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A Comparison of Three Training Interventions With Trainable Mentally Retarded Students in Prevocational Programs.

Arvil Fletcher Vandergriff

Louisiana State University and Agricultural & Mechanical College

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A COMPARISON OF THREE TRAINING INTERVENTIONS WITH TRAINABLE MENTALLY RETARDED STUDENTS IN PREVOCATIONAL PROGRAMS.

THE LOUISIANA STATE UNIVERSITY AND AGRICULTURAL AND MECHANICAL COLLEGE PH. D. 1978
A COMPARISON OF THREE TRAINING INTERVENTIONS
WITH TRAINABLE MENTALLY RETARDED STUDENTS
IN PREVOCATIONAL PROGRAMS

A Dissertation

Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy

in

The Department of Education

by

Arvil F. Vandergriff
B.S., University of Tennessee, 1971
M.S., University of Tennessee, 1973
December, 1978
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ABSTRACT

The purpose of this study was to compare the effects of self-monitoring procedures, a reinforcer, and a combination of the two in the prevocational training of trainable mentally retarded students. The study compared the effects of these interventions and a control condition on student production rates.

The development of functional vocational behaviors has been a major goal of educational programs for trainable students. One of the most important vocational behaviors has been rate of production. Previous investigators have demonstrated that this rate can be increased by various training interventions. Specific reinforcement has produced significant increases. However, the effect of self-monitoring procedures, which require students to assess and record their own rates, has not been examined. The results of the present investigation provided information on the comparative effects of three training interventions.

The subjects of this study were 40 trainable mentally retarded students enrolled in a public school vocational training program. They were randomly selected from students who were nominated by their teachers and who performed the experimental task to criterion during the three days of task training. Subjects were
then randomly assigned to four groups with ten members each.

During two twenty-minute goal establishment sessions, subjects were required to assemble and secure in plastic bags sets of three nuts and bolts. The subject's mean performance established his production goal.

The experimental period followed for ten consecutive school days, for twenty minutes each day. Treatment procedures corresponded to group designations. The self-monitoring plus reinforcement group assessed and recorded their production rates on bar graphs. Subjects who exceeded their goals, based upon rates which were adjusted for errors, participated in a ten minute free time period. Rates of subjects in the reinforcement group were recorded by the supervisors. Subjects who exceeded their goals participated in the free time period. For the self-monitoring procedures group, free time was not available. Production rates of the control group were recorded by supervisors. The free time period was not available for control group subjects.

At the completion of the experimental period, the null hypothesis of no differences among the production rates of the experimental and control groups was tested by a one-way analysis of variance. The null hypothesis was rejected, and the difference was significant beyond the .01 level ($F = 6.72$, d.f. = 3,36). A post hoc analysis, using the Newman-Keuls method of multiple
comparisons, revealed three significant differences. The production rate of the self-monitoring plus reinforcement group was significantly greater than the control group rate. The rate of the reinforcement group was significantly greater than the rate of the control group. Finally, the rate of the self-monitoring plus reinforcement group was significantly greater than the self-monitoring group rate.

The most significant finding and practical implication of the study was that two training interventions were effective for increasing students' production rates. The results also revealed that a reinforcer was necessary, in this study, for self-monitoring procedures to effectively increase the rates. Although there was no difference between self-monitoring plus reinforcement and reinforcement alone, the combined intervention has training advantages in that self-monitoring required students to assume more responsibility for their own behavior.
CHAPTER 1

INTRODUCTION

A widely accepted curricular goal for trainable mentally retarded students has been the development of economic usefulness in the home and in sheltered employment (Kirk, 1972). Indeed, with the proliferation of educational opportunities and the mandated extensions of the upper age limits of eligibility for special education services (The Education for All Handicapped Children Act, 1975), upgrading the prevocational curriculum has become imperative. Individuals who design prevocational training programs must consider both the probable future vocational placement and the work capabilities of trainable students.

There has been a discrepancy between the objectives of adequate vocational functioning and retarded individuals' present level of achievement of these objectives. Much of the discrepancy may be attributed to a scarcity of procedures which promote more functional vocational behaviors. Researchers have agreed that one of the most important vocational behaviors is work production rate. A high rate of work output is crucial for the success of sheltered workshops and clients working in them. Lack of
emphasis on production rate development will result in simply comfortable rates, considerably below worker potential. Vocational training environments must be designed in ways that challenge retarded workers' abilities. Crossen (1969) wrote:

... rather than to 'find work' to match the abilities of those who can be productive in a sheltered environment, the emphasis should be to 'find ways' to train retarded youth to perform available work.

The author suggested that training interventions which are consistent with the goal of challenging retarded individuals' abilities should be utilized.

A number of researchers have examined training interventions which have elevated retarded students' work production rates (Brown, Johnson, Gadberry, and Fenrick, 1971; Brown and Pearce, 1970; Brown, Van Deventer, Perlmutter, Jones and Sontag, 1972; Crossen, 1969; Gold, 1972; Kliebhan, 1967). The investigations revealed that the rates of the mentally retarded have not been representative of worker capabilities. Increased rates of production have been promoted by unique training interventions and rearrangements of work environments. For example, simplified task components have been used successfully for increasing production rates. Rates have been increased by elaborate token economies and tangible reinforcers as well.

Money has been widely recognized as a powerful rein-
forcer. However, monetary reinforcers usually have not been available in school settings. In fact, reinforcers have been absent in many school programs. In other programs, alternative reinforcement strategies have been developed to promote desired behavior changes. These teacher managed strategies have utilized a variety of reinforcers administered contingently upon appropriate student performance.

Reinforcers have increased the probability that a response would be repeated (Travers, 1977). In contrast to reinforcement strategies, self-monitoring procedures have been introduced by some researchers to provide information on which to modify a response. The use of self-monitoring procedures placed greater responsibility on the student. The student collected data on the frequency of target behaviors, such as rate of production. The information feedback allowed the student to compare his performance to an established goal.

Self-monitoring procedures have been an integral part of self-control research. A conceptual base for the analysis of self-control has been set forth. The major components were listed as follows: self-assessment, self-recording, self-determination and self-administration of reinforcement (Glynn, Thomas, and Shee, 1973). Self-assessment requires the individual to examine his performance of a specified behavior. Self-recording is the
objective recording of the frequency of the assessed behavior. Self-determination of reinforcement is the designation by the respondent of the type and amount of reinforcement to be received. Self-administration of reinforcement is contingent upon appropriate performance. Investigations utilizing one or more of these components have qualified as self-control research.

In terms of this conceptualization, self-monitoring, as used in this study, was the systematic combination of self-assessment and self-recording. This procedure required the individual to measure the frequency of a target behavior and keep a written performance record. The individual then compared this data to an established goal. In some investigations, reinforcers have backed up the self-monitoring procedure and their combined effects have been examined. Other investigators have compared the effectiveness of self-monitoring procedures to the effectiveness of specific reinforcers.

Reinforcers have been used effectively to change classroom behaviors, including the behaviors of mentally retarded students. Production rates of trainable mentally retarded students have been increased by a variety of reinforcers. In addition, a number of researchers have demonstrated the effectiveness of self-monitoring procedures. Preliminary evidence has indicated that these procedures may be used successfully with mentally retarded
students (Kurtz and Neisworth, 1976; Mahoney and Mahoney, 1976). However, the use of self-monitoring procedures with trainable students in prevocational programs has not been explored. Furthermore, the effects of these procedures on the production rates of trainable students have not been compared to effects of specific reinforcers.

PURPOSE OF THE STUDY

The purpose of this investigation was to compare the effectiveness of self-monitoring procedures, a reinforcer, and the combination of the two in prevocational training of trainable mentally retarded students. This investigation compared student production rates under three experimental conditions, and a control condition, which did not involve either self-monitoring procedures or reinforcers. Specifically, the study attempted to answer the following questions:

1. Do the production rates of students under the experimental and control conditions differ?
2. If there are differences in student production rates, where do the differences lie?

A meaningful interpretation of differences among the conditions required comparisons of the groups' production rates. A post hoc analysis allowed these comparisons and determined under
which of the four conditions production rates were greatest.

IMPORTANCE OF THE STUDY

Recently, there has been a dramatic increase in public school programs for trainable mentally retarded students. Deinstitutionalization programs have accounted for much of this increase. In order for retarded citizens to succeed in the community, they must develop appropriate vocational behaviors. These behaviors will allow for greater independence and self-sufficiency. A high production rate is an essential vocational behavior needed by trainable students. The systematic use of specific reinforcement strategies and self-monitoring procedures will lead to the development of a high rate of production. Furthermore, information on the comparative effectiveness of reinforcers and self-monitoring procedures will guide the professionals who design the prevocational curriculum. As a result, trainable students will be able to take a more active, independent role in their daily lives.

DEFINITION OF TERMS

The following terms are defined for the purpose of this study:

Experimental task - a nut and bolt assembly and
packaging task which is typical of the kind of work required in a sheltered workshop. This task is a simulated work sample which approaches an actual occupational activity.

Production rate - the number of nut and bolt assembly and packaging tasks completed over a twenty minute period.

Reinforcement - a ten minute free time period which is contingent upon exceeding an established production goal. Free time is a reinforcer which has been used frequently to change a variety of student behaviors.

Self-monitoring procedures - a self-written record on the frequency of a target behavior to be controlled. The self-monitoring procedure required the student to determine the number of tasks completed, and fill in that number of spaces on a bar graph.

DELIMITATIONS OF THE STUDY

This study was restricted to a sample of 40 subjects enrolled in a school for trainable mentally retarded students in East Baton Rouge Parish, Louisiana. The study examined work production rates in twenty minute time samples. These time samples were not equivalent to the six to eight hour work day of the sheltered workshop. The reinforcer was a ten minute free time period. The effects of various other reinforcers were not examined.
CHAPTER 2

REVIEW OF THE LITERATURE

The literature in classroom behavior management revealed that interventions were available which promote desired behavior changes. The effectiveness of elaborate token economies has been reported. Also, a variety of externally managed reinforcers have facilitated changes in a wide range of behaviors. Recent research has indicated that the acts of self-assessment and self-recording can result in a dramatic behavior change. This self-monitoring procedure has involved the development of an awareness of individual behavior and factors which influence it. The information feedback can function to promote desired changes.

Self-monitoring procedures and reinforcement strategies have been investigated and compared in academic settings. Some authors have demonstrated the usefulness of reinforcers and self-monitoring procedures for increasing academic performance and study habits (Harris and Trujillo, 1975; Gottman and McFall, 1972; Mahoney, Moore, Wade, and Moura, 1973; Richards, 1975; Richards, McReynolds, Holt, and Sexton, 1976). Other investigators have compared the relative effectiveness of self-monitoring
procedures and various reinforcers (Drabman, Spitalnik, and O'Leary, 1973; Glynn and Thomas, 1974; Glynn, Thomas, and Shee, 1973; Knapczyk and Livingston, 1973). Their usefulness for increasing appropriate behaviors and decreasing inappropriate behaviors has been examined (Bolstad and Johnson, 1972; Broden, Hall, and Mitts, 1971). The relative contributions of self-monitoring procedures and reinforcers in changing social behaviors of mentally retarded adults have been investigated (Nelson, Lipinski, and Black, 1976). In prevocational settings for trainable mentally retarded students, reinforcers have been compared to some basic properties of self-monitoring (Brown et al., 1970, 1971, 1972; Kleibhan, 1967). These properties were information feedback and goal setting.

A number of studies have looked at various behavior change interventions in special education settings. A variety of reinforcers have effected behavior changes in students. Furthermore, preliminary evidence has indicated that self-monitoring procedures may be utilized successfully in these settings (Kurtz and Neisworth, 1976; Mahoney and Mahoney, 1976). However, few studies have utilized special education for comparing self-monitoring procedures with reinforcement strategies.

Harris and Trujillo (1975) compared self-monitoring procedures with a group discussion technique. Junior high school
students enrolled in special (remedial) reading classes were the subjects. Those in the self-monitoring condition self-recorded data on personal study habits. The other subjects participated in discussion sessions of the group's study problems. Results showed an increase in grades for subjects under each experimental condition. However, the subjects using self-monitoring procedures showed the most improvement in study habits. This study was important because it showed that self-monitoring procedures can be learned and utilized by low achieving students.

Another investigation which involved a special education program was conducted by Gottman and McFall (1972). Subjects were enrolled in a project for potential high school dropouts. The dependent variable, oral class participation, represented the primary program objective stated by the teachers. The teachers recorded baseline data on students' "talk rates." After the baseline phase, students were taught self-monitoring procedures and then recorded the frequencies of the target behavior. A return to baseline phase followed ten school days of self-monitoring. No reinforcers for appropriate performance were incorporated in the experimental phases. However, the use of the self-monitoring procedure led to increased frequencies of oral class participation, lending support for the use of these procedures.

The effect of training retarded students to follow self-
monitoring procedures has been examined (Litrownik, Freitas and Franzini, 1978). The self-monitoring ability of trainable mentally retarded subjects was assessed before and after a demonstration-training program. Taped and live models were used. No reinforcers were included in the program. The results showed that subjects learned to use self-monitoring procedures effectively after systematic training.

The self-monitoring ability of mentally retarded adults was examined by Nelson, Lipinski, and Black (1976). The authors also compared the effects of a self-monitoring procedure and a reinforcer on a positively evaluated behavior (talking), a negative behavior (face-touching) and a neutral behavior (object-touching). The frequency of the talking behavior was increased by the self-monitoring procedure and the reinforcer. However, their effects on the other behaviors were not consistent. The accuracy of subject self-monitoring was checked by comparing subject data to that of college student observers. The results showed subject data to be accurate.

Training interventions for increasing the production rates of mentally retarded individuals in vocational settings have been investigated. A goal setting procedure was used by Kliebhan (1967). Educable mentally retarded students were required to state daily production goals on a typical workshop task.
The predicted goals were compared to actual work output, providing information feedback on rates of production. No reinforcers were offered for exceeding the stated goals. The results showed that this procedure facilitated increased production rates.

Brown et al. (1970, 1971, 1972) examined ways to increase the production rates of trainable mentally retarded students. The students were enrolled in a public school program, working toward the objective of preparation for sheltered employment. In this series of investigations, the authors looked at the effects of information feedback and various reinforcers on student production rates. In the first of these studies (1970), five trainable mentally retarded subjects in a simulated sheltered workshop were given an envelope stuffing task to perform. Performance feedback coupled with reinforcement (i.e., teacher proximity and praise) yielded a substantial increase in production rates. The second study (1971) entailed the setting of a production goal for each subject. This goal corresponded to the students' highest production rates in eighteen previous work sessions. Tangible back-up reinforcement was contingent upon exceeding individual production goals. The findings revealed significant increases in production rates subsequent to the combined use of goal setting and contingent reinforcement. However, the differential contributions of goal setting and reinforcement were
not assessed. In the third study (1972), student production charts were used to provide visual feedback on production rates. The subjects were mentally retarded and severely emotionally disturbed students. The observation and recording of production rates on a collating task was the classroom teacher's responsibility throughout the experiment. After a baseline phase, the performance feedback procedure was introduced. Results showed production rate increases for all subjects. However, upon removal of the treatment, the number of subjects who returned to baseline rates was less than the number who continued to increase production rates. In a later phase, a money reinforcer became contingent upon the subjects exceeding the highest rate recorded on the chart. Combining visual feedback with the reinforcer resulted in substantial increases in rates.

The important practical implication of research related to trainable students was that existing production rates did not represent student capability. In the research of Brown et al. (1970, 1971, 1972), and Kleibhan (1967), self-monitoring procedures were not used for increasing rates. Students have neither assessed nor recorded their own production rates in any of these studies. However, information feedback, a basic property of self-monitoring procedures, was studied. Brown et al. (1972) provided feedback through a charting process, a common practice in the investigation
of self-monitoring procedures. Information feedback was also used in conjunction with reinforcers, although their relative effectiveness was not assessed. This review of the related literature has indicated that investigators have not examined the effectiveness of self-monitoring procedures for prevocational training. Furthermore, investigators have not compared the effects of reinforcers and self-monitoring procedures for increasing production rates of trainable mentally retarded students.
CHAPTER 3

METHODOLOGY

The research design used in this study was a post test only control-group design (Campbell and Stanley, 1963). The methodology is organized under the following headings: (1) subjects, (2) arrangement of the work environment, (3) materials, (4) the experimental task, (5) task training sessions, (6) procedures, and (7) research design.

SUBJECTS

Forty students from a public school for trainable mentally retarded students in Baton Rouge, Louisiana, were the subjects. The total enrollment of the school was approximately 150. In the spring, 1978, all teachers at the school were asked to nominate students for participation in this study. Nominations were based on the teachers' judgments of the students' appropriate future vocational placement in sheltered employment, and their potential to function adequately there (Appendix A). Sixty-eight nominees participated in a series of demonstration and training sessions. Sixty-two nominees met the pre-established level of
performance and constituted the pool from which the 40 experimen-
tal subjects were randomly selected.

Subjects were randomly assigned to four groups which
were designated by the conditions of the experiment:

- **Group A (n=10)** - Self-monitoring procedures plus free
time reinforcement
- **Group B (n=10)** - Free time reinforcement
- **Group C (n=10)** - Self-monitoring procedures
- **Group D (n=10)** - Control

**ARRANGEMENT OF THE WORK ENVIRONMENT**

In order to separate subjects who had the reinforcer
available from those who did not, groups A and B worked in one
room, while groups C and D worked in another. Four faculty and
staff members supervised the groups on a random rotation basis.

**MATERIALS**

The materials used in the experimental task were
2" x ¼" bolts with accompanying nuts, transparent plastic bags,
wire bag ties and kitchen timers. Also, bar graphs divided into
days and number of production units (Appendix B), and tag board
for mounting the graphs were used. Jigs were constructed for all
subjects so that they could easily determine the number of exper-
imental tasks completed. Each jig was made of 25 one-half pint milk cartons, stapled together. The inside bottom surface of each carton was numbered from one through twenty-five. Subjects determined the number of tasks completed by dropping each into one of the jig sections.

THE EXPERIMENTAL TASK

The steps required for the completion of the experimental task were as follows:

(1) The subject assembled a single nut onto a single bolt until contact was made with the head of the bolt.

(2) The subject inserted three assembled nuts and bolts into a plastic bag.

(3) The subject secured the bag with a twist tie around the top opening, completing one experimental task.

(4) The subject placed each completed task into the appropriate carton of the jig until the session ended.

TASK TRAINING SESSIONS

All students who were nominated for participation were
involved in task training and demonstration for a maximum of three days, with each session lasting approximately one hour. The criterion level was accurate completion of the experimental task, in three successive trials, without assistance. When students reached the criterion level, they were released from the training sessions.

PROCEDURES

All subjects participated in goal establishment sessions in which the subjects performed the experimental task on two consecutive school days, for twenty minutes each day. Neither self-monitoring procedures nor reinforcement were utilized in these sessions. Each subject's mean production rate, expressed as a whole number, established the individual's production goal. All decimals were rounded off in the usual way.

Following the goal establishment sessions, the experimental period lasted ten consecutive school days, for twenty minutes each day. Treatment procedures varied as follows:

Group A: Self-monitoring procedures plus free time reinforcement. One day prior to the experimental period, subjects under this condition were shown how to record their performance on bar graphs (Appendix B). Each subject's goal was written at the top of his graph. Subjects were informed that they should
attempt to exceed this goal so that the bars would rise more each
day. Supervisors announced the beginning of each work session
and, after twenty minutes, a kitchen timer signaled the end. The
subjects determined the number of tasks completed either by count­
ing them or by using the counting jig and filled in the number of
spaces on the graphs corresponding to that day. Accuracy checks
for errors in the tasks and in the graphs were made by the super­
visors. Any discrepancy between the subject's performance of a
task and the stated requirements were counted as one task error.
For example, any number of nuts and bolts in the plastic bag
other than three, as well as partially assembled nuts and bolts
counted as a task error. Supervisors recorded the student ob­
served production rates and the adjusted rates (Appendix C).
Subjects who exceeded their goals on the basis of the adjusted
production rates participated in a ten minute free time period in
a room adjacent to their workroom. Typical free time activities
were available, such as record playing, games, dancing, and talk­
ing periods (Madsen and Madsen, 1974).

Group B: Free time reinforcement. Subjects under this
condition also performed the experimental task for twenty minutes
each day of the investigation. The supervisors announced the be­
ginning of the work sessions and informed the subjects that they
should attempt to exceed their established goals. At the end of
the sessions, the supervisors counted and recorded the number of tasks completed accurately by the subjects (Appendix D) and compared this number to the subjects' goals. Those who exceeded their goals were informed of this fact and participated in the ten minute free time period described in the procedures for Group A.

**Group C:** Self-monitoring procedures. The procedures for this group paralleled those for Group A, with the exception of the reinforcer. The ten minute free time period was not available as a contingency for exceeding production goals.

**Group D:** Control. Subjects performed the experimental task for the ten days of the investigation. However, these subjects did not use self-monitoring procedures and did not participate in the ten minute free time reinforcement period. Following each twenty minute session, supervisors checked for errors and recorded the number of tasks completed accurately by each subject (Appendix D).

**RESEARCH DESIGN**

The research design followed the typical form for a one-way analysis of variance (Ferguson, 1971). The independent variables were the training interventions and the dependent variable was production rate. The null hypothesis tested was:
The post-hoc analysis used in this study was the Newman-Keuls method of multiple comparisons (Ferguson, 1971). Newman-Keuls uses the studentized range in order to determine whether the differences between pairs of means are significant. In this study, the differences between the six possible pairs of production rate means were calculated and specific comparisons were made.
CHAPTER 4

ANALYSIS OF DATA

At the completion of the experimental period, mean production rates and standard deviations were computed for the experimental and control groups and are presented in Table 1. Subjects' daily production rates, which ranged from 1 to 29, are presented in Appendix E. These were the data used in the analysis of variance to test the following null hypothesis:

Ho: There are no differences in the mean production rates of the experimental and control groups.

Table 1

Production Rate Means and Standard Deviations for the Experimental and Control Groups

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<tr>
<th>Group</th>
<th>Production Rate Mean</th>
<th>Standard Deviation</th>
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<td>4.56</td>
</tr>
<tr>
<td>B</td>
<td>14.48</td>
<td>3.63</td>
</tr>
<tr>
<td>C</td>
<td>11.41</td>
<td>2.93</td>
</tr>
<tr>
<td>D</td>
<td>10.21</td>
<td>3.26</td>
</tr>
</tbody>
</table>

22
The data in Table 2 represent the results of the one-way analysis of variance. The F-ratio produced was significant beyond the .01 level. Therefore, the null hypothesis was rejected, indicating that there was a significant difference among the mean production rates of the four groups in this study.

Table 2

Analysis of Variance
Comparison of the Experimental and Control Groups

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>3</td>
<td>268.5</td>
<td>89.5</td>
<td>6.72*</td>
</tr>
<tr>
<td>Within Groups</td>
<td>36</td>
<td>479.06</td>
<td>13.31</td>
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</tr>
<tr>
<td>Total</td>
<td>39</td>
<td>747.56</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* p< .01

Specific comparisons of the group means were made through the Newman-Keuls method of multiple comparisons (Ferguson, 1971). The production rate means for each of the four groups were ranked from low to high and the difference between every mean and every other mean was calculated. Q values were then computed by
the appropriate formula. Six comparisons between pairs of means were made by comparing obtained Q values with tabled criterion values. The results, which are presented in Table 3, revealed three significant differences.

The obtained Q value in the comparison between Groups A and D exceeded the criterion value (p < .01). The difference was significant in favor of Group A. Thus, the production rate of the self-monitoring plus reinforcement group was significantly greater than the rate of the control group.

The obtained Q value in the comparison between Groups B and D exceeded the criterion value (p < .05). The difference was significant in favor of Group B. This demonstrated that the production rate of the reinforcement group was significantly greater than the rate of the control group.

The obtained Q values in the comparison between Groups A and C exceeded the criterion value (p < .01). The difference was significant in favor of Group A. Thus, the production rate of the self-monitoring plus reinforcement group was significantly greater than the rate of the self-monitoring group.
Table 3

Table of Q Values
Newman-Keuls Method of Multiple Comparisons

<table>
<thead>
<tr>
<th>Groups</th>
<th>D</th>
<th>C</th>
<th>B</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>-</td>
<td>1.04</td>
<td>3.71*</td>
<td>5.71**</td>
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<td>C</td>
<td>-</td>
<td>2.67</td>
<td>4.70**</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>-</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>A</td>
<td></td>
<td></td>
<td></td>
<td>-</td>
</tr>
</tbody>
</table>

.05 \( Q_2 = 2.86, \ Q_3 = 3.44, \ Q_4 = 3.79 \)

.01 \( Q_2 = 3.82, \ Q_3 = 4.37, \ Q_4 = 4.70 \)

* \( p < .05 \)
** \( p < .01 \)
CHAPTER 5

CONCLUSIONS AND SUMMARY

CONCLUSIONS

As noted in Chapter 2, previous investigators have not examined the effects of self-monitoring procedures in the prevocational training of trainable mentally retarded students. Furthermore, the effects of reinforcers and self-monitoring procedures on the production rates of these students have not been compared. The present investigation compared the effects of self-monitoring procedures, a reinforcer, and a combination of the two on the production rates of trainable students.

Consistent with the findings of other researchers interested in prevocational training (Brown et al., 1970, 1971, 1972; Crossen, 1969; Gold, 1972; Kliebhan, 1967), the results presented in Chapter 4 showed that production rates of trainable students can be increased. The most significant finding and major practical implication of this investigation was that two of the training interventions effectively increased these rates. Specifically, the findings revealed a significant difference between two of the
experimental groups and the control group. Students using self-monitoring procedures plus a free time reinforcer had significantly greater production rates than students in the control group. Also, the rate of the reinforcement group was significantly greater than the rate of the control group.

The production rate of the self-monitoring group was not significantly different from the rate of the control group. However, the previously reported results showed that the rate of the self-monitoring plus reinforcement group was significantly greater than the control group rate. Considered together, these findings demonstrated that the addition of a reinforcer was necessary, in this study, for self-monitoring to have a significant effect on production rates. Free time was the only reinforcer utilized in this investigation. Future research should be conducted on the effects of self-monitoring combined with various other reinforcers for increasing production rates.

The findings reported in Chapter 4 revealed no difference between self-monitoring plus reinforcement and reinforcement alone. However, several considerations were necessary for a meaningful interpretation of this result. Brown et al. (1970, 1971, 1972) found that information feedback, which required extensive teacher management, coupled with reinforcement led to increased production rates. Although the present results were consistent with Brown's, the self-
monitoring procedures involved more than teacher supplied information feedback. In contrast to the reinforcement strategy, students were given data collection responsibilities in order to generate the information on which to modify their production rates. Reinforcement was made contingent upon increased rates.

Some subjects had difficulty following self-monitoring procedures at the beginning of the experimental period. Litrownik et al. (1978) reported that systematic training enhanced the ability of trainable students to self-monitor. Although subjects were shown how to record their performance on bar graphs in the present study, the design provided for limited training in the self-monitoring procedures. Therefore, a training program should be implemented prior to the use of self-monitoring with trainable students. Self-monitoring alone might then have an effect on student production rates. Future investigators should pursue this possibility.

Both self-monitoring plus reinforcement and reinforcement alone increased student production rates. However, the combined intervention has training advantages which should be considered. The complexity of the self-monitoring plus reinforcement intervention is related to the complexity of living in the community. Deinstitutionalization programs have been initiated on a massive scale. Living in the community has resulted in a prolif-
eration of public school programs for trainable students. In the present study, these students learned to use self-monitoring procedures. Student production rates increased significantly when the procedures were combined with reinforcement. Further studies should examine prevocational training interventions which are consistent with the complexity of community living. Information from these studies should contribute to the self-control and independence of trainable citizens.

SUMMARY

Production rate has been an important functional vocational behavior. The literature in the area of prevocational training of trainable mentally retarded students has revealed that rates can be increased by various interventions. However, the effect of self-monitoring procedures for increasing these rates has not been assessed. Also, the effect of the procedures has not been compared to the effect of specific reinforcers. Information on the comparative effectiveness of these interventions will guide professionals who design prevocational programs.

The purpose of this study was to compare the effectiveness of self-monitoring procedures, a reinforcer, and the combination of the two in prevocational training of trainable mentally retarded students. The study compared the effect of these inter-
ventions and a control condition on student production rates. The comparison was made in order to determine whether production rates of students under the experimental and control conditions differed and where the differences were located.

The subjects of this study were 40 trainable mentally retarded students enrolled in a vocational training program. Subjects were randomly selected from students who were nominated by their teachers and who performed the experimental task to criterion. The subjects were randomly assigned to four experimental groups.

The experimental task required subjects to assemble sets of three nuts and bolts and secure them in plastic bags. Goal establishment sessions were conducted to obtain a production goal for each subject. The goal corresponded to the subject's mean rate over two sessions. The experimental period followed for ten consecutive school days, for twenty minutes each day. Subjects under the self-monitoring procedures plus reinforcement condition assessed and recorded their production rates on bar graphs. Subjects who exceeded their goals, based upon a rate adjusted for errors by supervisors, participated in a ten minute free time period. Production rates of subjects under the free time reinforcement condition were recorded by supervisors. Subjects who exceeded their goals participated in the free time period. Sub-
jects under the self-monitoring procedures condition assessed and recorded their production rates. However, no free time was made available to this group. Subjects under the control condition did not use self-monitoring procedures and did not participate in free time.

The following null hypothesis was tested by a one-way analysis of variance:

There are no differences in the mean production rates of the experimental and control groups.

This hypothesis was rejected.

A post-hoc analysis, using the Newman-Keuls method of multiple comparisons, revealed the following significant results:

(1) The difference between Group A (Self-monitoring procedures plus free time reinforcement) and Group D (Control) was significant, in favor of Group A.

(2) The difference between Group B (Reinforcement) and Group D (Control) was significant, in favor of Group B.

(3) The difference between Group A (Self-monitoring procedures plus free time reinforcement) and Group C (Self-monitoring procedures) was significant, in favor of Group A.
SELECTED BIBLIOGRAPHY


APPENDICES
APPENDIX A

TEACHER NOMINATION FORM
TO: Faculty of Arlington Vocational Center
FROM: Arvil F. Vandergriff
DATE: 
SUBJECT: Teacher Nomination Form

Presently, I am in the process of conducting dissertation research at Louisiana State University. This research will examine production rates of trainable mentally retarded students in prevocational training.

In order to carry out this project, I am requesting teacher nominations of students who might be selected for participation. The students who are nominated should have, in your judgment, the potential to develop skills needed to work in a sheltered workshop. You are encouraged to nominate as many students in your homeroom as you wish. Since this project deals with prevocational training, no age limits are necessary.

Listed below are some guidelines to assist you in your nominations. Students should have

1. some finger dexterity,
2. basic counting skills and related number concepts,
3. some ability to sequence objects,
4. the ability to use lines as guides for writing and/or drawing,
5. some concern or responsibility for appropriate behavior.

Upon making your nominations, please return them to the school office. Feel free to contact me for any further information which you might desire.
APPENDIX B

STUDENT BAR GRAPH
NUMBER OF TASKS COMPLETED
APPENDIX C
DATA SHEET FOR
STUDENT OBSERVED AND ADJUSTED PRODUCTION RATES
GROUP 

Subject: 

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<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
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<th>10</th>
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<tbody>
<tr>
<td>s</td>
<td>a</td>
<td>s</td>
<td>s</td>
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<td>s</td>
<td>a</td>
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s = subject observed production rate

a = adjusted production rate
APPENDIX D

GROUP PRODUCTION RATE

DATA SHEET
APPENDIX E

PRODUCTION RATE DATA
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Asterisks (*) indicate missing numbers due to subject absences. Subjects' means (x) were obtained by summing the daily production rates and dividing by the actual number of days attended by the subjects.
### GROUP B

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Asterisks (*) indicate missing numbers due to subject absences. Subjects' means (x) were obtained by summing the daily production rates and dividing by the actual number of days attended by the subjects.
GROUP C

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Asterisks (*) indicate missing numbers due to subject absences. Subjects' means (x) were obtained by summing the daily production rates and dividing by the actual number of days attended by the subjects.
GROUP D

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Asterisks (*) indicate missing numbers due to subject absences. Subjects' means (\( \bar{x} \)) were obtained by summing the daily production rates and dividing by the actual number of days attended by the subjects.
CURRICULUM VITAE

Arvil F. Vandergriff was born in Knoxville, Tennessee, and attended the public schools of that city. He received the Bachelor of Science and Master of Science degrees from the University of Tennessee, where he was elected to Phi Beta Kappa and Phi Kappa Phi honor fraternities.

For the past eleven years, Mr. Vandergriff has worked with retarded citizens. Most recently he has worked as a teacher of trainable mentally retarded students. Upon completion of his graduate coursework, he resumed his position at Carver Ranches Education Center of the Broward County, Florida, public schools.
EXAMINATION AND THESIS REPORT

Candidate: Arvil Fletcher Vandergriff

Major Field: Education

Title of Thesis: A Comparison Of Three Training Interventions With Trainable Mentally Retarded Students In Prevocational Programs

Approved:

[Signatures]

Major Professor and Chairman

Dean of the Graduate School

EXAMINING COMMITTEE:

[Signatures]

Date of Examination:

July 20, 1978