THE EFFECT OF INCONGRUENT INSTRUCTIONS AND CONSEQUENCES ON IMITATION IN RETARDED CHILDREN¹

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Three retarded boys served as subjects in a 13-phase experiment. In eight of these phases, the instructions administered by the experimenter before demonstrating a behavior and the consequences for imitative behavior were incongruent (the consequences were not those indicated by the instructions). Consequences rather than instructions controlled imitative behavior when (a) subjects were instructed not to imitate but received reinforcers if they imitated; (b) subjects were instructed to imitate but were differentially reinforced for other behavior; (c) subjects were instructed to imitate but were verbally reprimanded for imitation. Although subjects were highly imitative at the beginning of the study, when there was no reinforcement for imitation subjects gradually stopped imitating when instructed not to imitate. Instructions seemed to control imitative behavior when there was no reinforcement for imitation and subjects were instructed to imitate. These results indicated a need for further investigation of antecedent and consequent variables in imitation experiments and pointed out that certain techniques may be more efficient than others in eliminating well-established responses.

Imitation has been considered a critical concept for most theories of child development. Brigham and Sherman (1968) noted that imitation has proven important in producing socially significant changes in behavior and in analyses of socialization and the development of language. More recently, imitation has been approached as a form of operant behavior that may function as a response class. Much of the research in this vein has focused on what has been called "generalized imitation" (Baer and Sherman, 1964; Baer, Peterson, and Sherman, 1967). In the context of this research, the term "gener-

alized imitation" refers to imitation of demonstrated behaviors that the subject has never been trained to perform and/or the continued performance of unreinforced imitative behaviors (Rice and Burgess, 1971). In these experiments, imitative behaviors form a functional response class. Although an understanding of imitation is important for theories of child development, applications to social behavior changes and analyses of child behavior, the precise variables that control this class of behaviors are unknown; however, data have accumulated that indicate the importance of social or instructional control variables (Steinman, 1970a, b; Steinman and Boyce, 1971; Burgess, Burgess, and Esveldt, 1970; Peterson and Whitehurst, 1971; Peterson, Merwin, Moyer, and Whitehurst, 1971; Rice and Burgess, 1971; Martin, 1971).

Steinman (1970b) suggested that two controlling systems may be operating concurrently in unreinforced imitation experiments—the first the differential contingencies of extrinsic reinforcement administered by the experimenter and the second a composite of social-setting events that include the experimenter's instructions, the

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presence of and continued surveillance by the experimenter, and the previous consequences received by the subject when he complied or failed to comply with adult instructions. Peterson *et al.*, (1971) indicated that while contingent reinforcement remains important in our study of imitation, antecedent and setting conditions should be given more careful examination in the analysis of imitation. There is a need to investigate those variables (antecedent and consequent) present in generalized imitation experiments and to specify those conditions in which imitative response classes are controlled by consequences such as extrinsic reinforcement and those conditions in which imitative behaviors are controlled by such antecedent variables as instructional stimuli. Rice and Burgess (1971) suggested that the reinforcement system (or consequences of imitation) and social (or instructional) systems may be related to each other in two ways. They may be congruent; that is, the instructional stimuli are reliable indicators of the consequences associated with imitation or nonimitation. In contrast, they may be incongruent; that is, the consequences associated with imitation are not those indicated by the instructions. When the two controlling systems are incongruent, one of them must be inoperative.

By examining situations in which these two controlling systems are incongruent or in conflict, one should be able to formulate a clearer picture of the nature of the relationship between the two systems. In previous experiments, instructions and consequences of imitation have been incongruent in two different ways. In the first, the instruction, "Do this", was given before the experimenter (or model) demonstrated a behavior and the subject's imitation of the demonstrated behavior was not reinforced (extinction). In the second, the instruction, "Do this", was given before the experimenter (or model) demonstrated a behavior and any behavior other than the demonstrated behavior was reinforced (differential reinforcement of other behavior or DRO). There are other means by which an incongruity could be created; these include rein-

forcement for imitating when subjects are instructed not to imitate and verbally reprimanding subjects for imitating when they are instructed to imitate. The purpose of the present experiment was to examine imitative behavior under a number of conditions where such incongruities have been created between the verbal instructions given by the experimenter and the consequences administered for imitation. The results obtained should provide evidence concerning the relative importance of instructions and consequences for the control of an imitative response class.

METHOD

Subjects

Three severely retarded male residents of Murdoch Center, Butner, North Carolina served. The main requirements for their selection were that their behaviors be reinforceable by food and that they be able to remain fairly attentive throughout the experimental session (approximately 10 min). Cottage parents reported that all subjects possessed some imitative skills. Subject 1 was 12 yr old with an IQ below 30; Subject 2 was 7 yr old and had an IQ of 33; Subject 3 was 7 yr old and had an IQ of 30.

Procedure

Sessions with individual subjects were conducted two or three times per day, five days a week, in a small room containing a table and several chairs. The 12 behaviors listed in Sets A and B in Table 1 were demonstrated by the experimenter in a random sequence twice during every session. The experimenter waited 15 sec for a subject to imitate a demonstrated behavior, and if the subject did nothing or did not imitate the behavior within this time period, a new behavior was demonstrated. Different consequences were associated with imitations of Set A behaviors throughout the experiment, while imitations of Set B behaviors were always unreinforced so that generalized imitation could be examined.

The experimenter's verbal instructions and the consequences associated with a subject's imitative

Table 1
Behaviors Demonstrated by the Experimenter

Set A	
1.	Touch nose
2.	Clap hands
3.	Tap wall
4.	Hands on ears
5.	Twirl hands
6.	Hands flat on table
7.	Fold hands
8.	Point to the window
Set B	
1.	Raise hands over head
2.	Hit table with fist
3.	Shake hands from wrist
4.	Hands over eyes

behavior were changed throughout 13 experimental phases. Specifically, the experimenter would either say; "Do this", or, "Don't do this", before demonstrating a behavior from Set A or Set B. The consequences for imitative behavior in different phases were as follows: a subject's imitation of a demonstrated behavior from Set A produced no consequences (extinction); a subject's imitation of a demonstrated behavior from Set A was reinforced; reinforcement was delivered immediately after a behavior from Set A was demonstrated, before a subject had an opportunity to imitate (DRO 0-sec); reinforcement was delivered 15 sec after the experimenter demonstrated a behavior or, if a subject imitated the behavior, 15 sec after the imitative response

(DRO 15-sec); the experimenter verbally reprimanded (a loud "No!") imitation of any behavior from Set A. Reinforcers were chocolate candy or sugar-coated cereal and verbal praise. Although the experimenter's instructions varied from phase to phase, within a given phase, the same instructions preceded both Set A and Set B behaviors. The consequences for imitating Set B behaviors were always the same (extinction) in each of the phases, although they changed from phase to phase for Set A behaviors. Table 2 outlines the procedure in each of the 13 phases.

RESULTS

During 15% of the sessions, an independent observer scored the imitative behavior of the three subjects as a check on the experimenter's scoring of these behaviors. Reliability was computed by dividing the number of trials where the experimenter and observer agreed that imitation did or did not occur by the total number of trials where the observer scored the subjects' behavior. The experimenter-observer reliability exceeded 98%.

Figures 1, 2, and 3 indicate the percentages of Set A and Set B behaviors imitated for Subjects 1, 2, and 3, respectively. In Phase A, with the instructions "Don't do this", all three subjects imitated some (15 to 50%) demonstrated behaviors for at least three sessions, although they

Table 2
Conditions Present During Each Phase of the Experiment

Phase	Instructions	Set A Imitations	Set B Imitations
A	Don't do this	Extinction	Extinction
B	Do this	Reinforcement	Extinction
C	Don't do this	Reinforcement	Extinction
D	Don't do this	Extinction	Extinction
E	Do this	Reinforcement	Extinction
F	Do this	Extinction	Extinction
G	Do this	DRO-0 seconds	Extinction
H	Do this	DRO-15 seconds	Extinction
I	Do this	Extinction	Extinction
J	Do this	Reinforcement	Extinction
K	Do this	Extinction	Extinction
L	Do this	Verbal reprimand	Extinction
M	Do this	Extinction	Extinction

Fig. 1. Percentages of behaviors imitated in each session by Subject 1. The graph is in two parts, with the abscissa ending with Session 60 in the upper portion and beginning with Session 61 in the lower portion.

Fig. 2. Percentages of behaviors imitated in each session by Subject 2. The graph is in two parts, with the abscissa ending with Session 60 in the upper portion and beginning with Session 61 in the lower portion.

Fig. 3. Percentages of behaviors imitated in each session by Subject 3. The graph is in two parts, with the abscissa ending with Session 60 in the upper portion and beginning with Session 61 in the lower portion.

were never reinforced. Eventually all imitation ceased. When the instructions were changed to "Do this", and imitation of Set A behaviors was reinforced in Phase B, perfect imitation of both Set A and B behaviors was exhibited by Subjects 2 and 3 (Figures 2 and 3). Subject 1 demonstrated 75% to 100% imitative behavior (see Figure 1).

When the instructions were changed to "Don't do this", in Phase C, no change was observed in the percentage of behaviors imitated by the three subjects (Figures 1, 2, 3). In Phase D, contingent reinforcement was removed and the performance of imitative behaviors by the subjects slowly declined to zero.

With Phase E, the instructions were again "Do this", and they continued so for the remaining phases of the experiment. Contingent reinforcement for imitations of Set A behaviors was also reinstated with Phase E and imitative behaviors from both Sets returned to a near-perfect level of performance. When contingent reinforcement of Set A behaviors was again dropped during Phase F, little effect was seen in the performance of Subject 1 (Figure 1) or of Subject 3 (Figure 3); however, Subject 2 showed a noticeable decline in the percentage of Set B behaviors imitated (Figure 2).

The DRO 0-sec during Phase G led to a rapid elimination of all imitative behavior by all three subjects (Figures 1, 2, 3). Imitation of behaviors in Set A declined more rapidly than the behaviors in Set B (although imitation of Set A and Set B behaviors reached zero in the same session for Subject 2). When the DRO was changed to 15 sec in Phase H, there was a slight recovery of both Set A and Set B imitative behaviors; however, after several sessions imitation returned to its near-zero level of Phase G.

With Phase I, extinction of all imitation was substituted for DRO 15-sec, and after a session or two, imitative behavior recovered. The performance of imitative behavior during this phase was approximately 80% for both Set A and B behaviors. With Phase J, imitative behaviors in Set A were again reinforced and the three sub-

jects continued to imitate both the reinforced Set A behaviors and the unreinforced Set B behaviors. When extinction of all imitation was reintroduced in Phase K, there was little, if any, effect on the percentage of behaviors imitated.

In Phase L, the subjects were verbally reprimanded for imitating any Set A behavior that was demonstrated. This change led to a rapid decrease in the percentage of behaviors imitated from both Set A and Set B (Figures 1, 2, 3). With Phase M, the verbal reprimands were removed and extinction of all imitative behavior was scheduled. There followed an increase in imitative behavior by all three subjects.

DISCUSSION

In certain phases of this experiment, the consequences of imitative behavior were more important for the subjects than the instructions given by the experimenter, while in other phases instructional stimuli seemed to be controlling their imitative behavior. Additionally, during the initial sessions of two phases, neither instructions nor consequences effectively controlled the imitative behavior of the subjects. Although Set B behaviors were unreinforced throughout the 13 experimental phases, the performance or non-performance of imitation generalized from Set A to Set B. If the subjects did not imitate Set A behaviors they also failed to imitate Set B behaviors.

In Phases C, G, H, and L, when the instructions and consequences were incongruent, the imitative behavior of all three subjects was controlled by the consequences. That is, they imitated when imitation was reinforced and they did not imitate when reinforcement was given for behavior other than imitation or when they were reprimanded for imitation. During these phases, the verbal instructions appeared to have little effect upon the subjects' imitative behavior. Though the subjects were instructed not to imitate in Phase C, they imitated (and received reinforcers). In Phase G, they did not imitate, although they were instructed to imitate (and other behavior was differentially reinforced). Phase H

replicated Phase G with a different DRO schedule. With Phase L, subjects were instructed to imitate (and were reprimanded if they did) and they stopped imitating. In each of these phases, the reinforcement variable seemed to mask or override the instructional variables.

During Phases F, I, K, and M, the lack of consequences for imitation did not affect imitative behavior. In each of these four phases, subjects were instructed to imitate and they all imitated a very high percentage of demonstrated behaviors, although they received no extrinsic reinforcement. It would appear that the subjects' imitative behavior was controlled by the instructional stimuli during these extinction periods. Several experimenters (Burgess *et al.*, 1970; Steinman, 1970a; Steinman and Boyce, 1971; Peterson and Whitehurst, 1971) have obtained similar results, although other experimenters (Baer and Sherman, 1964; Lovaas, Freitas, Nelson, and Whalen, 1967; Peterson, 1968) have observed a decrement in imitative behavior with extinction procedures. In the present experiment, what was striking about the performance of imitative behavior by the subjects during extinction periods was the re-establishment of imitation during Phases I and M. In the phases before these (H and L), the percentage of behaviors imitated by the subjects was near zero; with the introduction of extinction, in Phases I and M the percentage of behaviors imitated rapidly increased.

It was apparent from Phase A that all three subjects were highly imitative from the beginning of the experiment. Subjects 1 and 3 were still imitating at least 50% of the demonstrated behaviors during the fourth session of Phase A in spite of the lack of reinforcement and the instructions, "Don't do this". Subject 2 was still imitating over 20% of the demonstrated behaviors through the third session. The same phenomenon was observed when the conditions of Phase A were repeated during Phase D. All three subjects continued to imitate for several sessions, although they did not receive reinforcement and were instructed not to imitate. Since imitation

was a well-established response for these subjects it seems likely that it was slow to come under instructional control during Phases A and D. The initial high level of imitativeness of the subjects from the beginning of the experiment may have been an important factor in the control of imitation during Phases F, I, K, and M (rather than instructional control). Further investigation is needed, however.

The present results point out some of the conditions in which the consequences of imitation can control the performance of imitative behavior and in which instructional stimuli can control imitative behavior. It is still open to question if reinforcement contingencies or instructional stimuli, or both, control imitative behavior in situations where they are congruent, such as in Phases A, B, D, E, and J of this experiment.

This experiment has shown that it was very difficult to eliminate a well-established behavior that was under instructional control. Mere removal of reinforcement for the behavior was not sufficient to diminish its strength. With the addition of instructions contraindicating the behavior, gradual elimination of the behavior was finally observed. In applied or experimental settings, the use of other techniques (DRO, verbal reprimand) may be more efficient than extinction in eliminating well-established behaviors. With the important role that imitation has played in theories of child development, changing deviant behavior, and analyses of child behavior, a need for further research on imitative behavior is certainly indicated. One focus of inquiry should be on antecedent variables such as instructional stimuli and the social control system. Additionally, as the present experiment has indicated, the consequences of imitative behavior are also important and deserve renewed attention. Further applications of procedures involving incongruencies between reinforcement contingencies and instructional stimuli should certainly yield additional information about the function of both these systems in the control of imitative response classes.

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