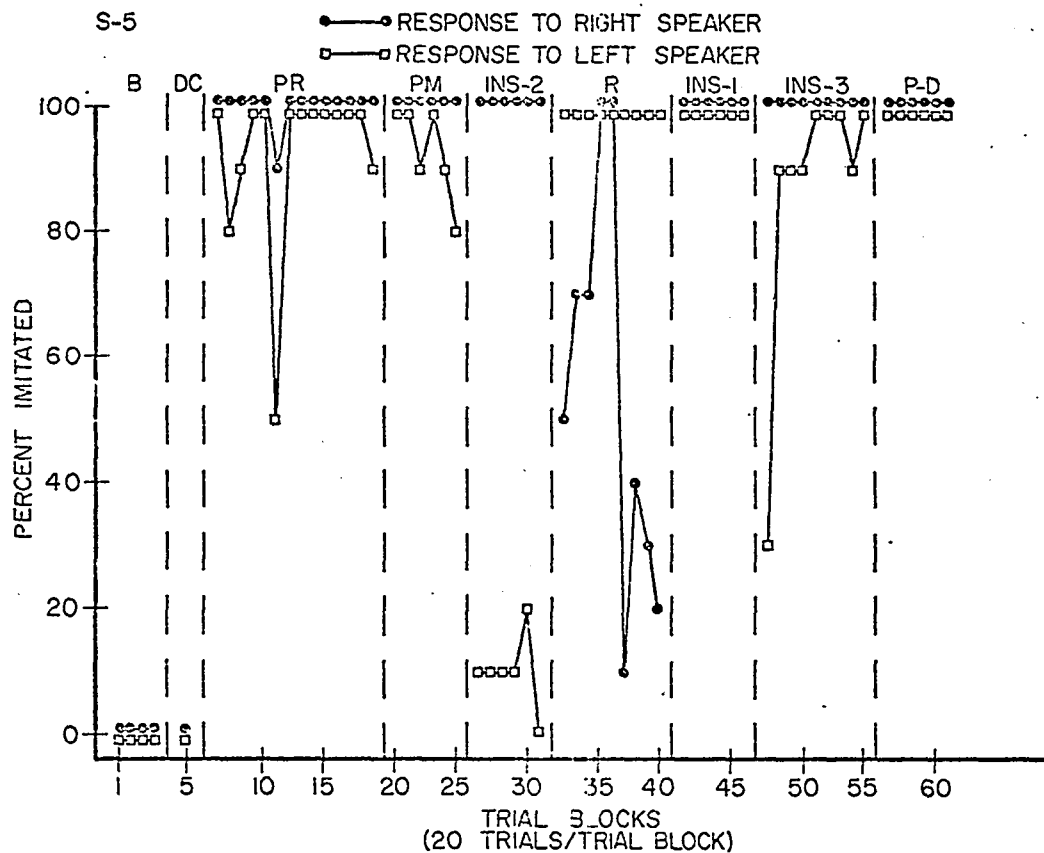


Fig. 6. Percentage of responses initiated by Subject S-6.

all the words. The effect of these instructions (INS-1) on responding was eventually sufficient to produce generalized imitation; although initially some variability was evidenced. With the introduction of INS-2 no major change in responding was produced. The subject continued to show 100 per cent responding to the S^D stimuli and a high but variable level of imitation of S-delta stimuli. The introduction of P-D maintained generalized imitation and replicated the data of Subjects S-4 and S-5.

GENERAL DISCUSSION AND CONCLUSIONS

Experiment II was an attempt to determine the importance of instructional variables in the production of generalized imitation. If it could be demonstrated that instructions are capable of producing nondifferential responding independently of social controlling variables, along with the fact that reinforcement is maximized when instructions are absent, then one might tentatively conclude that generalized imitation is a class of behaviors under the direct control of instructions.

The data presented in Experiment II gives some indication that instructions are powerful setting events capable of controlling the production of imitation and generalized imitation. It was demonstrated that once differential responding was developed, INS-1 conditions were capable of producing generalized imitation. All three subjects eventually responded similarly under INS-1; however, Subject S-6 showed some initial variability at the beginning of INS-1 which decreased over trial blocks.

Another demonstration of the controlling power of instructions is presented in the data of Subject S-5. This subject did not respond differentially under differential consequences, prompt or peer modeling conditions. However, when requested to respond only to the S^D stimuli (i.e., INS-2), differential responding was produced. These data

suggest that instructions are sufficient conditions for the development of generalized imitation. The question remains: Is instruction a necessary condition for generalized imitation to occur?

Recall that Subjects S-4, S-5, and S-6 all demonstrated some generalized imitation prior to the development of differential responding. Subject S-4, however, almost immediately demonstrated differential responding when exposed to the differential consequences procedure. This subject's performance was not confounded with the prompt condition, as were Subjects S-5 and S-6, because she began to respond during the baseline period.

Subjects S-5 and S-6 of Experiment II and Subject S-2 of Experiment I did not respond imitatively during baseline or differential consequences. The same was true of over 70 per cent of Bandura and Barab's (1971) subjects. Bandura and Barab reasoned that his subjects did not respond imitatively during baseline or differential consequences because they were unaware of the reinforcement contingencies. In order to convey this contingency information to the subjects in this study, verbal prompts were given at the beginning of the prompt session; Subjects S-2, S-5, and S-6 all received this prompt. All three of these subjects demonstrated nondifferential responding which was highly resistant to extinction. Subjects S-2 and S-6 eventually produced differential responding but only after they had been reinforced for not responding to the S-delta stimuli. Subject S-5 produced differential responding only after

being instructed to do so. Interestingly, the peer modeling condition was not sufficient to produce differential responding, even though Bandura and Barab (1971) had reported that peer modeling was a sufficient means of developing imitation.

It would seem logical that the verbal prompt, which may be interpreted as a verbal instruction, is a sufficient condition for the development of generalized imitation comparable to INS-1. When the verbal prompt does not exist (Subjects S-1, S-3, and S-4) differential responding occurs. However, when the prompt is present, it is equivalent to INS-1 in its ability to produce generalized imitation.

Another question of interest relates to the effect of removing instructions from the experimental paradigm on imitative responding. Steinman (1970a) reports that when the subjects in his study were told that the experimenter didn't care if they did the S-delta behaviors or not, the frequency of generalized imitation increased for most subjects from a level of almost no imitative responding. Only one subject actually showed a decrease in S-delta imitations. In the present study, subjects administered similar instructions (i.e., INS-3) showed no change in generalized imitation, except for Subject S-6, who demonstrated generalized imitation but at a somewhat variable rate. These data are in agreement with the research by Steinman (1970a) and Peterson and Whitehurst (1971). However, they are in disagreement with the research of

Zahn and Yarrow (1970) which have demonstrated that nonreinforced imitations decreased when instructions are rescinded.

It had been previously stated that the nature of DRO contingencies on generalized imitation is unclear (Steinman 1970a). All three subjects in Experiment II were administered a DRO contingency in which all reinforcers were pre-delivered to the subject before the session began. Subject S-4, during the initial P-D phase, demonstrated differential responding. However, after reestablishing generalized imitation, this same P-D phase had little or no effect on the nondifferential responding which had been established under INS-1. This latter finding was subsequently replicated by Subjects S-5 and S-6.

It may be that some variables, other than instructions or social control, were active in maintaining this behavior in condition P-D. According to Steinman (1970a) the reason DRO procedures are inconsistent in their effects on imitative behavior is because of the instructional control and social setting events operative within the generalized imitation paradigm. Accordingly, the subjects in this study should have extinguished imitative responding, since social and instructional variables were minimized; however, they did not extinguish responding.

One explanation for the failure of the pre-delivery phase to effect imitation in the present study might be the fact that once instructions are entered into the experimental situation their effects are present throughout the experiment. This point has already been made by Schoenfield and

Cumming (1963) which was presented earlier in this paper. Notice that the rescinding of instructions in this study had little effect on imitative responses; this would tend to support the notion that instructions persevere throughout the experiment. Thus, INS-3 and/or P-D may not be sufficient to negate the effects of INS-1, once the latter has been established.

Another illustration that social and instructional variables are important in the production and/or maintenance of generalized imitation is reflected in the degree of reinforcement control obtained over imitation. In both Experiment I and II reinforcement control over imitative responding has been demonstrated by the use of differential consequences and reversals in the contingencies of reinforcement. For all subjects, the introduction of a reversal has resulted in a reversal in imitative responding, even though a variety of procedures (e.g., RNR, INS-2, PM) were used to obtain the differential responding observed. The failure of P-D to alter responding has already been discussed.

In addition to the present study, only one other study has been able to demonstrate reinforcement control over differential responding in the generalized imitation literature; but that study was an attempt to demonstrate that differential responding was a function of the degree of discriminability between S^D and S -delta stimuli (Bandura and Barab 1971). These authors did provide evidence for the above relationship; however, they totally disregarded the importance of instructions which they

eliminated in order to determine the relevance of discriminability in the production of generalized imitation. One wonders whether they would have obtained differential responding at all had instructions to respond been included in their study. All available evidence would tend to indicate that they would not have obtained any differential responding.

The fact that the introduction of social control (i.e., condition SC) in Experiment I did not effect responding is, at first, quite surprising. Peterson and Whitehurst (1971) have demonstrated that the removal of the model from the experimental setting reduced imitative responding. However, one explanation might be that the removal of a model from the experimental setting in which a history of nondifferential responding exists is not equivalent to the introduction of a model into a situation in which only a minimal level of nondifferential responding had occurred. It is doubtful that they are even remotely equivalent. There is little doubt that an adult can and often does serve as a social setting event for responding, but the introduction of an adult who had not been closely associated with imitative responding may have little or no effect on behavior.

Another related interpretation, for the fact that the production of social controlling variables had little effect on imitative responding in the present study, may be that the effect of introducing or removing social controlling factors on imitation is, in part, a function of the contingencies and level of responding immediately in effect prior to the introduction of

social controls. In Experiment I the contingency in effect was differential consequences and the responding was differential. Obviously, the subjects interpreted the situation as being one in which differential responding was appropriate. The introduction of the adult merely served to insure that differential responding continued to be performed. In fact, observation of the data from Subjects S-1, S-2, and S-3 indicates that the frequency of S-delta imitations actually decreased under social control. There wasn't even a hint of a tendency to respond nondifferentially.

It is interesting to note that social control has never been demonstrated to actually increase S-delta imitations in a situation where differential responding directly precedes its introduction. Social controlling factors, such as the presence of the experimenter, have yet to be demonstrated as having functional properties in the development of generalized imitation. There is some evidence, as has already been established, that once nondifferential responses are developed they may, in part, be maintained by such social variables.

One must also question the importance of social controlling factors in the production of imitative responding on the Bandura and Barab study. There are some essential similarities between that study and the present one. Bandura and Barab used no instructions to develop imitative responding; instead, they used peer models. Thus, the two studies are equivalent on instructional influences. However, Bandura and Barab did

use a model who was an adult and who was present in the experimental setting throughout the study. If social controlling variables were important in the development of generalized imitation, then the subjects should have responded nondifferentially. Instead, they responded differentially. The authors reported that there was a significant difference between responses to the S^D and S-delta stimuli. A close look at the data, however, indicates that differential responding occurred at a relatively high rate. Almost 95 per cent of the S^D responses were imitated while from 45 to 68 per cent of the S-delta's were also imitated. This high rate of S-delta imitation, although the difference was statistically significant, might be a function of social controlling factors directly related to the presence or absence of the model. In the present study a greater degree of differential responding was obtained in most subjects when social control was minimized.

The present study was an attempt to evaluate the social and instructional control hypotheses of generalized imitation. In addition to these hypotheses, the data collected also has implications for the discrimination and scheduling of reinforcement hypotheses. In terms of these hypotheses, it is important to note that all subjects differentially responded to the S^D and S-delta stimuli at some time in the experiment. The discrimination hypothesis states that generalized imitation results because subjects cannot discriminate between the reinforced and non-reinforced stimuli. An attempt was made in the present experiment to

maximize the difference between these two sets of stimuli. The speakers were separated and a light was turned on above the S^D speaker when a word was presented from it. And, yet, some subjects continued to respond nondifferentially until such a situation existed which demanded differential responding (e.g., RNR, INS-2). If discriminability were the controlling factor in generalized imitation, one would have to explain why subjects who clearly discriminated between the S^D and S-delta words, continued to perform nondifferentially.

In the present study, and perhaps in others, some of the subjects continued to perform nondifferentially mainly because the "response-cost" involved in S-delta imitation was so minimal; that is, for some subjects it is more reinforcing to respond to all stimuli, than to respond to some and not to others. Another explanation might be that for some subjects, a conditioned reinforcement hypothesis is appropriate. Interestingly, when the response cost involved in not responding to the S-delta stimuli changed (i.e., RNR), differential responding was produced.

Another bit of data, which is not easily explained, is that of the two subjects who demonstrated imitative responding during the baseline condition. These data would seem to indicate that subjects often come to the experimental setting with a tendency or, if you will, a predisposition to respond in some particular and unknown manner. This predisposition to respond is perhaps a function of earlier experiences in similar

settings. In addition to the two subjects who responded imitatively during baseline, another subject was observed to have "free associated" to the stimulus words presented. If the word was "ball," he might have responded with "bat" or something similar. Yet another subject was observed to have counted each time the stimulus word was presented; needless to say, counting soon extinguished. Last, one subject was observed to have attempted to duplicate or, in some physical or non-verbal way, imitate the stimulus item. If ball was presented as the stimulus word, the subject would attempt to move his hands up and down as though he were bouncing it. Difficulty was often encountered when words were presented to which no overt response could be made; for example, plate. The majority of subjects, and even those just mentioned, usually looked back and forth from one speaker to the other in some type of anticipatory responses; perhaps in an attempt to determine from which speaker the next word would come.

A child in the second grade has learned many behaviors in response to diverse situations. The introduction of a subject into a new situation within close proximity to the school room of which he is a member could be sufficient to produce some responding where none is directly requested. Often this responding is appropriate, as in the present experiment when the subject imitates the stimulus words; and often the response is inappropriate, as in the case of the subject who counted or free associated to the stimulus words.

In regard to the importance of discriminability in generalized imitation research, it can be said that Bandura and Barab (1971) and Garcia et al. (1971) have demonstrated that as topological similarity diminished, differential responding decreased. Bandura & Barab demonstrated this function when instructional controls were minimized; however, the same is not true for the Garcia et al. research.

The data currently available in the experimental literature on generalized imitation, including the present experiment, would seem to indicate that generalized imitation is primarily a function of the methodology used to evaluate it. The most salient variable identified and the one which may be primarily responsible for the production of generalized imitation is the instruction to respond. Another variable which appears to be relevant in the maintenance of generalized imitation is social control; however, no research has demonstrated that it is a necessary or even sufficient condition for the initial development of nondifferential imitative responding.

APPENDIX I

STIMULUS PRESENTATION SEQUENCES

SEQUENCES OF STIMULUS WORDS

Sequence 1

CAT
PLATE
SAND*
BALL
SHOE
HEAD
TACK*
MAIL*
RACE
KITE
FACE*
MOUSE*
HALL
HOSE*
FOX*
SQUARE*
BOAT*
TAPE
SNOW*
CAR

Sequence 2

RACE
SHOE
SAND*
FACE*
FOX*
PLATE
SNOW*
BOAT*
MOUSE*
CAT
BALL
MAIL*
TACK*
SQUARE*
HEAD
CAR
HOSE*
HALL
TAPE
KITE

Sequence 3

MOUSE*
HOSE*
SQUARE*
TAPE
FOX*
SAND*
SNOW*
KITE
HALL
CAR
HEAD
TACK*
RACE
BOAT*
SHOE
CAT
PLATE
MAIL*
BALL
FACE*

*Indicates S-delta stimuli

TAPE SEQUENCES

following is a list of tape sequence presentations which were randomly selected for each session's presentation.

Tape	Sequence
1	1,2,3
2	1,3,2
3	2,1,3
4	2,3,1
5	3,1,2
6	3,2,1

REFERENCES

- Baer, D. M., Peterson, R. F., & Sherman, J. A. "The development of imitation by reinforcing behavioral similarity to a model." Journal of the Experimental Analysis of Behavior, 10, (1967), 405-416.
- Baer, D. M., & Sherman, J. A. "Reinforcement control of generalized imitation in young children." Journal of Experimental Child Psychology, 1, (1964), 37-49.
- Bandura, A. "Social-learning theory of identification processes." Handbook of Socialization Theory and Research. Edited by D. A. Goslin. Chicago: Rand McNally, 1968.
- Bandura, A. "Modeling theory: some traditions, trends and disputes." Symposium paper presented at the Society for Research in Child Development Meetings, Santa Monica, 1969(a).
- Bandura, A. Principles of Behavior Modification. New York: Holt, Rinehart & Winston, 1969(b).
- Bandura, A. & Barab, P. G. "Conditions governing nonreinforced imitation." Developmental Psychology, 5, (1971), 244-255.
- Bijou, S. W. & Baer, D. M. Child Development. Vol. 1. New York: Appelton-Century-Crofts, 1961.
- Bijou, S. W. & Baer, D. M. Child Development. Vol. 2. New York: Appelton-Century-Crofts, 1965.
- Bufford, R. K. "Discrimination and instructions as factors in the control of nonreinforced imitation." Journal of Experimental Child Psychology, 12, (1971), 35-50.
- Burgess, R. L., Burgess, J. M., & Esveldt, K. O. "An Analysis of Generalized Imitation." Journal of Applied Behavior Analysis, 3, (1970), 39-46.

- Garcia, E., Baer, D. M., & Firestone, I. "The development of generalized imitation within topographically determined boundaries." Journal of Applied Behavior Analysis, 4, (1971), 101-112.
- Gewirtz, J. L. "Mechanisms of social learning." Handbook of Socialization Theory and Research. Edited by D. A. Goslin. Chicago: Rand McNally, 1968.
- Gewirtz, J. L. & Stingle, K. G. "Learning of generalized imitation as the basis for identification." Psychological Review, 75, (1968), 374-397.
- Kantor, J. R. Interbehavioral Psychology. Bloomington: Principia Press, 1958.
- Lovaas, O. I., Berbrich, J. P., Perloff, B. F. & Schaeffer, B. "Acquisition of imitative speech by schizophrenic children." Science, 161, (1966), 705-707.
- Metz, J. R. "Conditioning generalized imitation in autistic children." Journal of Experimental Child Psychology, 2, (1965), 389-399.
- Miller, N. E. & Dollard, J. Social learning and imitation. New Haven: Yale University Press, 1941.
- Peterson, R. F. "Some experiments on the organization of a class of imitative behaviors." Journal of Applied Behavior Analysis, 1, (1968), 225-235.
- Peterson, R. F., Merwin, M. R., Moyer, T. J. & Whitehurst, G. J. "Generalized imitation: The effects of experimenter absence differential reinforcement, and stimulus complexity." Journal of Experimental Child Psychology, 12, (1971), 114-128.
- Peterson, R. F. & Whitehurst, G. J. "A variable influencing the performance of generalized imitative behaviors." Journal of Applied Behavior Analysis, 4, (1971), 1-10.
- Schoenfield, W. N. & Cumming, W. W. "Perception and behavior." Psychology: A study of a science. Edited by S. Koch. Vol. 5. New York: McGraw-Hill, 1963.
- Steinman, W. M. "Generalized imitation and the discrimination hypothesis." Journal of Experimental Child Psychology, 10, (1970), 79-99(a).

Steinman, W. M. "The social control of generalized imitation."
Journal of Applied Behavior Analysis, 3, (1970), 159-168(b).

Steinman, W. M. & Boyce, K. D. "Generalized imitation as a function of discrimination difficulty and choice." Journal of Experimental Child Psychology, 11, (1971), 251-265.

Zahn, C. J. & Yarrow, M. R. "Factors influencing imitative learning in preschool children." Journal of Experimental Child Psychology, 9, (1970), 115-130.