AN INVESTIGATION OF THE EFFECTS OF REWARDED AND NON-REWARDED VERBAL AND OBSERVATIONAL LEARNING ON SPECIFIED BEHAVIORS OF MODERATELY RETARDED ADULTS

DISSERTATION

Presented in Partial Fulfillment of the Requirements for the Degree Doctor of Philosophy in the Graduate School of The Ohio State University

by

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1973

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ACKNOWLEDGEMENTS

I would like to express my deepest gratitude to my parents, Neil Francis and Mary Alice Lynch, who gave me both financial and moral support over the years in my career as a student of higher education. I hope this small success makes you happy and, in some small way, repays your devotion.

To Professors Herman J. Peters, Donald J. Tosi, and David Lema who constituted the members of my committee, I will not forget your many kindnesses, your consultation, and your guidance both during the preparation of this manuscript and during my graduate career.

Dr. Jack Barnette deserves mention for his contribution to the statistical analysis of the data. Jack has been good to my family and I regard him and his wife, Susan, as colleagues and friends.

I would also like to thank the other members of my family, Leo and Virginia and Helen, for their love and understanding both in this and other matters. Few sons are so fortunate as to have two wonderful families.

It is difficult to thank Ellie for all that she has done. Ellie has been a strong and unflagging well of support to me over the years and she is my best friend, my favorite professor, and my loving wife.
VITA

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Major Field: Education, Counseling
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CHAPTER I

INTRODUCTION

Conditions in state supported institutions for the mentally retarded have received considerable attention from both public and professional sectors in the past several years. Blatt and Kaplan's *Christmas in Purgatory* (1966) provided a new impetus for review of institutional policy and procedure. Task forces suggested the development of community-based resources to reduce the need to institutionalize the retarded citizen in these generally substandard facilities (Nirje, 1969; Blatt and Kaplan, 1967; Vail, 1967; Wolfensberger, 1969; and Dybwad, 1969).

If increased numbers of retarded citizens are to be retained in the community it is imperative that programs and services be developed to meet their specific needs. Such a delivery of service would necessarily include group homes, work activity centers, sheltered workshops, protective services, advocacy services, and counseling. Unfortunately, local programs and services for the retarded are often ill-suited to the needs of the retarded, especially those in the trainable range. Central among those services seldom provided are counseling and other therapeutic services (Wolfensberger, 1967).

If the retarded citizen is to lead a free but guided life in the community a full range of counseling and educational services must be available to him (Wolfensberger, 1967). The need for such service is underscored by Beier's finding that the presence of a behavioral disorder is among the primary causes of institutionalization of some
mentally retarded citizens (1964). Unfortunately, many community
clinics tend to turn away such clients because they are retarded (Chess,

Although counseling and psychotherapeutic techniques have been
tailored to many treatment populations (e.g., play therapy for children,
etc.), further research is needed in developing techniques suitable for
the retarded population (Webster, 1970). The general consensus seemed
to be that a directive approach was generally more effective, and that
verbal methods, when employed, are most feasible with older, higher
level retardates (Bialer, 1967).

This researcher investigated the relative effectiveness of ver-
傍ally mediated instruction versus observational learning in contrived,
easily classifiable behavior with a population of moderately retarded
adults. If, as suggested by the research, the retarded learn less
well by the verbal medium, it would seem worthy to compare verbal
methods with a non-verbal or low-verbal procedure (e.g., modeling
techniques).

It was the purpose of this study to examine the relative effec-
tiveness of observational learning on specified behaviors of moderately
retarded adults living in a community setting. In the study modeling
procedures were compared with verbally mediated directions. An experi-
mental design was employed with subjects being randomly assigned to
either an experimental or control group, each group consisting of
forty subjects.
Significance

If observational learning procedures prove effective in teaching specified behaviors to the moderately retarded adult, exposure to such training procedures could increase the likelihood of effective functioning in the community. Counselors, social workers, home trainers, and teaching personnel in community classes and sheltered workshops could make modeling procedures part of the normal curriculum or daily training program. Vocational and rehabilitation personnel would find modeling procedures especially useful in teaching social and vocational behaviors to retarded citizens preparing for competitive job placement. If effective, such procedures make use of existing equipment and facilities and staff and would, therefore, prove to be low in cost.

Definition of Terms

1. Accuracy - "Accuracy" in this experiment is defined as the subject's ability to replicate the required task. Eighteen objects must be correctly placed in three containers. The accuracy score is the number of objects correctly placed by the subject.

2. Control Group - Randomly assigned subjects (forty) who were provided rewarded or unrewarded verbal instructions regarding the task.

3. Down's Syndrome - A clinical type of retardation caused by aberrant chromosomes usually resulting in moderate to severe retardation. Also called "mongolism."

4. Experimental Group - Randomly assigned subjects (forty) who were provided exposure to a video-taped model who engaged in the experimental task. In one tape sequence, the model was rewarded
for performance while another tape showed the model performing without reinforcement.

5. **Modeling** - The operation of demonstrating a response to a subject and then directing him to imitate the performance.

6. **Non-Reward** - The absence of any promise of reward for performance.

7. **Reward** - Observation of a rewarded model or promise of reward in the verbally mediated control group.

8. **Speed** - Length of time, measured in seconds, required by each subject to replicate the task given verbally or viewed on video tape. Speed is measured from time subject takes the first object from the staff person to the last object placed in the container.

9. **Task** - The task in this experiment consisted of placing six white balls, six black blocks, and six black and white blocks into, respectively, a bucket, a black box, and a black and white box. The experimental group viewed the task performed by a model on video tape while the control group were told the task verbally.

10. **Verbally Mediated Directions** - Verbal explanation provided to each control subject concerning the nature of the task (i.e., placing balls and blocks in proper containers).
CHAPTER II

REVIEW OF THE LITERATURE

A number of theorists have attempted to account for the phenomenon of observational learning, or "modeling." Allport (1924) and Markey (1928), dealing with the child's acquisition of social communicative behavior, hypothesized that the child's learning of language starts with his own babbling behavior which stimulates the child to make the vocal movements with which they are associated by impinging on his own auditory receptors. Thus a circular reaction presumably develops whereby the baby's own vocal behavior stimulates his audition which, in turn, stimulates him to make a vocal response. The total hypothesis requires (a) the previous establishment of circular reactions and (b) the coincidence that, at first, the sounds made by others are similar to his own babbling sound and possibly also (c) reward for his mimicking responses.

More recently, Miller and Dollard (1941) have suggested that the child's tendency to copy is an acquired secondary drive that can account for much of the identification process described by psychoanalytic theory. When a child imitates the behavior of others his social environment rewards him and thereby reinforces his tendency to imitate. Thus, mimicking becomes a social or secondary motive for the child to copy responses of others that he himself has not previously made. Reinforcement of imitative behavior is the basis of most socialization, according to Bandura and Walters (1959).
Borrowing from psychoanalytic theory, Sears (1957) hypothesizes that the child's initial tendency to imitate is motivated by his desire to secure his mother's nurturance of his primary drives, such as the drive for food. When the food is not forthcoming the child imitates the behaviors that accompanied the mother's nurturant behavior thereby substituting for her nurturant behavior.

Whiting (1960) and Kagan (1958) hypothesized that children identify with their parents because they observe that the parents control goal states. Envying their status he emulates them in the belief that he will thereby acquire their power and possessions.

Mowrer (1950) attempted to integrate social learning hypotheses with psychoanalytic hypotheses on identification. According to Mowrer the basic paradigm of identification is illustrated by the learning of words by Mynah birds. These birds are rewarded (primary reinforcement) when they make sounds. In the process, the other stimulus characteristics of the trainer, including his verbalizations also become rewarding (secondary reinforcement) for the bird's vocalizations. If the birds make sounds that approximate (imitate) those of the trainer, they essentially reward themselves or give themselves secondary reinforcement for vocalization that imitates speech. As a result, these birds tend to repeat words that their trainers utter.

Bandura and Walters (1963) contend that the developmental problem which respondent and operant conditioning principles have been least successful in dealing with is the acquisition of novel responses, particularly new social responses. According to Bandura and Walters,
the solution, at least for social behavior, lies in the mechanism of imitation. Children imitate new behaviors that they have observed in a model. For example, in one experiment on aggressive behavior, children observed a model who used a particular way of beating up a doll (pounding the doll). The children imitated the model's type of aggressive behavior even though they had not been given any direct verbal instructions to do so. From this and other experiments, Bandura and Walters (1963) conclude that learning novel responses is a consequence of observing the behavior of others whom the children accept as models. It has been shown that subjects are more likely to imitate the behavior of prestigious than non-prestigious models and of models who are similar to the subjects themselves (e.g., another child, as compared with a cartoon animal). Children are also more likely to imitate the behavior of models who are rewarded for their actions than those who are punished or not rewarded. Further, certain kinds of responses (e.g., aggressive responses) are more likely to be imitated than others. Presumably, imitation of some kinds of models and of some kinds of responses is more rewarding under certain conditions than imitation of other kinds.

Bandura and his associates have shown that general readiness to imitate may be increased by a number of factors including the subject's motivational set (e.g., promise of future reward for accurate imitation of model's behavior, etc.), or the child's readiness to notice certain elements in the model's behavior on the basis of past experience. In one experiment, cited by Bandura (Toch and Schulte, 1961),
advanced police administration students were more attentive to violent aspects of a complex stimulus situation than novice students, presumably because of prior reward for such attention. Additionally, the readiness to imitate is affected by the relevance of the model himself or the activity involved, to the child's own needs and the expectations derived from his past experience. Again, children and adults alike are more likely to be attentive in some situations than in others.

In a novel experiment, Bandura attempted to differentiate between acquisition of a response capability and actual performance (Bandura, 1962). Children were shown films of a model displaying aggressive behavior under varying conditions. In one condition the model was severely punished; in a second the model was generously rewarded with approval and food reinforcers; while in a third film there was no consequence for the model's behavior. A postexposure test of imitative behavior revealed differential amounts of imitative behavior with children in the "model-punished" condition performing significantly fewer imitative responses than those in both "model-rewarded" and the "no-consequence" groups. Subsequently, Bandura offered children in all three groups attractive rewards contingent on their reproducing the model's behavior. Introduction of these positive rewards completely eliminated the previously observed performance differences. Children in all three groups imitated equally, revealing an equivalent amount of learning among children in each of the three groups. Therefore the actual performance of imitative response patterns is not always necessary for learning them.
Additional evidence of modeling effects is provided by experiments employing similar classes of responses (Bandura, 1965; Hicks, 1965) as well as sequences of behavior (Bandura, 1965; Bandura, 1963). At an even higher level of complexity it has been shown that children can acquire contingencies for self-reinforcement and self-evaluation (Bandura, 1964; Bandura, 1966), judgemental orientations (Bandura, 1963), self-imposed delay of reward patterns (Bandura, 1965). Moreover, responses acquired observationally may be retained over an extended period of time (i.e., over six months) even if there is little or no time to perform the novel behavior during the interval (Hicks, 1965). The findings of other experimenters demonstrates that subjects are more likely to behave in socially disapproved ways frequently after they have observed models so behaving. On the other hand, observations of models conforming to social norms seems to strengthen the observer's self-controlling responses and reduce the tendency to yield to temptation (Ross, 1962).

As has been pointed out in the foregoing discussion, modeling, imitative behavior, and observational learning involve teaching complex behaviors by having the subject observe a model then perform the behavior by imitating the model's performance (White, 1971; Hilgard and Bower, 1966). Literature on the effectiveness of modeling (Bandura, 1963; Bandura, Ross, and Ross, 1963) suggests that there are at least four factors which pertain to the efficiency of observational learning. The four factors include: (1) the stimulus properties of the model, (2) the type of behavior exemplified by the model, (3) the
consequences of the model's behavior, and (4) the motivational set
given to the subject. In general, the more nearly like the subject
the model is in age, appearance, sex and so forth, the more likely the
subject is to model the behavior. Rewarded behavior is more likely
to be imitated than behavior which is either ignored or punished; and
the more clearly the behaviors which the subject is to imitate are
specified; the greater the extent and degree of modeling. Although
it has been suggested in the studies done that more complex tasks re-
quire more observations and more opportunities for practice, each
situation requires an independent assessment. Not enough work has
yet been done to assign optimal lengths of observation to particular
behaviors.

The review of the literature indicates that observational learning
procedures may be more effective than verbal methods in changing the
behaviors or teaching new behaviors to the moderately retarded. Be-
cause of the high incidence of hearing difficulties, auditory discrim-
ination problems, memory disturbances, and environmentally induced in-
hibiting factors, many retarded citizens frequently have difficulty in
making optimum use of the auditory channel (Goertzen, 1957; Harrison,

Based on a review of the pertinent literature this study will
compare the effectiveness of video taped modeling procedures with
directions given verbally on a particular task that involves putting
certain small objects in designated receptacles. The experimental
group will be trained by a video tape model while the control group
will only be given verbal directions for the task. Half of the experimental and control group will be trained under conditions of reward. Subjects will be tested immediately after training and again one week after training.
CHAPTER III
DESIGN

Subjects

Selection of Experimental Subjects: Subjects were obtained from the Hamilton County Council for Retarded Children in Cincinnati, Ohio. More than ninety-two (92) moderately retarded adults were receiving services in the Council's work activity centers. From this pool eighty (80) subjects were randomly assigned to four treatment groups with twenty (20) being assigned to each cell. The twelve (12) remaining candidates were kept on a roster as back-up subjects in case of attrition in the original random assignments.

The names of all the individuals comprising the moderately retarded group were written on small pieces of paper (2" x 4" cards). The paper slips were then vigorously rotated in a small mesh drum (1 gallon) for two minutes. The slips were then placed into boxes coded RX₁ through RX₄. This procedure ensured that the subjects were randomly assigned to treatment groups.

Characteristics of Experimental Subjects: All of the experimental subjects were living with their parents in greater Cincinnati. None had ever married, and the majority of experimental subjects had never attended regular schools, being trained instead in county funded "community classes." Eleven subjects exhibited Down's Syndrome, six were diagnosed as "brain injured," and the remainder were undifferentiated. I.Q. scores ranged from 40 to 54 with an average of 48.
Twelve subjects were female and 28 were male. Ages ranged from 19 to 34 with an average of 27.

**Characteristics of Control Subjects:** All of the control subjects were living with their parents in greater Cincinnati. None had ever married, and the majority of control subjects had never attended regular schools, being trained instead in county funded "community classes." Fifteen subjects exhibited Down's Syndrome, two were "brain injured," and the remainder were undifferentiated. I.Q. scores ranged from 40 to 54 with an average of 51. Sixteen subjects were female and 24 were male. Ages ranged from 17 to 28 with an average of 24.

**Settings**

**Settings for Experimental Subjects (See Figure 1):**

The experimental subjects received the video tape treatment at the Eastern Hills Work Activity Center. The site was chosen because of its ideal facilities and because the majority of trainable retardates receive workshop services at that location.

The experimental setting consisted of two rooms, both eight feet by ten feet in size, separated by a common wall which had a one-way glass. Both rooms were soundproofed and were equipped with video tape monitors.

Room "A" (See figure 1) was a soundproofed and monitored (audio and video) facility at the Eastern Hills Work Activity Center. The room measured eight feet by ten feet. Situated against the south
wall of Room "A" was a table of sufficient size to accommodate a
nine inch monitor and a Panasonic video tape one-half inch E.I.J.A.
recorder. Three feet away from the television monitor and facing the
screen was a straightbacked chair. There was no other equipment or
furnishings in Room "A."

Room "B" (See figure 1) was a soundproofed and monitored (audio
and video) facility at the Eastern Hills Work Activity Center. The
room measured eight feet by ten feet. On the west side of the room,
against the wall housing the one-way glass, was a five foot long table.
Situated on the table was a large white box, a large black and white
box and a bucket. There was no other equipment or furnishings in
Room "B."

Procedures

Experimental Group with Reward: Each experimental-reward subject
was brought to Room "A" individually by a floor supervisor. The sub-
ject was then met by the experimenter who made the following state-
ment:

Experimenter: "I want you to watch the television very
closely. Watch the woman and see where she puts all
the blocks and the balls. The blocks and the balls go
in special places. After the movie we will see if you
can put the blocks and the balls in the right places
just like she did. She goes very fast. See if you can
go fast, too!"

The experimental-reward subject was then shown the tape which featured
a model being highly rewarded for her performance. The reward in the
video tape was verbal in nature. Every third placement by the model
was rewarded by a "very good!" and "that's right!" by the staff person.
Each experimental-reward subject was then taken to Room "B" where he was required to imitate the behavior of the video taped model. The number of objects correctly placed constituted the "accuracy" score while the time required to place all the objects constituted "speed" of that particular subject. Subjects were re-tested for accuracy and speed again one week later.

**Experimental Group Without Reward:** Each experimental non-reward subject was brought to Room "A" by a floor supervisor. The subject was then met by the experimenter who made the following statement:

Experimenter: "I want you to watch the television very closely. Watch the woman and see where she puts all the blocks and the balls. The blocks and the balls go in special places. After the movie we will see if you can put the blocks and the balls in the right places just like she did. She goes very fast. See if you can go fast, too!"

The experimental non-reward subject was then shown a video tape in which the model engaged in block-placing behaviors without benefit of reward.

The experimental non-reward subject was then taken to Room "B" where he was required to approximate the behavior of the video-taped model. Subjects were assessed on the accuracy and speed of their performance. The subjects were re-tested one week later to measure retention.

**Control Group With Reward:** Each control-reward group subject was brought to Room "B" by a floor supervisor. The subject was then met by the experimenter who made the following statement:
Experimenter: "There is a woman in this room who is going to give you a job to do. She is going to give you some black blocks and you should put the black blocks into the black container. She will also give you some black and white blocks and you should put them into the black and white container. She will also give you some white balls and you should put those into the pail. Try to do everything fast! If you can put everything in the right place, the woman in the room will be happy!

Each control-reward subject was then admitted to Room "B" where he or she was given the opportunity to perform as instructed verbally. Subjects were assessed on the accuracy and speed of their responses. Subjects were re-tested one week later to measure retention.

**Control Group Without Reward:** Each control non-reward group subject was brought to Room "B" by a floor supervisor. The subject was then met by the experimenter who made the following statement:

Experimenter: "There is a woman in this room who is going to give you a job to do. She is going to give you some black blocks and you should put the black blocks into the black container. She will also give you some black and white blocks and you should put them into the black and white container. She will also give you some white balls and you should put those into the pail. Try to do everything fast!

Each control-reward subject was then admitted to Room "B" where he or she was given the opportunity to perform as instructed verbally. Subjects were assessed on the accuracy and speed of their responses. Subjects were re-tested one week later to measure retention.

**Video Taped Material:** Two video tape presentations were prepared: one designed for the reward group and the other for the non-reward group, both in the experimental section. The experimental-reward tape showed a high-status moderately retarded adult female receiving both
black and black and white blocks and six white balls from a staff person. The staff person was a twenty-three year old female undergraduate pursuing a degree in psychology at a local college. Three groups of objects were given the model, each group being comprised of six blocks or balls. After each third correctly placed object the staff person said "that's right!" or "very good," constituting verbal reward. At the end of the task the staff person stated "...what a good job you did Jenny. I am very proud of you!" The tape was approximately two and one-quarter minutes in length.

The experimental non-reward (RX2) tape showed the same high status moderately retarded adult female receiving both black and black and white blocks and six white balls from a staff person. The staff person was the same twenty-three year old female undergraduate pursuing an undergraduate degree at a local college. Three groups of objects were given the model, each group being comprised of six blocks or balls. The objects were given to the model in random fashion, correctly placed, and no reinforcement of any type was provided by the staff person.

**Selection of the High Status Model:** Floor supervisors at the work activity centers were polled as to whom they thought enjoyed the most prestige among the client population at the centers. The client chosen for the modeling task was selected because of her high scores in the Special Olympics swimming contest. Her excellent performance in Special Olympics events had earned her the respect of the workshop clients, in the opinion of the floor supervisors.
Summary of Experimental Design: Eighty moderately retarded subjects, IQ 40-54, were employed in this study. Subjects were randomly assigned to experimental-control cells as follows:

<table>
<thead>
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<th></th>
<th>R</th>
<th>X</th>
<th>01</th>
<th>05</th>
</tr>
</thead>
<tbody>
<tr>
<td>N=20</td>
<td></td>
<td>X1</td>
<td>01</td>
<td>05</td>
</tr>
<tr>
<td>N=20</td>
<td></td>
<td>X2</td>
<td>02</td>
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<tr>
<td>N=20</td>
<td></td>
<td>X3</td>
<td>03</td>
<td>07</td>
</tr>
<tr>
<td>N=20</td>
<td></td>
<td>X4</td>
<td>04</td>
<td>08</td>
</tr>
</tbody>
</table>

Where

- $X_1$ involved a model's behavior being reinforced
- $X_2$ involved a model's behavior being unreinforced
- $X_3$ involved verbal directions only for the behavior required. Reward is promised for successful behavior.
- $X_4$ involved verbal directions only for the behavior required. No reward is promised.
- $X_5$ re-test after one week
- $X_6$ re-test after one week
- $X_7$ re-test after one week
- $X_8$ re-test after one week

Hypotheses

The hypotheses to be tested, stated in null form, are as follows:

1. There will be no significant difference in accuracy scores on Test I between the experimental and control groups.

2. There will be no significant difference in accuracy scores on Test I between the rewarded and non-rewarded experimental and control groups.
3. There will be no significant difference in accuracy scores on Test II between the experimental and control groups.

4. There will be no significant difference in accuracy scores on Test II between the rewarded and non-rewarded experimental and control groups.

5. There will be no significant difference between scores obtained on Test I and Test II by the experimental and control groups.

6. There will be no significant difference between accuracy scores obtained on Test I and Test II by the rewarded and non-rewarded experimental and control groups.

7. There will be no significant difference in speed of performance on Test I between the experimental and control groups.

8. There will be no significant difference in speed of performance on Test I between the rewarded and non-rewarded experimental and control groups.

9. There will be no significant difference in speed of performance on Test II between the experimental and control groups.

10. There will be no significant difference in speed
of performance on Test II between rewarded and non-rewarded experimental and control groups.

11. There will be no significant difference in speed of performance scores between Test I and Test II by the experimental and control groups.

12. There will be no significant difference in speed of performance scores between Test I and Test II by the rewarded and non-rewarded experimental and control groups.
CHAPTER IV
RESULTS AND DISCUSSION

Results

This study was conducted to investigate the effects of rewarded and non-rewarded observational and verbally mediated learning on specified behaviors of moderately retarded adults. Moderately retarded adults were randomly assigned to one of four treatment groups, each cell consisting of twenty subjects. Depending on the treatment group, each subject was then exposed to either a rewarded or non-rewarded video taped or verbally mediated sequence of behavior. Subjects were re-tested on week later. The data was then analyzed using analysis of variance.

Hypothesis Testing: Each of the twelve hypotheses will be presented separately. Each hypothesis will refer to a table of results which pertains to it. Table 1 presents a statistical description of scores for the experimental and control groups for accuracy. Shown are the mean scores and the standard deviations for the various cells.

Hypothesis 1: There will be no significant difference in accuracy scores on Test I between the experimental and control groups.

The data for this hypothesis can be found in Table 2 and 3. An analysis of the data leads to a rejection of the null hypothesis. As the F ratio pertaining to that hypothesis is significantly higher
Table 1: Accuracy - Table of Means and Standard Deviations for Experimental and Control Groups

<table>
<thead>
<tr>
<th>Group</th>
<th>Test I</th>
<th>Test II</th>
<th>Change</th>
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<tbody>
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<td>$\bar{x}$</td>
<td>$\sigma$</td>
<td>$\bar{x}$</td>
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<td>Control-No Reward</td>
<td>10.75</td>
<td>5.00</td>
<td>10.50</td>
</tr>
<tr>
<td>Total Experimental</td>
<td>14.25</td>
<td>5.17</td>
<td>14.68</td>
</tr>
<tr>
<td>Total Control</td>
<td>11.65</td>
<td>5.56</td>
<td>11.08</td>
</tr>
<tr>
<td>Total Reward</td>
<td>13.80</td>
<td>5.67</td>
<td>13.55</td>
</tr>
<tr>
<td>Total No Reward</td>
<td>12.10</td>
<td>5.23</td>
<td>12.20</td>
</tr>
<tr>
<td>All Subjects</td>
<td>12.95</td>
<td>5.52</td>
<td>12.88</td>
</tr>
</tbody>
</table>
than the critical F ratio of 3.97, the results are significant at the .05 level.

Table 2: Accuracy: Table of Means for Test I

<table>
<thead>
<tr>
<th>Group Variable</th>
<th>Reward</th>
<th>No Reward</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>15.05</td>
<td>13.45</td>
<td>14.25</td>
</tr>
<tr>
<td>Control</td>
<td>12.55</td>
<td>10.75</td>
<td>11.65</td>
</tr>
<tr>
<td>Total</td>
<td>13.80</td>
<td>12.10</td>
<td>12.95</td>
</tr>
</tbody>
</table>

Table 3: Accuracy Analysis of Variance Summary, Test I

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental-Control</td>
<td>135.20</td>
<td>1</td>
<td>135.20</td>
<td>4.58*</td>
</tr>
<tr>
<td>Reward-No Reward</td>
<td>57.80</td>
<td>1</td>
<td>57.80</td>
<td>1.96</td>
</tr>
<tr>
<td>Interaction</td>
<td>0.20</td>
<td>1</td>
<td>0.20</td>
<td>0.01</td>
</tr>
<tr>
<td>Within (error)</td>
<td>2244.60</td>
<td>.76</td>
<td>29.53</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>2437.60</td>
<td>79</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*F .05 (1, 76) = 3.97

Hypothesis 2: There will be no significant difference in accuracy scores on Test I between the rewarded and non-rewarded experimental and control groups.

The data for this hypothesis can be found in Table 2 and 3. An analysis of the data leads to an acceptance of the null hypothesis of no significant difference. The F ratio of 1.96 for reward and
non-reward is substantially below the critical ratio of 3.97.

**Hypothesis 3:** There will be no significant difference in accuracy scores on Test II between the experimental and control groups.

The data for this hypothesis can be found in Table 4 and 5.

**Table 4: Accuracy: Table of Means for Test II**

<table>
<thead>
<tr>
<th>Group Variable</th>
<th>Reward</th>
<th>No Reward</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>15.45</td>
<td>13.90</td>
<td>14.68</td>
</tr>
<tr>
<td>Control</td>
<td>11.65</td>
<td>10.50</td>
<td>11.08</td>
</tr>
<tr>
<td>Total</td>
<td>13.55</td>
<td>12.20</td>
<td>12.88</td>
</tr>
</tbody>
</table>

**Table 5: Accuracy Analysis of Variance Summary, Test II**

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental-Control</td>
<td>259.20</td>
<td>1</td>
<td>259.20</td>
<td>8.81**</td>
</tr>
<tr>
<td>Reward-No Reward</td>
<td>36.45</td>
<td>1</td>
<td>36.45</td>
<td>1.24</td>
</tr>
<tr>
<td>Interaction</td>
<td>0.80</td>
<td>1</td>
<td>0.80</td>
<td>0.03</td>
</tr>
<tr>
<td>Within (error)</td>
<td>2236.30</td>
<td>76</td>
<td>29.43</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>2536.30</td>
<td>79</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**F_{01} (1,76) = 7.02**

An analysis of the data leads to a rejection of the null hypothesis. The F ratio of 8.81 is significant at the 0.01 level as the
critical F ratio is 7.02.

**Hypothesis 4**: There will be no significant difference in accuracy scores on Test II between the rewarded and non-rewarded experimental and control groups.

**Table 6**: Accuracy: Table of Means for Change in Accuracy Between Test I and Test II

<table>
<thead>
<tr>
<th>Group Variable</th>
<th>Reward</th>
<th>No Reward</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>+0.40</td>
<td>+0.45</td>
<td>+0.43</td>
</tr>
<tr>
<td>Control</td>
<td>-0.90</td>
<td>-0.25</td>
<td>-0.58</td>
</tr>
<tr>
<td>Total</td>
<td>-0.25</td>
<td>+0.10</td>
<td>-0.08</td>
</tr>
</tbody>
</table>

**Table 7**: Accuracy: Analysis of Variance Summary, Change Between Test I And Test II

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental-Control</td>
<td>20.00</td>
<td>1</td>
<td>20.00</td>
<td>1.06</td>
</tr>
<tr>
<td>Reward - No Reward</td>
<td>2.45</td>
<td>1</td>
<td>2.45</td>
<td>0.13</td>
</tr>
<tr>
<td>Interaction</td>
<td>1.80</td>
<td>1</td>
<td>1.80</td>
<td>0.10</td>
</tr>
<tr>
<td>Within (error)</td>
<td>1429.30</td>
<td>76</td>
<td>18.81</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1453.55</td>
<td>78</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\[ F_{0.05}(1,76) = 3.97 \]

The data for this hypothesis can be found in Table 4 and 5.
An analysis of the data leads to an acceptance of the null hypothesis of no significant difference between rewarded and non-rewarded experimental and control groups. The F ratio of 1.24 for reward, non-reward is substantially below the critical F ratio of 7.02 derived for Test II data.

**Hypothesis 5**: There will be no significant difference between accuracy scores obtained on Test I and Test II by the experimental and control groups.

The data for this hypothesis can be found on Tables 6 and 7. An analysis of the data leads to an acceptance of the null hypothesis of no significant difference between the experimental and control groups on results obtained on Tests I and II.

**Hypothesis 6**: There will be no significant difference between accuracy scores obtained on Test I and Test II by the rewarded and non-rewarded experimental and control groups.

The data for this hypothesis can be found on Tables 6 and 7. An analysis of the data leads to an acceptance of the null hypothesis. Analysis of variance indicates no significant difference between the reward and non-reward variables with regard to Test I and Test II accuracy.

**Hypothesis 7**: There will be no significant difference in speed of performance on Test I between the experimental and control groups.

The data for this hypothesis can be found in Tables 9 and 10. The F ratio score derived for the experimental-control groups, 2.48,
Table 8: Speed of Performance: Table of Means and Standard Deviations for Experimental and Control Groups

<table>
<thead>
<tr>
<th>Group</th>
<th>Test I</th>
<th>Test II</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\bar{x}$</td>
<td>$s$</td>
<td>$\bar{x}$</td>
</tr>
<tr>
<td>Experimental-Reward</td>
<td>68.35</td>
<td>27.76</td>
<td>42.55</td>
</tr>
<tr>
<td>Experimental-No Reward</td>
<td>51.60</td>
<td>16.55</td>
<td>39.95</td>
</tr>
<tr>
<td>Control-Reward</td>
<td>53.95</td>
<td>28.15</td>
<td>38.55</td>
</tr>
<tr>
<td>Control-No Reward</td>
<td>49.65</td>
<td>14.52</td>
<td>38.70</td>
</tr>
<tr>
<td>Total Experimental</td>
<td>59.98</td>
<td>27.75</td>
<td>41.25</td>
</tr>
<tr>
<td>Total Control</td>
<td>51.80</td>
<td>22.50</td>
<td>38.63</td>
</tr>
<tr>
<td>Total Reward</td>
<td>61.15</td>
<td>28.87</td>
<td>40.55</td>
</tr>
<tr>
<td>Total No Reward</td>
<td>50.63</td>
<td>15.65</td>
<td>39.33</td>
</tr>
<tr>
<td>All Subjects</td>
<td>55.89</td>
<td>23.79</td>
<td>39.94</td>
</tr>
</tbody>
</table>

*A negative value indicates less time taken in Test II than in Test I.
does not approximate the critical ratio of 3.97 for Test I speed of performance data. An analysis of the data necessarily leads to an acceptance of the hypothesis of no difference.

Table 9: Speed of Performance: Table of Means for Test I

<table>
<thead>
<tr>
<th>Group Variable</th>
<th>Reward</th>
<th>No Reward</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>68.35</td>
<td>51.60</td>
<td>59.98</td>
</tr>
<tr>
<td>Control</td>
<td>53.95</td>
<td>49.65</td>
<td>51.80</td>
</tr>
<tr>
<td>Total</td>
<td>61.15</td>
<td>50.63</td>
<td>55.89</td>
</tr>
</tbody>
</table>

Table 10: Speed of Performance Analysis of Variance Summary Table, Test I

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental-Control</td>
<td>1336.61</td>
<td>1</td>
<td>1336.61</td>
<td>2.48</td>
</tr>
<tr>
<td>Reward-No Reward</td>
<td>2215.51</td>
<td>1</td>
<td>2215.51</td>
<td>4.11*</td>
</tr>
<tr>
<td>Interaction</td>
<td>775.01</td>
<td>1</td>
<td>775.01</td>
<td>1.44</td>
</tr>
<tr>
<td>Within (error)</td>
<td>40954.85</td>
<td>76</td>
<td>538.88</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>45281.99</td>
<td>79</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*F .05 (1,76) = 3.97

Hypothesis 8: There will be no significant difference in speed of performance on Test I between the rewarded and non-rewarded experimental and control groups.

The data for this hypothesis can be found in Table 9 and 10.

An analysis of the results on Table 10 indicates a significant
difference between reward and non-reward means (61.15 and 50.63) which necessitates the rejection of the null hypothesis.

**Hypothesis 9:** There will be no significant difference in speed of performance on Test II between the experimental and control groups.

The data for this hypothesis can be found in Tables 11 and 12. Hypothesis 9 positing no significant difference between experimental and control groups on speed of performance is confirmed by results on Table 12.

**Table 11: Speed of Performance: Table of Means for Test II**

<table>
<thead>
<tr>
<th>Group Variable</th>
<th>Reward</th>
<th>No Reward</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>42.55</td>
<td>39.95</td>
<td>41.25</td>
</tr>
<tr>
<td>Control</td>
<td>38.55</td>
<td>38.70</td>
<td>38.63</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>40.55</td>
<td>39.33</td>
<td>39.94</td>
</tr>
</tbody>
</table>

**Table 12: Speed of Performance Analysis of Variance Summary Table, Test II**

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental-Control</td>
<td>137.81</td>
<td>1</td>
<td>137.81</td>
<td>0.61</td>
</tr>
<tr>
<td>Reward-No Reward</td>
<td>30.01</td>
<td>1</td>
<td>30.01</td>
<td>0.13</td>
</tr>
<tr>
<td>Interaction</td>
<td>37.81</td>
<td>1</td>
<td>37.81</td>
<td>0.17</td>
</tr>
<tr>
<td>Within (error)</td>
<td>17225.05</td>
<td>76</td>
<td>226.65</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>17430.68</td>
<td>79</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

F.05 (1,76) = 3.97
Table 13: Speed of Performance: Table of Means for Change In Time Spent on Test I as Compared to Test II

<table>
<thead>
<tr>
<th>Group Variable</th>
<th>Reward</th>
<th>No Reward</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>-25.80</td>
<td>-11.65</td>
<td>-18.73</td>
</tr>
<tr>
<td>Control</td>
<td>-15.40</td>
<td>-10.95</td>
<td>-13.18</td>
</tr>
<tr>
<td>Total</td>
<td>-20.60</td>
<td>-11.30</td>
<td>-15.95</td>
</tr>
</tbody>
</table>

Table 14: Speed of Performance Analysis of Variance Summary Table, Change Between Test I and Test II

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental-Control</td>
<td>616.05</td>
<td>1</td>
<td>616.05</td>
<td>1.61</td>
</tr>
<tr>
<td>Reward-No Reward</td>
<td>1729.80</td>
<td>1</td>
<td>1729.80</td>
<td>4.53*</td>
</tr>
<tr>
<td>Interaction</td>
<td>470.45</td>
<td>1</td>
<td>470.45</td>
<td>1.23</td>
</tr>
<tr>
<td>Within (error)</td>
<td>29053.50</td>
<td>76</td>
<td>382.28</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>31869.80</td>
<td>79</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*F.05 (1,76) = 3.97

Hypothesis 10: There will be no significant difference in speed of performance on Test II between rewarded and non-rewarded experimental and control groups.

The data for this hypothesis can be found on Table 11 and 12. The lack of significance between reward and non-reward means on the speed variable of Test II confirms the null hypothesis of no significant difference.

Hypothesis 11: There will be no significant difference in speed
of performance scores between Test I and Test II by the experimental and control groups.

The data for this hypothesis can be found on Table 13 and 14. The group mean scores for speed of performance between Tests I and II for experimental and control confirms the null hypothesis of no difference.

**Hypothesis 12**: There will be no significant difference in speed of performance scores between Test I and Test II by the rewarded and non-rewarded experimental and control groups.

The data for this hypothesis can be found on Table 13 and 14. The null hypothesis is rejected as the F ratio of 4.53 for the reward and non-reward means is higher than the critical F ratio of 3.97 with 6 and 76 degrees of freedom.

**Discussion**

**Accuracy**: Analysis of the raw data confirmed the effectiveness of observational learning over verbally mediated methods in reproducing a specified behavior sequence. Modeling procedures were shown to be more effective than verbal methods not only upon immediate testing following treatment but also after a lapse of time (one week). The effectiveness of observational learning over a period of time is consonent with Hick's (1965) findings that certain behaviors remain with the subjects even in the absence of practice. Particularly interesting in the present study is the continued significant difference between the experimental and control group both
Test I and Test II. The mean group score of the experimental group is higher than that of the control group in Test I (14.25 versus 11.65; significant at 0.05) and is higher yet in Test II (14.68 versus 11.08; significant at 0.01). The improved performance of the experimental versus the control group between Test I and Test II can only be suggested as it will be recalled that Table 7 found no significant differences, improvement, or change between Test I and Test II results.

None-the-less the results are provocative and suggest that behaviors learned observationally not only are learned with greater accuracy but also serve as a basis for improved performance through practice (i.e., Test II). On the other hand, behaviors obtained verbally are not replicated as accurately as those learned through a modeling situation. As was the case with the experimental group, inferences can be drawn from group mean scores on Test I and II. Although no significant differences were noted between experimental and control, reward and non-reward, the Test II results for control reward and non-reward show decreases in group mean scores over scores obtained in Test I.

If is possible to account for any significant lack of change between Test I and Test II accuracy scores by suggesting that what is learned, either through modeling procedures or by verbal means, is retained by the subject over a period of time without any significant loss. Those subjects that performed a certain way, right or wrong,
on Test I were highly likely to replicate their behavior during Test II. For example, a number of the control subjects placed all task materials in the black container which was supposed to house the black blocks. There was a very high likelihood that they would replicate their behavior upon retesting. This serves to re-confirm the long-standing principle of learning that learning is a more or less permanent modification of behavior. The results of this study suggest that observational learning is possibly more efficient in teaching certain behaviors than are verbal methods.

That the null hypothesis concerning lack of significance between reward and non-reward variables and Test I, Test II, and Test I and II retention is confirmed by Bandura's research (1962) where subjects imitated the behaviors of punished, highly rewarded, and non-rewarded models when promised a reward for accurate imitation. Evidently observational learning procedures, independent of reward or non-reward is sufficient to produce learning for specified behaviors.

If is a matter for conjecture, however, to speculate on how the results might have been changed if, for instance, the reward for the experimental and control group had been monetary reinforcement rather than promise of reward. As the subjects were adults and received wages the promise of monetary reward for accurate performance might have been more reinforcing.

An analysis of means, without reference to statistical significance, again seems to point in the direction that a rewarded
observed model behavior is learned more quickly than a non-rewarded and the same trend presents itself in the control group. Further research is needed on these variables.

**Speed of Performance:** Unlike the results obtained for accuracy in Test I, the null hypothesis of no significant difference between experimental and control groups was confirmed. At no time does there exist a significant difference between experimental and control group means for speed of performance. It should be recalled that subject speed of performance was measured by the length of time required for each individual subject to reproduce the task learned either by exposure to a model of learned by verbal directions. Analysis of the data indicates that significant differences in speed of performance are related to reward or non-reward, with the non-reward mean being significantly faster than the reward group.

An analysis of the group mean scores for the experimental and control groups in Test I demonstrates that experimental and control reward subjects performed slower than the subjects in the experimental or control non-reward groups. One possible explanation for the lower score of the rewarded group would be the groups' potentially higher anxiety caused by their having to please the staff person used in the study. Perhaps the non-reward group, unencumbered by the affective states of rewarding agents were able to perform, initially, at a faster rate.

Test II results, one week later, indicated no significance between group means. It is possible to account for such scores by
regression to the mean. Additionally, having become familiar with the staff person, having learned from Test I, and with reduced anxiety, their scores did not depart significantly from any others. The substantial changes within group, between means, from Test I to Test II are indications that the factors mentioned above might be operating.

A significant difference once again existed between reward and non-reward groups in speed performance scores between Tests I and II. The significance lie in the greater decrease in time for the rewarded experimental and control groups. This would appear to be in accord with the theory advanced previously that regression factors or learning or reduced anxiety, especially in the rewarded groups, might account for the significant increase in speed of performance between Tests I and II.

Analysis of the data for experimental and control groups in accuracy and speed of performance leads to the conclusion that observational learning or modeling procedures are significantly more effective in teaching certain types of behavior, in this case task behavior, than are verbal procedures. An analysis of the difference between experimental and control groups on Test I and Test II and the difference between Tests I and II for accuracy demonstrates that modeling is more effective in instilling the desired behavior pattern. Subjects learn in either the modeling or the verbally mediated group as evidenced by the lack of significant difference between Test I and II accuracy measures. The difference that existed between the experimental and control groups in Test I for accuracy
were almost duplicated in Test II one week later. Reward or the absence of reward did not prove to be a significant factor in the learning process.

Unlike accuracy of imitation, speed of performance was influenced by reward variables. Non-rewarded subjects performed significantly faster than rewarded in Test I but all significant differences were eliminated one week later in Test II. In assessing the difference between Test I and Test II it was shown that reward and non-reward again proved significant with the significance moving in the direction of a substantial increase in speed of performance for the rewarded subjects. An analysis of the means of the experimental and control groups would seem to indicate that, over time, differences between groups on measures of speed disappear. Evidently, subjects can be encouraged to proceed quickly and, initially, do so at the expense of accuracy. Therefore, initially the experimental or observational learning group is performing more accurately but more slowly that the control subjects. By Test II experimental and control groups are comparable in speed of performance; however, the observational learning (experimental) group continues to perform more accurately.
CHAPTER V
SUMMARY AND CONCLUSIONS

Summary

This study was undertaken to investigate the effects of rewarded and non-rewarded verbal and observational learning on specified behaviors of moderately retarded adults. As a result of a series of precedent-setting lawsuits and as a result of increased social concern for the disabled citizen, more and more mentally retarded citizens will be either retained in the community or returned to the community from institutions. To accommodate the special needs of the retarded, communities need to develop infant education centers, parent counseling programs, day care centers, community class programs, day care centers, parent counseling programs, work activity centers, sheltered workshops, satellite corporations, group homes, foster homes, sheltered apartments, protective services, guardianship, legal services, and a full range of counseling and guidance services. Unfortunately, psychotherapeutic services are often denied to the mentally retarded citizen for one reason or another. As a further complication, counselors and clinicians must develop techniques and procedures suitable to and for the mentally retarded citizen. Without such supportive services the retarded individual will not be able to lead a free but guided life in the community (Wolfensberger, 1967).

It was the purpose of this study to examine the relative effectiveness of observational learning on specified behaviors of moderately retarded adults living in a community setting. In the study
modeling procedures were compared in effectiveness with verbally mediated directions, both observational and verbal groups being required to perform identical behaviors. Modeling procedures were compared to verbally mediated procedures as the medium of speech is the most common vehicle by which counselors, therapists, teachers, rehabilitation personnel, and others relate to their clients. Many retarded citizens, however, frequently have difficulty in making optimum use of the auditory channel, because of the high incidence of hearing difficulties, auditory discrimination problems, memory disturbances, and environmentally induced inhibiting factors (Goertzen, 1957; Harrison, 1958; Smith, 1962; Peins, 1962; Spradlin, 1963; McCarthy, 1964). Much as therapies have been devised for children and other special treatment groups so must techniques and procedures be devised to meet the needs of the retarded.

An examination of everyday kinds of learning by which human beings, both adults and children, suggests that much learning results from one person observing another. This kind of learning is particularly appropriate for teaching and learning highly complicated responses and behaviors for which shaping successive approximation to a terminal behavior would be an extended process.

White (1971) defines modeling as the training technique or the operation of demonstrating a response to a subject and then directing him to imitate the performance. When the subject patterns his performance after that of the model, he is said to be modeling or imitating the model's behavior. In the context of this study, modeling,
imitation, imitative behavior and observational learning were used interchangeably.

The basic premise in modeling, imitation, or observational learning is that a subject can learn complex behaviors simply from observing someone else performing these behaviors. In effect, there can be almost immediate learning of complex behaviors which were not previously in the subject's repertoire.

The sample was selected from a list of ninety-two moderately retarded adults currently receiving services in the work activity centers of the Hamilton County Council for Retarded Children in Cincinnati, Ohio. Eighty subjects were randomly assigned to four treatment groups with twenty subjects assigned to each group.

Using the opinions of supervisory personnel, a high status moderately retarded female was selected as the model for the study. The model was trained to engage in certain behaviors which, when learned, were subsequently video taped and became part of the study.

To facilitate post-treatment analysis and to avoid the problem or preconditions a sequence of behaviors were devised which were novel and easily classifiable. The behavior sequence involved having the model receive, one at a time and in random fashion, six black cubes, six black and white cubes, and six white golf balls. Black blocks were placed in a black container and a black and white container housed the black and white blocks while all the golf balls were to be placed in a bucket. A model-rewarded and model non-rewarded tape were made.
Experimental subjects were shown the video taped behaviors while the control group received verbal instructions regarding the same behavior. Immediately after individual exposure to either video taped model or verbal directions, each subject was tested using identical blocks, etc., as used in the video tape. After one week all subjects were retested.

The results of the study indicate that modeling procedures are significantly more effective than verbally mediated directions in getting subjects to approximate a series of behaviors. The results of this study are itemized below:

1. Subjects who learned by modeling procedures were able to accurately imitate the model's behavior or to complete the task significantly more accurately than subjects who learned by verbal directions.

2. No significant gain or loss of accuracy occurred between subjects who learned by modeling and those given verbal instructions after a period of one week. From this data it is possible to surmise that both the experimental groups learned elements of the task more quickly.

3. Subjects who learned the experimental task under a reward situation performed less quickly than non-rewarded subjects. Modeling procedures
were no more effective than verbal procedures, in Test I, in teaching speed of performance.

4. Subjects re-tested for speed one week later did not show significant mean differences which indicates that initial significant differences were eliminated. All subjects were performing equally.

The results of the study indicate that modeling procedures are significantly more effective than verbally mediated directions in getting subjects to approximate a series of behaviors. The results of this study indicate that learning took place in both experimental and control conditions but that the extent of learning was significantly greater among the experimental group or those exposed to a model. Reward or non-reward variables did not prove to be significant factors in the case of learning the task required in the study.

It was determined that the variable of reward is significant in speed of performance initially, but that later performance (e.g., Test II) levels out so that no significant difference exists between experimental and control, rewarded and non-rewarded. Assessment of the difference between Test I and Test II results, however, found the reward and non-reward variables again significant with the difference attributed to the substantial decrease in performance time for rewarded subjects. This led to the conclusion that differences between group means on measures of speed disappear. Differences in accuracy, or the extent to which a subject has learned continue and remain
markedly different than the group which learned by verbal means.

Limitations

One of the more severe limitations of the present study was that it was conducted in the facilities of the Eastern Hills Work Activity Center only. There was a possibility that subjects, across experimental and control lines, could have discussed the task and thereby influenced learning by an uncontrolled variable. However, an analysis of the raw scores of each subject after Test II showed, as noted before, great similarity to the individual subject's score on Test I.

An additional problem of a technical nature continued to be a nuisance during the entire study. The video tape equipment was new and of first quality. However, for reasons beyond the ken of the service representative, the video tape picture would "garble" in an unpredictable manner. The monitor would suddenly lose the vertical hold, scrubbing the picture, and providing the experimental subject with nothing more than random patterns of light. The machine would be stopped immediately and then re-started, a procedure that required approximately two to three seconds. As a result of this there was some slight variation in the treatment from individual to individual.

Yet another limitation concerns the nature of the sample used in the study. The majority of the subjects derive from lower-middle and upper-lower socio-economic homes. The very poor moderately retarded citizen all too frequently does not avail himself to workshop services because of family ignorance of the service. On the other hand the
retarded dependents of the upper class tend to be placed in private facilities offering a variety of services, albeit at a very high price. The sample employed in this study may, therefore, not be representative of the moderately retarded population in general.

Future Research

There is a need for further research into the effects of modeling procedures on higher and lower functioning retarded populations. One possible starting place would be to replicate the present study using a larger population and a longer treatment.

Additionally, further research might obtain correlations between performance scores and measured intelligence. Further research might also be concerned with differentials in performance attributed to model sex difference, length of exposure to the model, live model versus video taped model, variations in the nature and kind of reward, variations in the difficulty and novelty of the task. Finally, a research study might compare behavioral counseling procedures with various levels or retarded subjects with modeling procedures used on the same population.
BIBLIOGRAPHY

Allport, F. H. Social Quotient. Boston: Riverside Press, 1924


------. & Grusic, J. E., Menlove, F. The influence of symbolization and incentive-set on observational learning, Unpublished Manuscript, Stanford University, 1965


