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# Efficacy of Reinforcement in an Observational Paradigm

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# EFFICACY OF REINFORCEMENT IN AN OBSERVATIONAL PARADIGM

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BY

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## ABSTRACT

Study investigated the effectiveness of reinforcement in an observational paradigm where the dependent variable was indicated by increased morphological resemblance of an observer (O) after viewing a model (M). The stimulus was a series of novel responses recorded on videotape with each child viewing the tape individually. The subjects were 32 Head Start males divided into four groups. The first group was administered verbal praise prior to the modeling session. The second served as the vicarious reinforcement condition and observed an adult praise the model. The third group received direct reinforcement during the test for acquisition. The control group received no reinforcement along any dimension. The analysis showed only the post-reinforcement group imitated significantly more than the control group.

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# CHAPTER I

## INTRODUCTION OF THE PROBLEM

New psychological techniques are traditionally postulated and applied before any rigorous scientific studies have validated their underlying assumptions. However, when laboratory findings provide an operationally defined basis for principles of learning and behavior change, each stage of development is subject to close scrutiny.

The human organism possesses the ability to imitate other person's behavior on a vicarious basis through observation of a model and its consequences for that model. (Bandura 1965a; Bandura & Walters; 1963).

It has been hypothesized that the occurence of imitative or observational learning is contingent on the administration of reinforcing stimuli either to the model or to the observer. For example, Miller and Dollard (1941), reduce imitation to a special case of instrumental conditioning. The necessary conditions for learning through imitation include a motivated subject who is positively reinforced for matching the rewarded behavior of a model during a series of initially random trial-and-error responses.

Taking Clark L. Hull's learning theory, Miller and Dollard expanded to human behavior and experimented with

children and demonstrated that under the conditions demanded by the theory, imitation will be learned and, once learned, will generalize to new situations.

An explanation of the imitation paradigm is a difficult task as Baldwin explains:

> "Empirism is reflected in the emphasis given to observational learning by Bandura and Walters (1963). The research on observational learning and imitation is very important, but Bandura and Walters do not integrate it into the main body of S-R theory. Just how does imitation occur? What events intervene between the stimulus (model) and the response (imitation)? Is there a tendency for any stimulus to be imitated? If not, what differentiates a model from a stimulus? The exploration of these problems is necessary for the development of a good social-learning theory. At the moment, the justification of the concept of imitation is merely that it occurs, not that it is related to other concepts in theory" (1967, p. 480).

Bandura and Walters (1963) have developed a social learning theory to explain imitation; contiguity is the central theme. When an observer witnesses a model exhibit a sequence of responses, the observer acquires, through contiguous association of sensory events, perceptual and symbolic responses possessing cue properties that are capable of eliciting, at some time after a demonstration, overt responses corresponding to those that had been modeled (Bandura, 1965b).

One of the major disagreements in imitation theory is the role of reinforcement. There is evidence that imitative learning may occur in the absence of rewards to the model or rewards to the observer (Bandura, 1962, 1965b; Bandura and Walters, 1963).

Reinforcement theories account adequately for performance of a response or response class, but fail to explain the initial occurence of matching responses (Bandura, 1962, 1965a; Bandura and Walters, 1963). This makes the distinction between learning and performance necessary in explaining a particular imitative response. Behaviors which already exist in a behavioral repertoire are easily strengthened and maintained by operant methods developed in the laboratory. However, behaviors not already in the repertoire provide a far more difficult task for therapists. Bandura (1965c) has provided evidence that operant procedures are laborious and inefficient for developing new behavioral repertoires. He emphasizes reinforcement influences performance, more than learning.

A discussion of reinforcement as it affects imitation makes it necessary to explain the phenomena of vicarious reinforcement. Observers show facilitation and decrement in behavior as a result of seeing performers of a class of behavior, experience rewarding or punishing consequences. (Bandura & Whalen, 1966; Phillips, Benston & Blaney, 1969; Fernandez & Liebert, 1970).

Two generalizations may be implied from the concept of vicarious reinforcement. One is that people continually observe the behavior of others as this behavior is rewarded, ignored or punished, and this observation influences the subsequent operation and effect or reinforcers on the observers (Bandura, 1965b). The second is

individuals regulate their own self-reinforcement mechanisms.

Bandura and Perloff (1967) conducted a study to test self-reinforcement and externally imposed systems of reinforcement. Children worked at a task in which they could achieve progressively higher scores by performing increasingly more effortful responses. Children in the self-reinforcement condition selected their own achievement standards and rewarded themselves whenever they attained their self-prescribed norms. Because the capacity to maintain effortful behavior over time is the most important attribute of a reinforcement operation, the dependent measure was the number of responses the children performed until they no longer wished to continue the activity. Children in the self-monitored condition imposed upon themselves highly unfavorable schedules of reinforcement. Not a single child chose the lowest score which required the least effort, while approximately half of them selected the highest achievement level as the performance meriting self-reward.

If any individual has excessively stringent self-reinforcement systems he may have difficulty attaining goals for much social behavior may depend upon a considerable amount of individual learning (Church, 1968).

Bandura's (1965b) position on imitation hypothesizes an observer may reproduce the actions of a model more or less faithfully after a single demonstration. Walters

(1968) counters by saying many demonstrations are often necessary for exact reproduction to occur unless the observer's response repertory already includes sequences that approximate closely those displayed by the model.

Other interpretations have been offered by Baer and his associates (Baer, Peterson, & Sherman, 1967; Baer & Sherman, 1964). They speak of generalized imitation. If accurate reproduction of modeling stimuli is frequently reinforced, behavioral similarity eventually acquires conditioned reinforcement properties. After similarity has become reinforcing in its own right, persons are disposed to perform imitative responses for their inherent reward value.

Sheffield's (1961) analysis of the processes involved in learning complex perceptual motor tasks have also been suggested as a basis for imitation learning (Bandura, 1962: Bandura & Walters, 1963; Bandura, 1965b). This analysis requires only that stimuli be presented in conjunction and their association is, in some sense, "registered" within the memory "storage" of the organism. As a result of contiguous presentation, sensory experiences become chained in such a way that the representation of a stimulus can elicit imaginal representations of associated stimuli and that the perceptual-cognitive structures that are thus evoked may serve to guide behavior.

These general discussions of assumptions underlying imitative learning are not all encompassing. The idea

that the acquisition of matching responses result from contiguous sensory stimulation is an attractive one. Any response can be attached to any stimulus and vice versa. If this is so, why aren't all responses imitated? When will learning not occur? This brings up the functional relationships of antecedent and consequent conditions surrounding the observational paradigm. An organism becomes a "selective" imitator dependent on reinforcement or non-reinforcement of such behavior (Rosenbaum & Arenson, 1967). Gewirtz and Stingle (1968) express the view that theory may not be essential to conceptualize functional relations of a selected class of variables and response outcomes.

> Although there is a sense in which all organisms must somehow bridge the gap between relevant experience and later response outcomes, the means whereby this is accomplished is not obvious. Thus, theoretical approaches may differ not only on the means by which they explain this gap-bridging process, but also on the utility of even postulating such processes at all. For most heurestic purposes it has typically been assumed by conceptualizer's of human and subhuman learning to be unnecessary to posit a special process over and above that implied on the functional relations of selected independent variables to overt response classes (p. 375).

By exploring these functional relationships, imitation learning may be the answer to many therapists prescriptive problems. Modeling already has proven to be a very effective behavior modification technique (Chittenden, 1942; Kelly, 1955; Gittelman, 1965; Lovaas, Berberich, Perloff & Schaeffer, 1966; Marshall & Hahn, 1967; Bandura, Blanchard & Ritter, 1969).

Statement of the Problem

Section one of this chapter provided a general discussion of the dominant theoretical explanations of imitation. Miller and Dollard's conceptualization is generally regarded as the classic S-R position. Another type of theory about imitative acquisition of novel responses takes the position that learning occurs in one trial, and contiguity alone is sufficient to produce it. Bandura (1962) would amend the contiguity formulation to include a wide range of additional variables, from motivated attention to intensity of the model's stimulation.

One of the confusing aspects about theories of imitation is the tendency to consider imitative behaviors a unitary thing while in fact they are referring to behaviors which are heterogeneous in nature. A simple approach to the problem would be to explain a behavior, not an inferential concept.

The dependent variables in imitation experiments have been indicated by increased behavioral similarity by an observer (O) when viewing a model (M). The study of imitative behavior is concerned with causal relationships between M's behavior (or alleged behavior) and O's behavior. This similarity has been demonstrated by increased frequency of response, magnitude of response, and/or morphological resemblance of O's behavior to that of M (Flanders, 1968).

There are eight basic parameters in an observational paradigm; the model's cue, the model's drive, the model's response, the model's reward, the observers cue, the observers drive, the observers response, and the observers reward. Although all eight are potentially involved, this study is concerned with observers cue, drive, response, reward, and the vicarious reward of the model. A reinforcement may be called vicarious if giving it to a model changes the probability of a response in an observer (Berger, 1968).

The focus of this study centers on the various roles of reinforcement in the modeling session, whether it be primary, secondary, vicarious or whether reinforcement is an essential part of imitation learning at all.

Related Literature

Flanders (1968) has offered an extensive review of the research on imitation learning organized according to independent variables manipulated so that gaps and consistencies in the literature become apparent. It should be noted other reviews (Bandura & Walters, 1963; Mowrer, 1960) present a far more biased presentation. Each reflects a theoretical position which cite studies to support the espoused viewpoint. The context of this section deals with research pertinent to the hypotheses to be presented.

To imitate a model an observer must attend to, retain, and comprehend the modeled behavior (Hovland, Janis & Kelly, 1953). When the behaviors are relatively simple,

it is assumed that the modeled act falls within the responses repertoire of the observer. If O is asked to describe what M did or do what M did, it must be inferred that O knows what M did to some degree. The best measure of testing this inference is to vary incentive conditions and compare among them. Incentive may be increased along three dimensions; before the modeling session, during the modeling session or after the modeling session.

Looking at prior motivational incentive first, it has been found that a stimulus may be used to increase alertness for processing all external information and to improve selection of particular stimuli (Posner & Bores, 1971). Estes and Skinner (1941) found incentive-motivational properties when presented prior to the initiation of an instrumental response may facilitate instigation of the response.

The situational stimuli determine the directional component of behavior along with innate or habit factors (Cofer & Appley, 1964, p. 834). Incentive set appears to to be an important ingredient on the effects of social reinforcers. Cairns (1970) found a prior instructional set was necessary before an effective verbal event could be influencing as a signal. According to this proposal, "the reinforcement properties of social reinforcement for children are dependent upon (a) the childs orientation toward the event, and (b) its signal properties." (p. 653).

Hyman (1970) studied incentive from a Hullian viewpoint and found that intentional learning was increased by raising the level of intrinsic drive (D) and extrinsically produced incentive (K). Scores on the Children Manifest Anxiety Scale were used to determine the childs level of D while the offering of a monetary reward served as the extrinsic incentive. There was also a significant interaction between D and K with high D students displaying greater intentional learning under the K condition than did low D students.

Bandura, Grusec, and Menlove (1966a) investigated the effects of symbolization on delayed reproduction of modeling stimuli in a test of the contiguity-mediational theory of observational learning. They found the effects of increased incentive non-significant, but because of the design, where each child sat individually in front of the screen, incentive set could have had little effect due to the lack of other external stimuli. The modeling sequence presented only one model and a relatively easy behavioral task. They concluded selected control over stimulus input would be more obvious during controlled exposure to multimodels requiring selective attentiveness to social cues.

This study will attempt to determine the effects of administering sensitization prior to the modeling session in the form of model praise.

It may be assumed that one effect of vicarious reinforcement is increased imitation of M by O. This is

the second dimension this paradigm is concerned with. Flanders (1968) cites a large number of studies with human subjects which have confirmed this hypothesis. Rewards such as: knowledge of task-success results (Bisese, 1966; Luchins & Luchins, 1955; Mausner & Bloch, 1957; Rosenbaum 1967; Rosenbaum & Tucker, 1962; Willis, 1963), utterance of the word "good" by E (Kanfer & Marston, 1963; Marston, 1966; Marston & Kanfer, 1963), utterance of the word "good" by M (Marlowe, Brecher, Cook & Dobb, 1964; Marston, 1965), tokens (Clark, 1965; McDavid, 1962), praise by E (Bandura, Grusec & Menlove, 1967a) praise plus fruit juices and candy (Bandura, 1965), maternal affection (Walters, Leat, & Mezec, 1963; Walters & Parke, 1964) and absence of aversive consequences (Bandura, Grusec & Menlove, 1967b; Geer & Turtlebaum, 1967).

Bandura postulated reinforcers administered to a model exert their major influence on the performance of imitatively learned responses (Bandura, 1965b). In this experiment children observed a film-mediated model who exhibit novel physical and verbal aggressive responses. In one treatment condition the model was severly punished; in a second, the model was generously rewarded; while the third condition presented no response consequences to the model. The test for acquisition revealed that reinforcing consequences to the model resulted in significant differences in the performance of imitative behavior. The model-rewarded groups produced the highest number of match-

ing behaviors and the model-punished group the lowest. The most interesting part of the study was the introduction of positive incentive to all three groups after the test for acquisition. This eliminated the performance differences revealing an equivalent amount of learning among children in the three treatment conditions.

Bandura, Grusec and Menlove (1967) employed pretest and posttest measures on all experimental and control groups to determine vicarious reinforcing effects. Dog-phobic children O's were initially measured for approval behavior toward a dog. Then experimental O's observed a peer M exhibit gradual approach behavior toward a dog in a highly positive party context. Control O's were exposed either to the dog in a party context or the party context alone but never to M. Increased approach behavior on an immediate posttest constituted the imitation measure. O's viewing the model in the party context exhibited the greatest imitative effect.

Though vicarious reinforcement appears to be an effective controller of selective imitative behaviors, maximal incentive conditions after the modeling session appears to be more effective than vicarious reinforcement (Bandura, 1965; Bandura, Grusec & Menlove, 1966; Marston, 1966; Phillips, 1968).

Other studies have provided evidence concerning other variables which may affect the modeling session.

The level of imitation can be enhanced through practice or overt rehearsal of modeled response sequences (Margolius & Sheffield, 1961). This process seems to be most effective in tasks that rely heavily upon symbolic functions or when novel modeling stimuli are introduced. No opportunity for overt practice was presented in this study.

The incentive provided by the model would seem to be an important consideration in any observational or modeling session. The ability of a model to augment observational learning by eliciting and maintaining strong attending behavior is a function of their organizational affiliations and living circumstances (Bandura & Huston, 1961; Grusec & Mischel, 1966; Cairns, 1970). The present model was of the same sex and slightly older than the observers. Bandura, Ross & Ross (1961) have found that because of past reinforcement history "one would expect subjects to imitate the behavior of a same sex model to a greater degree than the model of the opposite sex" (p. 575).

If subjects were allowed to verbalize during the observational session, imitation would be enhanced. For example, Van Hekken (1969) found relevant verbalization during the modeling session to significantly improve the reproduction of matching responses compared to the control group who observed passively.

If subjects were allowed to view different modeling sequences, the ability of the subject to code modeling

responses into verbal labels could enhance imitation. Gerst (1969) had subjects observe a filmed model perform complex motor responses varying in the ease with which they could be verbally coded. They were instructed to code the items into either vivid images, concrete verbal descriptions of the response elements, or convenient summary labels that incorporated the essential ingredients of the responses. Compared to the performance of control subjects who had no opportunity to generate symbolic mediators, all three coding operations enhanced observational learning. The sequences were identical for all groups in this study.

Behaviors that can be operationally defined in the subjects repertoire may elicit strong stimulus cues. For example, aggresive responses suggest affective qualities, this is not to imply aggressiveness is a cause of behavior.

> Trait names usually begin as adjectives- "intelligent," "aggressive," "disorganized," "angry," "introverted," "ravenous," and so on- but the almost inevitable linguistic results is that adjectives give birth to nouns. The things to which these nouns refer are then taken to be the active causes of the aspects. We begin "intelligent behavior," pass first to "behavior which is the effect of intelligence." . . . But at no point in such a series do we make contact with any event outside the behavior itself which justifies the claim of a causal connection (Skinner, 1953, p. 202).

For this reason simple motor responses were used as modeling stimuli.

## Hypotheses of the Study

The hypotheses tested in this study were as follows:

Hypothesis 1: Pre-trial sensitization will increase attention, therefore, increasing the stimulus effects of the model.

Hypothesis 2: Viewing a model receiving reinforcement will enhance imitation.

Hypothesis 3: Post-trial reinforcement based on the number of morphologically correct matching responses will increase imitation.

Matched-dependent behaviors acquired by an observer through simple contiguous stimulation independent of the observer's overt responses or reinforcement serves as a control condition.

# CHAPTER II

## METHOD

### Subjects

The subjects used in this study were 38 males in the Head Start program at the Jefferson Elementary School in Charleston, Illinois. All were between the ages of 3½ and 5½ years. Six were eliminated for not responding leaving a total of 32 subjects.

### Design and Procedure

The subjects were randomly assigned to four groups; eight subjects per group. For convenience, groups were labeled A, B, C, and D (Table I). A sequence of novel responses were recorded on video-tape and served as the stimulus in the modeling session. All the stimuli were uniform and are listed in Figure I. In all conditions, two people are being shown, a ten year old male and an adult. The adult shows no reaction to the M's behavior except to group B, here he reinforces M's behavior with positive reactions and gestures such as head nodding, smiling approvingly, and an occasional pat on the back. Group B served as the vicarious reinforcement condition.

TABLE I

| GROUP | TREATMENT |
|---|---|
| A | Sensitization |
| B | Model reinforcement |
| C | Post reinforcement |
| D | Control |

One subject at a time viewed the videotaped modeling session.

Group A (sensitization group) are given the following instructions:

> "Your teacher told me you are a good student and pay attention very well. I have a film showing a boy doing some things. There is no sound so watch closely."

Group B (model reinforcement) were given these instructions:

> "I have a film showing a boy doing some things, there is no sound so watch closely."

This taped sequence shows the M being positively reinforced by the adult for performing the tasks.

Group C (post reinforcement) were given these instructions:

> "I have a film showing a boy doing some things, there is no sound so watch closely."

In this sequence the adult gives no reinforcement during the modeling session. However, during the test for acquisition, the subjects are told they will receive a penny for every behavior thay can match.

FIGURE I

RESPONSE CHECKLIST

Opening Cue; "in the beginning of the film, the boy did some things with a jacket he had in front of him, see if you can do what he did."

RESPONSE

1. M picks up coat from table
2. Lays coat on floor with the lining side up. (collar toward him)
3. Bends over and inserts hand into proper sleeves
4. Picks coat up over head onto back
5. Walks to rear of table
6. Lays coat on table

Second Cue; "In the second part of the film, he did some things with a box full of things.

1. Moves box to side
2. Takes out plate
3. Takes out glass
4. Takes out cup and saucer
5. Takes out knife and fork
6. Puts them back in box.

Third Cue; "Okay, show me what he did with the light."

1. Lifts off towel
2. Puts towel in waste can
3. Turns on light
4. Takes out towel
5. Turns off light
6. Puts towel back on

Group D (control) are given the same instructions as group B and C.

> "I have a film showing a boy doing some things, there is no sound so watch closely."

This group receives no cues to increase awareness, does not see the M being reinforced and is offered no post test reinforcement for matching responses.

Delayed imitative performance is determined not only by observational variables, but also by rehearsal processes which improve retention. For this reason, individual sessions were used instead of a group session in order to control for rehearsal. Immediately after viewing the videotape, the subjects were taken into another room where the same stimulus items used on the tape were present.

Test for Acquisition

In order to control for any possible E influences, the person who conducted this phase did not know to which treatment conditions the Ss had been assigned.

The Ss were asked by E to demonstrate all of the model's responses they could recall. The number of morphologically correct matching responses were recorded on a checklist illustrated in Figure I.

# CHAPTER III

## ANALYSIS OF THE DATA

Table 2 shows the mean number of matching responses for each treatment group.

TABLE 2

Mean Number of Matching Responses

| Sensitization A. | Model Reinforcement B. | Post Reinforcement C. | Control D. |
|---|---|---|---|
| 6.5 | 7.375 | 9.750 | 5.125 |

Note-There were 18 possible matching behaviors.

Following the Hartley (1950) procedure the largest and smallest cell variances make up the F max statistic. The result is $F\ max = \frac{12.21}{8.982} = 1.359$. F max must be equal to or greater than 8.44 in order to allow rejection of the homogeneity of variance assumption at the .05 significance level.

A summary of the analysis of variance based on the matching scores is presented in Table 3. The design is characterized by the random assignment of each subject to only one level of the independent variable.

TABLE 3

Analysis of Variance of Imitative Matching Responses

| Source | df | SS | MS | F |
|---|---|---|---|---|
| Total | 31 | 346.88 | | |
| Between (A) | 3 | 90.63 | 30.21 | 3.30* |
| Within (S/A) | 28 | 256.25 | 9.15 | |

*p .05

Since one of the groups is a control there are 3 nonindependent comparisons which are of interest. Dunnett's analysis as outlined in Keppel (1973) was applied. Comparisons between the treatment groups and the control showed only the Post-reinforcement (C) group to be significant (Table 4).

TABLE 4

Dunnett's test: Comparing the Control Group Mean with Experimental Group Means

| A & D | B & D | C & D |
|---|---|---|
| 11 | 18 | 37* |

*p<.01, difference between means required ≥ 34.72

The significant F gives evidence of differences between the means and Dunnett's tests shows a significant difference between the Post-reinforcement group and the

control group. The question then becomes, does each mean differ from all the rest, or are some undifferentiated? Following Snedecor's (1959) adaption of Tukey's procedure for testing the comparison between all means only the Post-reinforcement condition is near significance (Table 5).

TABLE 5

Tukey's Test: Tests of all Comparisons Among Means*

| Treatment | $\bar{x}$ | D $\bar{x}$-5.12 | A $\bar{x}$-6.50 | B $\bar{x}$-7.37 |
|---|---|---|---|---|
| C | 9.75 | 4.62 N.S. | 3.25 N.S.. | 2.375 N.S. |
| B | 7.37 | 2.25 N.S. | .875 N.S. | |
| A | 6.50 | 1.37 N.S. | | |
| D | 5.12 | | | |

*difference required $\geq$ 4.79 (p = .05)

Also examined was the sequential test of differences utilizing not one value of Q, (studentized range) but one for each range of the treatment means. No significant differences were detected except the Post-reinforcement conditions as in the first procedure.

# CHAPTER IV

## DISCUSSION

Although the results of the present study provide confirmatory evidence for the facilitative role of post-reinforcement in the modeling session, the other treatment effects were not significant. Some interpretations of this result should be examined.

The subjects in the study were enrolled in the local Head Start program. Since one of the requirements is that the children's family is below a prescribed income level it may be assumed they are well below the middle class standard. Baker(1970) conducted a study comparing subjects from a Head Start development center and a middle class private kindergarten. Both males and females participated. Each child was individually exposed to a female model who displayed certain verbal and motor responses while playing with toys. She reached these conclusions: (A) Middle class children will display a greater frequency of imitative responses than will lower class children. (B) Attention-directing cues in the form of incentive-oriented instructions did not facilitate imitation for all subjects. (C) Incentive oriented instructions did have a significant positive effect for lower class girls and a

negative effect for lower class boys.

These results suggest the lower class boys may have been actively resisting social influences. The results of this study coincide with the present data. Six of the original subjects would not respond at all and only the post-reinforcement group showed significant imitation. Apparently the monetary incentive was the strongest facilitator of imitation and the pre-trial sensitization was the lowest next to the control suggesting more than simple stimulus contiguity is necessary for imitation.

Another problem of behavior enactment or reproduction are critical motor skills. The subjects must observe the model and identify at least operationally the behaviors he sees before he can imitate them. As noted earlier, the stimulus items were simple motor responses that did not require any cognitive interpretation, yet the data shows many subjects had difficulty identifying behaviors during the test for acquisition. This also may be attributed to the subjects' cultural background. Greenfield and Bruner (1971) found similar deficiencies in cognitive development among isolated Wolof bush children. "Some environments push cognitive growth better, earlier and longer than others." (p. 41).

The hypothesis that pre-trial sensitization induced prior to exposure would enhance imitation may have had detrimental effects. The incentive-set instructions may have generated achievement anxieties in some of the children.

Observational learning could be adversely affected by implicit rehearsal of preceding events and disrupting thoughts if these competing cognitive activities occur while the modeling stimuli are being presented, especially at a rapid rate.

The hypothesis that vicarious reinforcement would enhance imitation did not prove true in this study. However the group mean for the model reinforcement group was larger than all but the post reinforcement group, though not significant. The social reinforcement offered by the adult on the tape may not have been rewarding enough based on the subject's previously learned social reinforcement history.

Bandura (1965c), as discussed earlier, suggested reinforcement affected levels of performance rather than learning. An interesting approach would be to offer monetary incentive to all groups to test if the level of learning imitative responses really differed.

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