

The University of Manitoba

A Self-Management Package  
Versus  
A Group Exercise Contingency  
For Increasing On-Task Behavior of  
Developmentally Handicapped Workers

by

Sharon Elaine Rae

A Thesis  
Submitted to the Faculty of Graduate Studies  
In Partial Fulfillment of the Requirements for the  
Degree of Doctor of Philosophy

Department of Psychology  
Winnipeg, Manitoba  
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A SELF-MANAGEMENT PACKAGE VERSUS  
A GROUP EXERCISE CONTINGENCY FOR INCREASING  
ON-TASK BEHAVIOR OF DEVELOPMENTALLY HANDICAPPED WORKERS

BY

SHARON ELAINE RAE

A thesis submitted to the Faculty of Graduate Studies of  
the University of Manitoba in partial fulfillment of the requirements  
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DOCTOR OF PHILOSOPHY

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## Abstract

This study compared the effects of "typical" staff supervision to two strategies for increasing on-task work behaviors of mentally handicapped persons. The strategies were self-management with individualized consequences, and a staff-managed group contingency involving contingent exercise breaks. Subjects were six moderate to severely mentally handicapped workers in a sheltered workshop setting. An ABACA reversal design was used with an additional replication of the best condition. Data on staff/worker interactions was obtained in order to quantify "typical" staff supervision. The self-management intervention was clearly effective in increasing the on-task performance of four of the six subjects. Self management also appeared to increase on-task performance of the remaining two subjects, but the results were less clear cut. The contingent exercise break showed a clear effect over baseline with only one subject, and less clear effects with two additional subjects. No consistent changes in on-task behaviour during the study were observed with control subjects. Social validity data indicated both the line supervisor and the subjects preferred the self-management strategy over the contingent exercise break.

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## Introduction

The acceptance of mentally handicapped persons in sheltered workshops and competitive employment situations depends to a large extent on helping mentally handicapped persons improve their production rates and exhibit appropriate social and work behaviors (Bellamy, Horner, Inman, 1979). The accomplishment of this goal requires strategies that take into consideration the practical realities of workshop and employment settings such as low staff/worker ratios, the need for high contract turnover, crowded quarters in which they often operate, inconsistent and irregular feedback on performance, delays in reinforcement for high productivity and the monotonous nature of many of the tasks workers are required to perform. Previous research has focused on staff managed systems, self management, and exercise programs to increase work behaviour.

### Staff Managed Systems to Increase Productivity

A number of attempts to develop higher productivity and improve work behaviors have focused on alterations of the workshop environment by the staff. Strategies include: a) use of more effective and frequent discriminative stimuli for work behavior; b) use of frequent social contingencies such as praise for

being on task; c) monitoring in quantitative terms the output of workers; and d) use of more effective schedules of reinforcement to increase production rates. Such staff managed interventions have been found to effectively increase production rates (Martin, Palotta-Cornick, Johnstone & Goyos, 1980), on-task behaviors (Martin & Flexer, 1975), and vocationally relevant behaviors (Gardner, 1971; Kazdin, 1975; Kanfer & Phillips, 1970).

Despite the usefulness of staff managed strategies in improving the production rates and work related behaviors of mentally handicapped persons, there are a number of drawbacks associated with these procedures as they have been applied. Given the high ratio of workers to staff in most workshops, staff managed strategies often have too high a response cost to make them practical or efficient. In addition, such strategies are of little benefit in helping workers sustain independent work behaviors after the interventions are withdrawn (Palotta-Cornick & Martin, 1983), a requisite skill in a production oriented work setting and an important component of successful community work placement (Martin, Rusch, Lagomarcino & Chadsey-Rusch, 1986).

### Self-Management Procedures to Increase Productivity

There have been attempts to use self-management procedures to improve production rates, as such procedures are more consistent with the goal of normalization for mentally handicapped persons by developing more independence in their work behaviors. Self-management strategies have usually involved one or more of self-monitoring, goal-setting and self-administration of reinforcers. Self-management strategies have been shown to increase productivity on repetitive work tasks with mildly, moderately, and severely mentally handicapped persons (Helland, Paluk, & Klein, 1976; Zohn & Bornstein, 1980; Litrownik & Freitas, 1980; Hanel & Martin, 1980). A recent addition to the self-management strategies has been the use of picture prompts to help individuals learn complex assembly tasks (Wacker & Berg, 1983; Wacker, Berg, Berrie & Swatta, 1985); change tasks independently (Connis, 1979); independently initiate a series of work tasks (Sowers, Verdi, Bourbeau, Sheehan, 1985) and independently take appropriate lunch and coffee breaks (Sowers, Rusch, Connis and Cummings, 1980).

While self management procedures have potential for increasing productivity of retarded persons,

research to date has some serious limitations (Martin & Hrydowy, 1987). Many of the self-management studies have been conducted in vocational training centres or in specially designed work spaces within a workshop. Such settings often bear little resemblance to normalized work settings or competitive employment situations. A second deficiency is that most of the studies took place for only limited periods throughout the workday (from 20 minutes to 1 1/2 hours). Third, most studies involved a comparison of production rates when self-management strategies were in place to production rates during baseline when so called natural contingencies were in use but were not being monitored. Consequently, very few of the comparisons of specific strategies have included reliabilities on the components of the "natural" contingencies. Fourth, although most of the self-management programs have made use of back up staff contingencies to ensure that clients were accurately applying the various self-management components, rarely were procedural reliabilities obtained as to how the contingencies were applied. Fifth, in most of the studies, the interventions were applied by researchers who were engaged in short term projects. A recent study by Mullen & Martin (1987) addressed many of the

deficiencies cited above. In this study, the training and intervention procedures were under the supervision of the regular staff and were in place throughout the workday. In addition, natural staff contingencies during baseline were carefully monitored. A novel feature of the Mullen & Martin study was the incorporation of the "one-minute management" approach in the staff contingencies to support the self-management procedures. This feature offset a further weakness which was evidenced in most of the staff managed and self-management studies, namely, that the application of the procedures involved excessive staff input. Although the Mullen & Martin study obtained positive results, the participating staff thought that the procedures were too time consuming to be of use in many workshops.

The present study attempted to look at contingencies which are realistic for workshop settings, are easily applied, involve little input from staff, and which draw on some of the previous research aimed at improving worker productivity.

#### Contingencies to Increase On-Task Behavior

One strategy that has been easy to apply in settings with a large client/staff ratio, where on-

task behaviors needed to be maintained for periods of time, is the "timer game" (Wolf, Hanley, King, Lachowicz & Giles, 1970). Wolf et al were able to decrease out-of-seat behavior of low achieving children in a remedial class by having a timer set for various intervals (ranging from 0 to 40 minutes) and having the teacher observe which children were out-of-seat when the timer rang. Each child could earn five points each time he/she was observed to be in their seat when the timer rang. The points could be exchanged for back-up reinforcers such as snacks, candy, clothes and field trips. The "timer game" has potential for increasing on-task behaviors in work settings since it does not require continuous monitoring and encourages individuals to monitor their own behavior for extended periods of time. To date this approach has not been used as a means of increasing productivity and improving work behaviors in a sheltered workshop setting.

A second strategy which has been found effective in increasing the on-task behaviors of children in a classroom setting is the use of self-control procedures combined with visual and auditory cues to prompt accurate use of the self-control procedures (Glynn & Thomas, 1974). In this study, students were taught to

self-assess and self-record whether they were on-task whenever a buzzer rang. Visual cues were also provided to help students assess whether they were on task or not. The results showed that the students were able to accurately assess and record their on-task behavior when they were provided with clear instructions as to what the appropriate on-task behaviors were (visual cues) and when given frequent opportunities to do so. Such a procedure enabled the students to use the self-control procedures across variable tasks without the teacher having to intervene. This strategy has potential for increasing the on-task behaviors of mentally handicapped workers, as it provides a strategy whereby self-control procedures can be applied independently of the specific work task. The present study incorporated some aspects of the cueing and self-control procedures described above.

#### Exercise Programs to Improve Work Behavior

Another possibility for increasing the on-task behavior of workers is the use of exercise breaks during regular working hours. The use of exercise breaks to improve productivity of workers has been shown to be effective in numerous work settings with non-handicapped workers. One such study was conducted



with the corporate sector of the Pepsico Company in Purchase, New York. The program which began with a small number of employees participating in a small number of fitness activities has expanded to an extensive fitness program in which the majority of employees participate (Patton, Corry, Gettman and Graff, 1986). Results showed increased self-reports of feelings of well being, energy level, and morale. Their conclusions were that employee fitness programs were effective in lowering health care costs and improving worker productivity.

Similarly, a study which analyzed the costs of poor health for Mesa Petroleum employees (Gettman, 1983) found that fitness programs were related to lower medical costs, lower absenteeism rates and increased productivity. Other studies have been concerned with the direct relationship between exercise and such measures as absenteeism and turnover rates and have found a positive association (Song, Shephard and Cox, 1982; Linden, 1969). A correlation has also been found between exercise participation and employees perceived increases in work performance (Pauly, Palmer and Wright, 1982). Baun and Williams (1985), in a recent study of Tenneco Inc. employees in various levels of white collar positions, investigated the relationship

between levels of adherence in a corporate fitness program and job performance as determined by an established supervisor's rating system. A strong association was found between high work performance ratings and frequent and regular participation in an exercise program.

A recent study by Wallin & Wright (1986) found that women in unskilled jobs which were monotonous and involved simple repetitive movements of the arms and hands all day long had a high rate of visits to the medical department for psychological problems, depressions and musculo-skeletal symptoms. Another study by Kobasa, Maddi and Puccetti (1982) found a significant correlation between participation in regular exercise and resistance to illness. Subjects who engaged in regular exercise had fewer physical and psychological illnesses than those who didn't exercise. These studies suggest that assembly type work can result in psychological as well as physiological symptoms of illness and that exercise may be beneficial in preventing the development of symptoms of physical and mental stress in individuals. An important implication of these studies is the potential physical and psychological benefits of exercise for individuals who work at assembly type tasks.

In light of the above findings, the use of exercise as a viable strategy for improving productivity of mentally handicapped workers seems worthy of investigation. Although this has not been the focus of much research with the mentally handicapped to date, there is one study which lends support to the idea that a similar relationship between exercise and productivity may hold for mentally handicapped workers as has been found with nonhandicapped populations. Beasley (1982) had mildly and moderately mentally handicapped workers from a sheltered workshop participate in an eight week jogging program. The results showed subjects who participated in the jogging program had an increase in their rate of production on an assembly type task. However, although the above studies are encouraging in their results, in terms of the relationship demonstrated between exercise in the workplace and work behavior, it must be recognized that the results are correlational not causal in nature. These studies do not demonstrate a functional relationship between exercise and work production with individual subjects. Moreover, they did not examine if the opportunity to exercise might function as a positive reinforcer to increase productivity. The question thus remains as to whether

exercise breaks which are made contingent on work performance would be effective in increasing the work performance of mentally handicapped workers.

### Statement of the Problem

The purpose of the present study was to extend the research on effective procedures for improving the on-task work performance of mentally handicapped workers in workshop settings. First it made use of procedures which were easy for staff to implement and consumed a minimum of staff time. Second, it incorporated components of procedures which have been found to be effective in increasing work performance of nonhandicapped workers, thus promoting the goal of normalization for mentally handicapped persons. Third, it made use of procedures which allowed workers to monitor their own work performance, thus making them better candidates for successful supported employment in the community where they must function with less supervision. The study focused on on-task performance (rather than production rates) so that generalization and maintenance of the behaviors across various work tasks was more likely to occur, thus promoting worker independence.

Specifically, the present study compared two procedures for increasing on-task performance of mentally handicapped workers in a sheltered workshop. The first procedure involved having workers self-assess and self-record their on-task work behavior when a buzzer rang at variable intervals. Workers who reached a predetermined criterion of on-task performance received tickets which could be exchanged for food purchases at the cafeteria. The second procedure involved the use of a group contingency in the form of a one-minute informal exercise break for on-task performance if the supervisor observed most workers were on-task when a buzzer rang at variable intervals throughout designated work periods. Performance under the two procedures was also compared to workers' on-task performance under "typical" staff supervision.

### Method

#### Subjects and Line Supervisors

The subjects were five male and one female mentally handicapped persons, employed at Versatech Industries, a sheltered workshop in Winnipeg, Manitoba. Subject 1 was a 38 year old female with an I.Q. of 52 and had worked at the workshop for 18 years.

Subject 2 was a 32 year old male with an I.Q. of 44 and had worked at the workshop for 15 years. Subject 3 was a 56 year old male with a moderate level of retardation\* and had worked at the workshop for 3 years. Subject 4 was a 47 year old male with a moderate level of retardation\* and had been at Versatech for 26 years. Subject 5 was a 38 year old male with an I.Q. of 30 and had worked at the workshop for 14 years. Subject 6 was a 25 year old male with a moderate level of retardation\* and had been at Versatech for 2 years. All the subjects were able to learn the skills required for the various work contracts which Versatech receives, but their line supervisor was dissatisfied with the lack of consistency of their on-task work behavior and had recommended them as candidates for the study.

All the procedures were carried out by the line supervisor except as described in the following text. The line supervisor was a 25 year old female, who had been employed by Versatech in the position of line supervisor for two years. She had no formal training in behaviour modification.

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\*Based on agency records, actual test results not available.

### Setting

This study was conducted at Versatech Industries Incorporated, a sheltered workshop in Winnipeg, Manitoba. The workshop was divided into seven work areas. Some of the work areas were separated by plywood dividers, some of them were big open areas, and one was a completely enclosed room. In each section there were four or more rectangular work tables arranged in varying configurations with four or more workers seated at each table. The number of workers at a table varied depending on the contract. Work materials and various machines were also located in the work area as were the line supervisor's desk and a set of shelves for workers lunches.

The subjects were seated at a table with workers on both sides and sometimes across the table from them. There were twenty-three workers in the department, however, only six were targeted as subjects on whom data would be collected. These were selected on the basis of the line supervisor's evaluation that all six were capable of doing better work but had difficulty maintaining consistent work behaviors. The line supervisor continued to supervise the work of all twenty-three subjects throughout the study. The interventions were in place for the entire department (all twenty-three workers) but data was collected only

for the six subjects identified whom the line supervisor identified as needing to improve their work behavior. The tables measured three feet by eight feet and three feet by five feet. The materials required for the contract were placed on the tables by the line supervisor and designated workers. Designated workers were workers chosen at random by the line supervisor to obtain materials as required. In addition there were one or more model workers in the department during 80% of the experimental phases. Model Worker was the title given by Versatech to identify non-handicapped workers in the workshop who provided a model for appropriate work behavior. The hours of work for the workers were 8:30 to 4:00 with a half hour lunch break and two fifteen minute breaks, one in the morning and one in the afternoon. There was always a great deal of noise in the workshop due to the machines operating and talking between supervisor and workers.

#### Experimenters

The author was present to do observations and interobserver reliability assessments on Wednesday and Friday afternoons. Two or three other students were present as observers on Mondays, Wednesdays and Fridays. All three students were undergraduate students enrolled in psychology courses at the



University of Manitoba. The undergraduate observers were trained by the author in the observational procedures to be used and in doing I.O.R.'s (see Appendix A). One of the students had extensive experience in training, data collection and I.O.R. checks on several previous studies with mentally handicapped persons in workshop settings, and she assisted with training the novice observers. Two other observers also had previous experience in data collection on projects with mentally handicapped workers.

#### Apparatus

Throughout the intervention phases, a timer was placed on the line supervisor's table in the department where the subjects worked. The timer was set by the supervisor to produce a buzzer sound at varied intervals ranging from two to fifteen minutes. Watches with a second hand were used to time the observation sessions. Hand-held commercial golf counters and bingo counters were used to monitor the on-task behaviors of workers and the verbal interactions of staff with workers.

During the self-management phase, a sheet of paper (8 in. X 11 in., see Appendix C) was taped to the table in front of each worker. The paper was divided in half

28 by a line and each half had 12 squares for a worker to record on-task behavior. On the sheet was the worker's name, date and written prompts identifying on-task behavior, i.e. "eyes on work" and "hands touching materials". Pencils were placed in containers in front of the workers.

#### Work Tasks During the Study

The following procedures were characteristic of the Versatech Workshop, and remained in effect throughout this study. Workers were assigned to a particular task each day by the line supervisor. The line supervisor demonstrated and provided verbal directions on how to complete the task, and provided spot checks on accuracy of performance. She also gave verbal prompts and reprimands on an irregular basis when workers were not working or were engaging in inappropriate behavior such as talking loudly, name calling, and sleeping. Positive comments for good work were also delivered by the line supervisor on an irregular basis. All tasks were assembly line tasks. Once a worker was trained for a task, he/she received no more training unless the quality of the work deteriorated or the task was not performed as demonstrated by the line supervisor. There were

usually two to three contracts ongoing at any one time in each area. Length of the contracts varied from one day to two months.

### Experimental Sessions and Phases

#### General Session and Data Recording Procedures.

The entire study lasted approximately four months. Data was obtained from 12:00 - 3:30 p.m. on Mondays, Wednesdays and Fridays from February 4 to April 15, and on Monday through Friday from April 21 to May 21.

All sessions took place in the actual work area and were conducted by the line supervisor. At all other times, other than the experimental sessions, the line supervisor and workers carried on as usual without any interventions. Two observers were present at all experimental sessions, and a third observer was present two-thirds of the time to determine interobserver reliability. In addition, three other observers were available as floaters to replace an observer unable to attend a session. Each observer observed two subjects during each observation period. Observers placed themselves at various production tables around the room, worked on the same tasks as the workers, and functioned as "model workers". Working as a model worker enabled observers to unobtrusively record on-

task behavior of subjects. At the end of the intervention session each day, the observers notified the line supervisor that the intervention and observations were over for that day and the observers left. The observers placed themselves so that they would have a clear frontal view of the subjects being observed but so that they would be unable to see what the other observer was recording. During two days of each week in all phases, data on staff/worker interactions was recorded by one or two of the observers. This latter data was taken for control purposes as described in the subsection, "Additional Variables Controlled".

#### Dependent Variable

Although data was taken throughout each afternoon that the study was in effect, observations were grouped and graphed in 30 minute intervals. Within each 30-minute interval, on-task data of subjects was collected on a time sampling basis. Each subject's performance was sampled during five seconds at the end of each three-minute segment, yielding ten, five-second work samples per half hour. Exact durations were timed. On-task behavior was defined as "a worker's hands in contact with work materials and manipulating materials

progressively toward completion of the task, and eyes focused on work materials during three seconds of the five-second time sample". The main observer kept track of the time during the observation intervals on a wristwatch with a second hand. She nodded to the other observers at the beginning of each half hour observation period as a prompt to start the observational interval. At the end of three minutes she nodded to the observers as a prompt to begin the five second observation of the subject they were observing. All observers counted out five seconds beginning immediately after the nod. At the end of five seconds they recorded their observation of on-task behavior on their counters. This was continued until the 30 minute observation session was completed. Observers each had a hand held golf counter for recording on-task behaviors of a worker; if a subject was observed to be on-task a counter was turned once. Each counter was kept in an apron with two pockets which the observers wore during the observation sessions. At the end of each thirty minute session, observers transferred the number recorded on the counters to the data sheets (see Appendix B). A separate data sheet was kept for each day (by each observer) for each phase of the experiment. Percentage

on-task performance was calculated by dividing the total number of on-task observations in each thirty minute observation period by the total possible on-task performance (ten) and multiplying by 100.

Baseline. Baseline consisted of the "typical" staff supervision provided by the Versatech Staff members. During baseline conditions, the observers seated themselves at production tables where they were able to have a frontal view of the subject under observation. At the beginning of each session during baseline, the line supervisor would say to the whole group: "Today we have our extra workers here to help us". The observers then worked as model workers on the tasks assigned to them and unobtrusively observed and recorded the on-task performance of the subjects. Data collected on staff/worker interactions were used to quantify characteristics of "typical" staff supervision (data collection procedures for this phase are described later).

Self-Evaluation and Self-Recording: An Individual Self-Management Contingency. "Typical" staff supervision continued throughout this phase, as during Baseline. In addition, prior to the introduction of

the individual contingency strategy, all the workers in the targeted department received training concerning on-task and off-task work behaviors. The training sessions were conducted by the line supervisor with one or more observers present. The training session lasted approximately 20 minutes and was held from 12:00 noon to 12:20 p.m. prior to the commencement of the afternoon workday. The training session was conducted with the workers as a group and took place in the actual work area. One training session was held at the beginning of the initial intervention phase.

During the training session, the line supervisor demonstrated on-task/off-task work performance using actual work tasks with which the workers were familiar. Each demonstration was accompanied by a verbal description explaining why her work was on-task or off-task. After several demonstrations by the line supervisor identifying the on-task and off-task behaviors, the line supervisor demonstrated the on/off-task behaviors without verbal prompts and asked the workers to label the behaviors as working (on-task) or not working (off-task). Criterion for being trained was correct identification of the working (on-task) and not working (off-task) behaviors during the demonstration on three consecutive demonstrations.

Next, the line supervisor told the workers she would like to try some ways that might help everyone to become better workers and enjoy their work more. She asked the workers if they would be willing to try to do some things differently when the extra model workers (the observers) were present to help. The workers agreed and she explained the first strategy to them.

At the beginning of the individual contingency phase, a training session was held with all the workers to teach them how to self-evaluate and self-record their on-task performance. Each worker had in front of them a sheet with their name on it and a pencil. The sheet was divided into two sections with 12 squares in each section (see Appendix C). One section was used before the coffee break and the other after the break. The line supervisor then provided a demonstration for the workers. She had the buzzer ring while she was on-task and showed them where to mark an X on the sheet. She then demonstrated being off-task when the buzzer rang and told them that she couldn't mark an X on her sheet because she wasn't working when the buzzer rang. The line supervisor then repeated the demonstration three times for on-task behavior and three times for off-task behavior, and had the workers, as a group, tell her each time if she could mark an X or not. The



line supervisor then told the workers they would have a chance to practice. She set the buzzer and when it rang each worker marked his/her sheet if appropriate. The line supervisor and observers provided feedback to the workers on the accuracy of their recording. If they were inaccurate, they were told why they couldn't mark an X. Practice trials continued until all workers were accurately evaluating and recording their on-task performance. Throughout the individual contingency phase, the line supervisor and observers monitored by spot checks the accuracy of the self-recording of the workers. The average number of accuracy checks per worker was 12 for each intervention session. The line supervisor also told the workers that if they were working and marked their X's honestly six times before a break (coffee or the end of the day) they could receive a ticket for a free snack of their choice from the cafeteria.

After the initial training period, during all days that the self-control procedures were in operation, the observers attached the recording sheets to the table in front of each worker and placed pencils on the table prior to the beginning of the afternoon work session (12:00 p.m.). The line supervisor would say to the workers "This afternoon, I want you to see how well you

are working. Whenever the buzzer rings, you decide if you were doing the two things on the sheet that good workers do. If you were doing both of them when the buzzer rang, mark an X in the square on your sheet. If you weren't, don't mark an X but try to work better so you can mark your sheet. Everyone who gets six X's on their card before break will get a ticket to use at the cafeteria for a free drink or snack." After the break the instructions were repeated and workers who earned another six X's were given another ticket.

An Exercise Break for On-Task Performance: A Group Contingency. During this phase, "typical" staff supervision continued as during Baseline. In addition, at the beginning of the group contingency phase, all the workers were told by the line supervisor that she would like to try something else to help them work better. They were told that during certain work days she would set a timer, and whenever it rang, she would look to see if everyone was working. If most people were working, she would make a check mark on the chart on the wall and if they got nine checkmarks before 1:50 p.m. they would stop working and have a chance to get up, move around, stretch and relax for one minute. If there were more than three workers not working she

would say "Some people aren't working, I can't give you a check mark". After coffee break, the instructions were repeated, and if the group earned nine checkmarks before 3:15, they received another exercise break.

The exercise break consisted of one minute of stretching exercises led by the line supervisor. The exercises involved arm and shoulder stretches, hand and finger stretches, waist and upper body stretches and leg stretches. The exercises were ones which all the workers were capable of performing. The observers (as model workers) also participated in the exercise.

Just prior to the introduction of the exercise break, the department was moved to a different location in the building. This setting was more open and allowed workers from other departments beside the designated department to observe what was going on. This was an unintended but anticipated move in terms of the research.

### Experimental Design

An ABACA reversal design was used with an additional replication of the better condition (for a description of this design, see Martin & Pear, 1983) The on-task behavior of all six subjects was monitored

across all phases. The extra replication of the better condition was included to counter possible sequence effects. Each treatment phase was in effect for seven or eight observation days spanning a two to three week interval. Each reversal phase lasted four or five observation days spanning a one to two week interval. The length of time for each phase was dependent upon the results obtained from visual inspection of the graphs. However, in order for the line supervisor to manage the interventions by herself it was necessary that all subjects receive the same treatment at the same time. This meant that phase changes were not always ideally timed for all subjects in terms of visual inspection of their graphs. Consequently, the data for one or two subjects was less reliable than it might have been if the phase changes had occurred for each subject independently.

#### Additional Variables Controlled or Monitored

General Prompts. At the beginning of individual contingency sessions, the line supervisor would say to all the workers "Remember to keep working so you can earn a coupon to use at the cafeteria". At the beginning of the group contingency sessions, the line supervisor would say to the whole group "Remember to

keep working everybody so you can have an exercise break."

Comparative On-task Data. During all experimental phases, the observers collected on-task data on several other workers picked at random throughout the workshop setting. The observation procedure was the same time sampling system used to collect on-task data for the experimental subjects. This data provided a production standard of "average" workers against which production of subjects could be compared, and served as a control to determine if factors other than the independent variable might be affecting on-task performance.

Staff/Worker Interactions. Interactions between staff and workers other than the subjects were recorded (See Appendix D). Data on staff/worker interactions was collected in order to quantify "typical" staff supervision and to compare this with the frequency and quality of interactions when the interventions were in operation. Interactions were grouped into three categories: namely, positive interactions concerning work behavior, e.g. when a client was on-task and praise was provided; all other interactions e.g. when a worker was asked how he/she was feeling, or when a

worker was off-task and the supervisor asked the worker to resume working; undetermined interactions - those where observers did not hear the verbal content sufficiently to categorize them.

Workshop Pay System. Each worker received a base pay rate of \$1.20 to \$5.60 per day, depending on the worker's productivity. Cheques were distributed to the worker every two weeks on a Friday afternoon. During this research, the subjects continued to receive their regular pay cheques every two weeks throughout the project. There were no changes in their pay rates.

#### Interobserver Reliability

Interobserver reliability checks on the dependent variable were done on 68% of the sessions. Reliability checks were also carried out on staff/worker interactions 100% of the time for the experimental subjects and 57% of the time for the control subjects. I.O.R. percentages were determined by dividing the number of observer agreements during a session by the number of agreements plus disagreements x 100%.

### Procedural Reliability

Procedural reliability data was collected during the various intervention phases to determine if the line supervisor was adhering to the procedures outlined (see Appendix A, B & C). I.O.R.'s were obtained on at least 75% of the procedural reliability checks. I.O.R. percentages were determined by dividing the number of observer agreements during a session by the number of agreements plus disagreements X 100%.

### Social Validity

Social validity questionnaires were administered to assess the line supervisor's (see Appendix E) and subjects' (see Appendix F) preference for the intervention strategies. In addition, the author interviewed the line supervisor and other staff who participated to determine the acceptability of each procedure and the feasibility of implementing each strategy in the workshop setting as a whole on a continuing basis.

### Data Analysis

Percentage of on-task performance was presented in graphs covering the various phases of the experiment. Visual inspection of the graphical analysis compared

baseline and treatment phases in terms of: 1) overlapping data points between baseline and treatment phases, 2) size of intervention effects, 3) immediacy of intervention effects, and 4) number of successful replications (Martin and Pear, 1983). Results were also compared with previous findings to determine whether they were consistent with existing data.

The results were also analyzed in terms of their practical significance for the workshop setting such as the acceptability of the procedure to the staff and workers, the effect of the procedures on workers and staff/worker relations and the significance of any changes in work behavior for the individuals in terms of increased enjoyment of the job.

## Results

### On-Task Data for Experimental Subjects

The self-management strategy was clearly effective in increasing the on-task work performance of four of the six subjects (see results for Subjects 1, 2, 3, and 6 in Figures 1 and 2).

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Insert Figures 1 and 2 about here  
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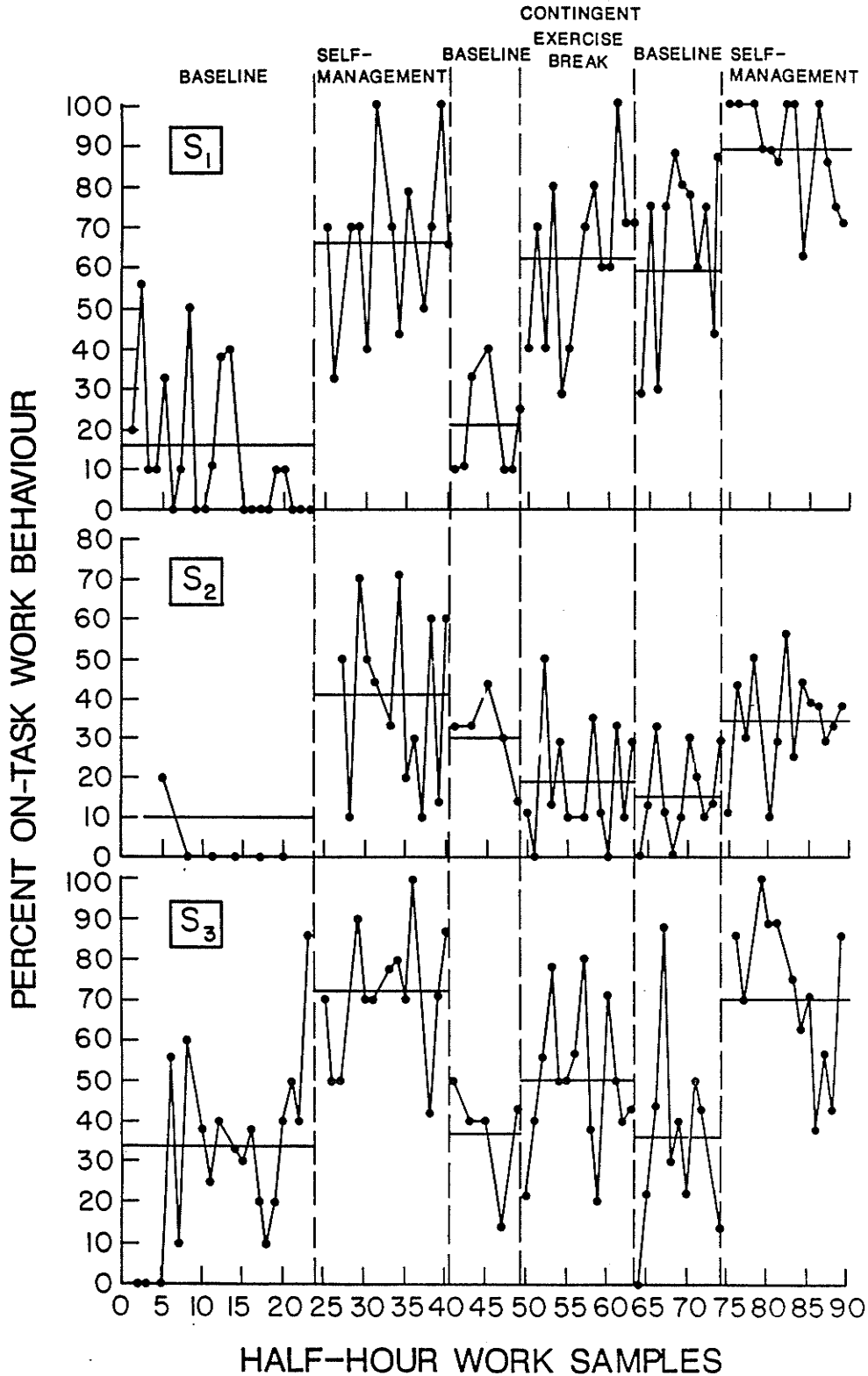


Figure 1. Percent on-task work behavior based on half-hour work samples for experimental subjects 1, 2 and 3.

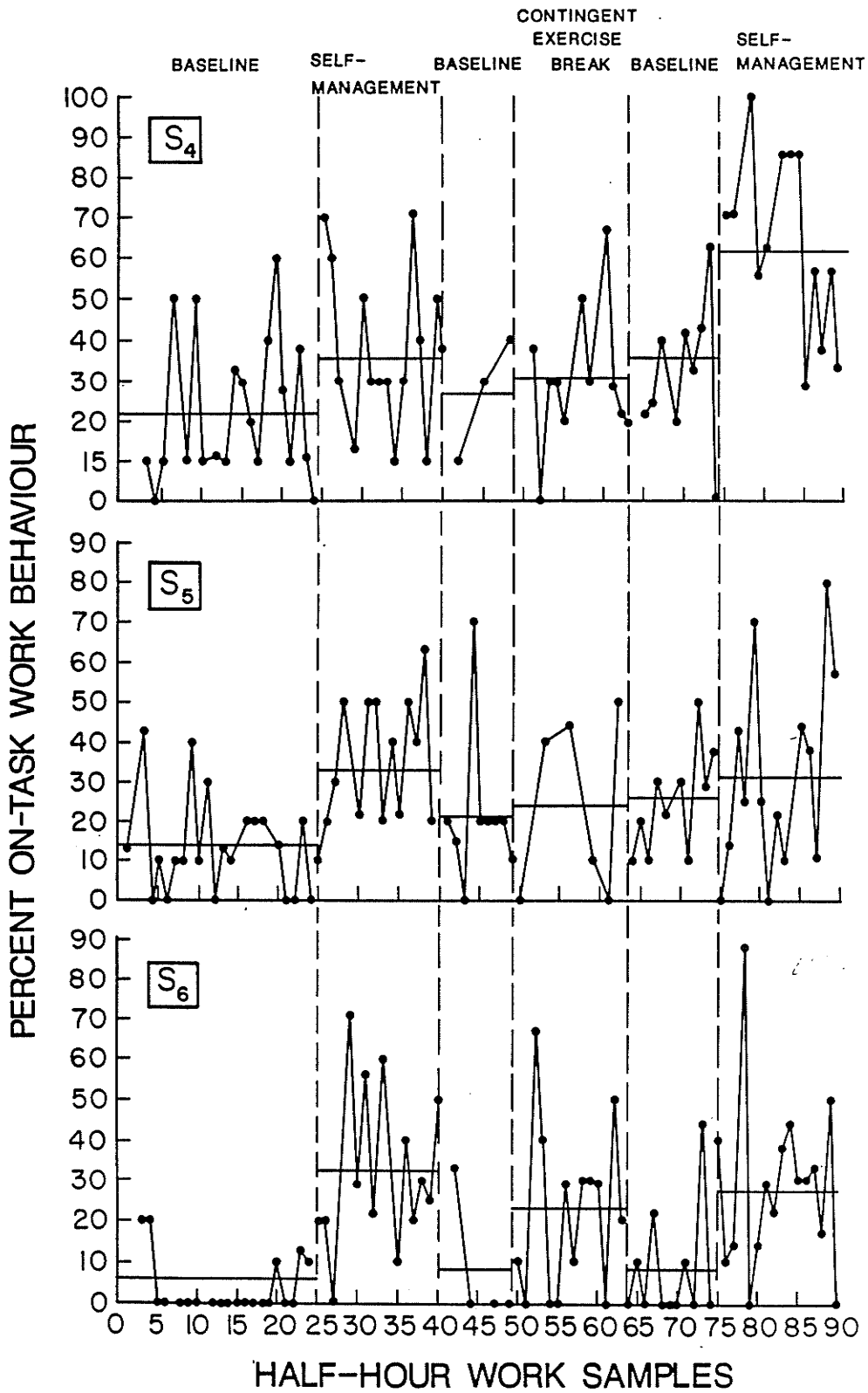


Figure 2. Percent on-task work behavior based on half-hour work samples for experimental subjects 3, 4 and 5.

Subject one showed an average increase of 240% over baseline in on-task behavior when the self-management strategy was in place initially and an average increase of 56% over baseline when the self-management strategy was reintroduced following the third baseline. Subject two had an average increase of 310% during the first introduction of the self-management and an increase of 127% when the self-management was replicated. Subject three had an increase of 112% on the first intervention and an average increase of 94% when the self-management strategy was replicated. Subject six had an increase of 433% and 238% respectively with the self-management strategy. Subjects four and five showed an effect in terms of group means from baseline to self-management phases but the individual results were less clear. Subject four showed an immediate effect when the self-management strategy was originally introduced; however, there were a number of overlapping data points across the two phases. In addition, during the reversal to baseline prior to the replication of the self-management phase, subject four's data showed an upward trend, thus the effect obtained in the replication phase may have been a continuation of this baseline trend. Subject five showed a clear but small effect

during the first self management phase. However, this effect was not replicated.

The effect of the contingent exercise break was somewhat more variable. Subject one showed a large effect over baseline, (195% increase) in terms of the mean difference. There were few overlapping data points and the effect was immediate. However, there was no recovery of baseline following the contingent exercise break intervention. Subject three showed a small increase of 35% over baseline under the contingent exercise break conditions; however the effect was not immediate and there were a number of overlapping data points. A clear effect was demonstrated with subject six who showed an average increase of 188% over baseline with few overlapping data points. Three other subjects (subjects two, four and five) showed negligible effects under the contingent exercise break condition.

In summary, the individual self-management strategy was shown to be clearly more effective than the group contingent exercise break in increasing the on-task performance of the subjects.

Comparative On-Task Data

Comparative on-task data with control subjects from other departments was collected while the experimental phases were in operation for the targeted subjects.

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Insert Figure 3 about here  
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Only one of the four subjects (Subject eight) showed any systematic change in on-task performance coinciding with the baseline/intervention effects observed in the experimental subjects. However, the increase observed when the self-management strategy was in operation for the experimental subjects was relatively small (50% and 22%) compared to the effects with the experimental subjects. An increase of 150% over baseline was observed for subject eight when the exercise contingency was in operation. As subject seven, who was from the same department and was observed at the same time as subject eight, showed no comparable alteration in performance with phase changes, there is little support that any consistent contingencies were operating across these subjects that might exert functional control over their performance. It should also be noted that at no time during the experimental phases were subjects seven and eight in a position to

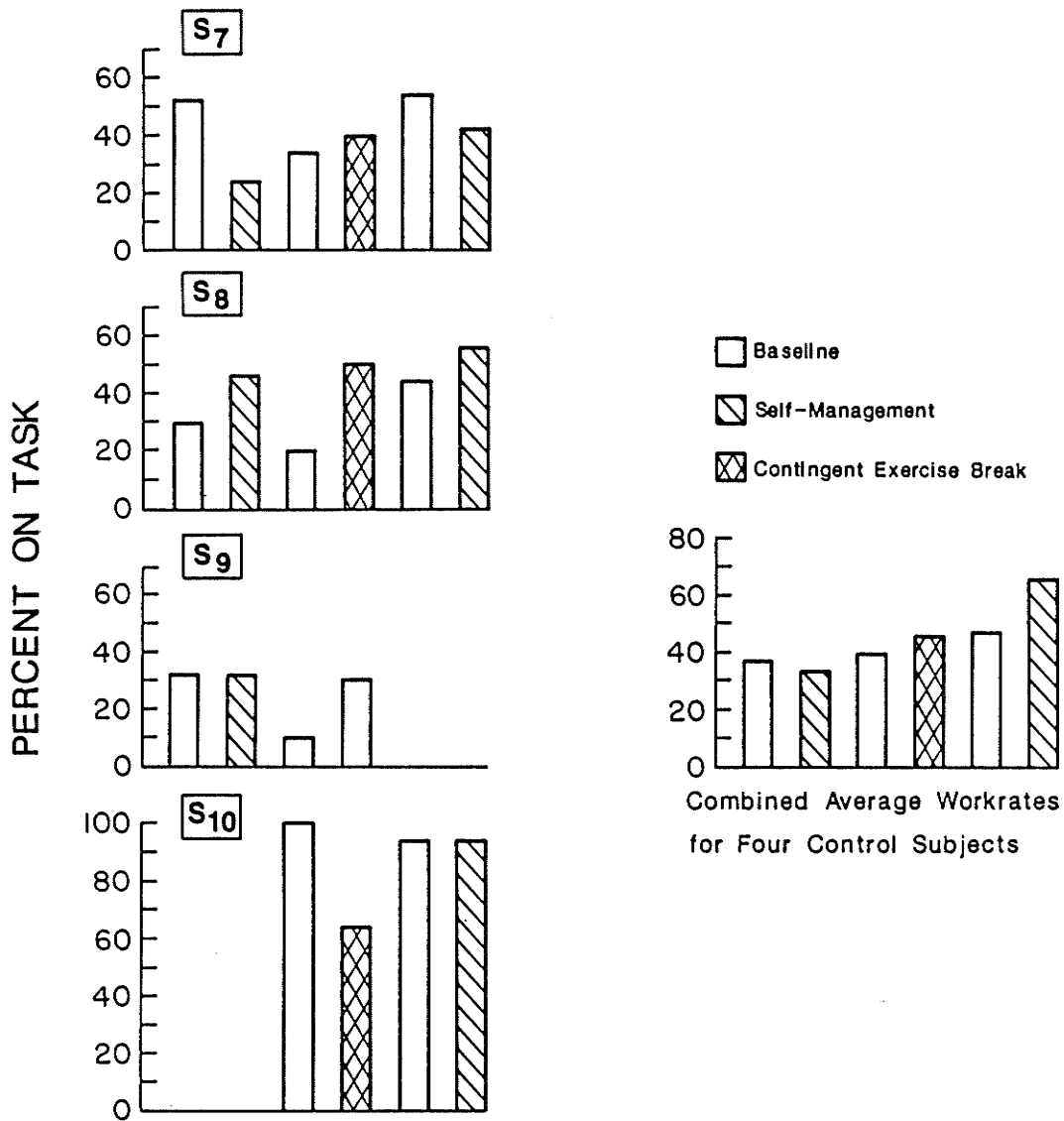


Figure 3. Mean percent on-task for control subjects. The different bars indicate sessions for control subjects that occurred during the corresponding experimental conditions for the experimental subjects.

observe intervention strategies being implemented. Subject seven showed a decrease from baseline during both times the self-management strategy was in operation for the experimental subjects. Subject nine showed no change in performance when the self-management intervention was first employed and an increase in performance over the preceding baseline when the exercise contingency was in operation. Data was only available for the first four experimental phases as subject nine was participating in a training program during the final two phases of the project. Observation of subject ten occurred at the beginning of the second baseline phase to replace a subject who had moved. Subject ten showed a decrease in performance compared to baseline when the contingent exercise break was in operation and no change in performance from baseline to the second self-management intervention. Overall there were no systematic changes in performance coincident with the implementation of the intervention strategies with the experimental subjects except for subject eight. The combined average on-task performance for the four control subjects in each phase (as presented in Figure 3) are Baseline 1 38%, Self-Management 34%, Baseline 2 41%, Contingent Exercise Break 46%, Baseline 3 48%, Self-Management 67%.

### Staff/Worker Interactions

Because the number of observed, positive staff/worker interactions was extremely low for both experimental and control subjects (often zero per half day), the average total staff/worker interactions per half day for each phase are presented in Table 1 for both experimental and control subjects. Data for control subjects was based on the average number of interactions for all other workers observed except the six experimental subjects.

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Insert Table 1 about here  
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The average number of interactions per half day during baseline for the experimental subjects was similar to that for the control subjects (1.9 vs. 0.9 respectively). The average number of total interactions per half day for the three intervention phases for the experimental and control subjects were 2.1 and .9 respectively. During interventions, the number of interactions with experimental subjects approximately doubled, both in comparison to baseline and to control subjects. The higher rates of occurrence of interactions under the self-management



Table 1.

**Average Total\* Staff/Worker Interactions per Half Day  
For Experimental and Control Subjects for All Phases**

	Experimental Subjects	Control Subjects
Baseline	1.6	1.0
Self-Management	2.2	0.8
Baseline	0.9	0.9
Contingent Exercise Break	1.9	1.4
Baseline	1.0	1.0
Self-Management	2.3	0.6
Baseline	1.2	0.9

\* Total - Includes positive work related, other and undetermined interactions.

condition were primarily because the subjects were prompted to self-evaluate if they didn't do so on their own initiative, and they also received regular feedback for their on-task performance when the buzzer rang.

#### Production Data

Due to a limited number of observers and the changes in work tasks within and across various phases it was not possible to obtain any production data to determine whether changes in on-task performance correlated with changes in production rates.

#### Work Tasks

Work tasks varied throughout the phases and for four subjects a change in work task coincided on one occasion with a change in phases. However, each change involved a return to a task the subject had performed previously during the experimental conditions and thus did not represent the introduction of an unfamiliar task. Overall, subjects worked on the same work task during 62% of the experimental conditions.

Coupons Earned during Self-Management Phases

Subjects earned an average of 1.5 coupons per day during the self-management intervention. Only one subject earned the maximum of two coupons per day during each day of the self-management intervention. Observers noted that the line supervisors definition of on-task was not consistent with the definition of on-task used by the observer. The line supervisor was much more lenient in her definition, allowing subjects to give themselves a mark if they were waiting for work when the buzzer rang or if, as in one case, the subject began to work when the buzzer rang. This may have resulted in subjects earning a higher number of coupons than they might otherwise have earned. Part of this was the result of the line supervisor not being able to watch each subject closely due to the high staff/worker ratio. All but one subject cashed in all their coupons for purchases at the cafeteria. Subject six cashed in only twelve out of fourteen coupons earned. The other coupons earned by subject six were never exchanged at the cafeteria for food purchases. It was observed that some subjects saved their coupons for several days and used them at one time to purchase a meal, rather than purchasing one item at a time.

### Exercise Breaks

On only one occasion was no break earned as determined by the line supervisor. Subject one exercised only 60% of the time. Subject two exercised 69% of the time, subject three exercised 71% of the time, subject four exercised 70%, subject five 71% and subject six 80%. In terms of the procedure, the break was always one minute in length and observers modeled exercises during all breaks. On one occasion the line supervisor did not model exercises and during two other breaks the line supervisor's modeling was negligible. On one occasion the break was given before workers earned the required number of points. On four different occasions, the line supervisor did not prompt workers to return to work.

### Interobserver and Procedural Reliabilities

Interobserver agreement was obtained on 68% of on-task observation sessions. Mean agreement was 91% for on-task data with a range from 54-100%. Only one of the interobserver agreement scores fell below 80%. I.O.R.'s were obtained on 75% of the sessions for comparative on-task data with a mean agreement of 91% and a range of 82-100%.

I.O.R.'s were obtained on 100% of the staff/worker interactions for the six experimental subjects with a mean agreement of 86% and a range of 60-100%. Of the total of twenty-eight I.O.R. assessments, 21 of them were between 80-100% I.O.R. For comparative staff/worker interactions I.O.R.'s were obtained on 57% of the data. The mean was 95% with a range of 71-98%. Only one of the I.O.R. scores fell below 80%.

Mean agreement for procedural reliability was 96% for the first self-management intervention, 94% for contingent exercise breaks, and 90% for the replication of the self-management strategy. Range for procedural reliability was from 78-100% with one agreement below 80%. Mean agreement on social validity data was 100%.

#### Social Validation Results

The social validation questionnaire was administered orally with five of the six experimental subjects (see Appendix F). An attempt was made to administer the questionnaire with subject five, by the author and the line supervisor; however, the subject did not understand the questions and made no response. The other five subjects were unanimous in their preference for the self-management strategy over the

contingent exercise break. All five subjects said they would like to continue to be able to earn coupons and were able to verbalize the behaviours required to earn coupons.

The line supervisor completed a social validation questionnaire (see Appendix E) in which she indicated a preference for the self-management strategy over the contingent exercise break. She indicated she would use the self-management strategy in the future for increasing production rates rather than for on-task behaviour. She also felt the self-management strategy did increase production for some of the workers but that to be most effective it should be done on a one to one basis to allow more accurate implementation by the supervisor.

The line supervisor did not like the contingent exercise break. She felt that it was not consistent with the management and organizational system at Versatech.

Another means of considering social validity of the results is to compare the on-task performance of the subjects during intervention phases with the on-task performance of workers in other departments picked at random and workers designated as "good" workers by

supervisors. Three of the four experimental subjects for whom a clear effect was observed with the self-management strategy had higher average percent on-task behavior than three of the four control subjects. The control subject identified as a "good" worker had 10% higher on-task behavior than the experimental subject with the greatest percent on-task behavior (88% and 78% respectively).

#### Discussion

The results of the present study support the value of self-management procedures for increasing on-task performance with mentally handicapped workers. The self-management strategy significantly increased the on-task performance of four of the six workers. Effects with the other two workers were positive, although smaller and somewhat inconsistent. The one subject with whom self-management seemed least effective was severely mentally handicapped. This research extends previous studies in several ways. First, it demonstrates the practical utility of self-management procedures when applied by typical workshop staff during regular workshop hours with an

unfavourable staff/client ratio. Second, the procedural reliability assessments quantified aspects of baseline conditions as well as enhancing confidence in the integrity of the intervention strategy, both of which have been absent from recent studies of self-management with mentally retarded persons. Third, it extends the potential application of self-management with the timer game to an additional problem, that of improving work behavior of developmentally disabled adults.

The results also suggest that individual contingencies involving self monitoring and token reinforcers are more effective for increasing work performance than are group contingencies in the form of a brief exercise break. The exercise break had a significant effect with only two subjects. With the others the effect was negative or negligible. Exercise may not have been a reinforcer for some of the subjects under the group contingency condition. Two of the workers for whom it had no effect are overweight, and body movement in the form of exercise may have acted as a punisher. A similar explanation may hold true for the other two workers for whom no positive effect was obtained as they tended to be somewhat shy and self



conscious. Since the workers were in full view of co-workers in other departments who were watching but not participating, the exercise may have been a punisher. This seems even more likely given the comments and the behaviour of the line-supervisor during this intervention. The line supervisor said she felt self-conscious doing the exercises, and that her colleagues from other departments were saying "the workers looked silly". As a result, the line supervisor did not provide an enthusiastic model for the workers in terms of the exercise break, nor was she consistent in providing feedback about performance when the buzzer rang.

Social validity results and comments of the workers during the various phases also support the contention that the individual contingency with a token reinforcer was more effective. Five of the six subjects said they preferred the individual contingency and that they would like to continue to work under these conditions. Throughout the second and third baseline and exercise phases, workers frequently asked the line supervisor and the observers when they would be able to earn coupons again, and they frequently said that they liked earning coupons. In addition the line

supervisor commented that she felt it was important for the workers to receive reinforcement for their work on a more frequent basis. The choice of a token reinforcer would appear to be significant in terms of the effectiveness of the intervention. Workers consistently used their coupons to make purchases in the cafeteria. One worker would save her coupons for several days and use them to purchase a complete meal. In terms of the low pay which workers received a coupon with monetary value would seem to be a powerful motivator.

Another factor operating in conjunction with the type of reinforcer may have been the frequency and immediacy of the reinforcement experienced by workers with the individual contingency. Workers received little in the way of verbal positive reinforcement for their work as evidenced by the low rate of staff to worker positive interactions. Moreover, pay periods were at two week intervals. During baseline phases, observers noticed workers engaged in more talking, laughing, singing, and calling to the line supervisor. than during the self-management intervention. Observers unanimously and independently commented on the lower noise level during self-management

intervention. The self-management strategy may have provided both more immediate conditioned reinforcers in terms of the buzzer ringing, the worker having a break to mark his/her sheet, and the feedback received from the line supervisor. In addition, the coupons provided more immediate token reinforcement for work than the money at the end of each two week period.

The results of the staff/worker interactions suggest that the increase in on-task work performance during self-management was not related to changes in the number of staff/worker interactions which occurred across phases. First, the staff/worker interactions were very low in all phases. Second, the average number of interactions was similar for all intervention phases even though the on-task performance was not significantly affected by the exercise break.

Casual observation suggests that the self-management procedures increased workers verbal understanding of what constituted work behaviour, and influenced them to assume more responsibility for their own work performance. The five workers who completed the social validation forms were able to verbalize the behaviors which were required of them to earn the coupons. Two workers were observed, during the second

self-management phase, obtaining their own work materials without prompting when there was no more material on their table. One worker self-initiated an alternate work task when materials for the assigned work task were not available due to a slow down in an earlier phase of the original work task. In addition, one worker was observed to frequently prompt another worker (on whom his task was dependent) to do his work.

Although the self-management intervention was effective in increasing the on-task performance of four of the subjects, its effect might have been even more potent if the procedures had been more consistently applied by the line supervisor. One inconsistency observed was the difference in definition of on-task performance between the line supervisor and the observers. The line supervisor allowed workers to call their behaviour on-task when they were waiting for work. Workers were sometimes taken away from their assigned tasks to perform other work related functions, and at times this was contingent upon a worker not performing his/her assigned task. Workers were sometimes allowed to do a task in a less efficient manner than was possible, thus decreasing their on-task behaviour and their production rate. Another

difficulty was the lack of organization of work tasks within the department. The availability of work materials fluctuated with the result that workers were, at times, allowed to sit in the department and engage in social interactions. Such a situation may have made it difficult for the work environment to acquire stimulus control over work behavior since the contingencies operating were not consistent.

The implementation of the intervention strategies with the entire department rather than with a few individuals was important for a number of reasons. Firstly it provided a means of improving the work performance of those who were inconsistent in their work behaviours without singling them out for individual attention, and without removing them from their natural work environment. This may have provided a greater likelihood of the improved work performance being maintained. A further advantage was the possible effect of modeling. Although good workers are available as models at all times, the self-management strategy especially provided an opportunity for poor workers to observe frequently (whenever the buzzer rang) the association between specific behaviours and

the positive contingencies of a check mark, verbal feedback, and receipt of coupons.

Although the present study is encouraging in terms of the possibilities for improving on-task behaviours in a group setting, it also brought to light some limitations which need to be addressed. A first limitation concerns the dependent measure. An improvement in on-task work behavior might not necessarily mean an increase in productivity. On-task work behavior was chosen as the dependent measure primarily because of the frequent change in contracts. Obviously, measures of production rate would be greatly influenced by the type of work being performed. It was assumed that a measure of on-task work behavior would be valid across work tasks so that it would not be necessary to return to baseline with each change in work task. Moreover, it is obvious that a client who improves from near zero on-task behavior during baseline to as high as 70% on-task behavior during self-management intervention is showing an increase in production. The line supervisor did not allow a client to sit for long periods of time and manipulate the same work materials over and over. Nevertheless, future research should examine the potential of the timer game

when applied directly to increased production rates. A second limitation of the current research concerns the lack of follow-up data on the continued use of the self-management procedures. Although the supervisor enthusiastically indicated that she planned to continue using the self-management package, observers were not available to evaluate the effect of its continued application. A further problem concerns the training procedures used to teach self-evaluation. Although five of six workers initially were able to self-monitor after the thirty minute group instruction session, accurate self-monitoring was not maintained. After two days, one of the subjects required constant prompting, two required frequent prompting or feedback as to accuracy and only two were able to accurately and consistently monitor their on-task behaviour without prompting. This suggests a need for small group instruction and more than one training session. Another problem from a practical standpoint is the use of a buzzer as a prompt for self-monitoring. The line supervisor found it time consuming and sometimes disruptive to have to stop what she was doing and set the timer. One alternative would be to alter the frequency with which the buzzer rang. A high frequency

could be used for initial training sessions with a lower frequency of rings following training. Another alternative would be to have individual workers equipped with watches that could be set to ring at various intervals. This would allow workers to assume even more responsibility for monitoring their own work performance.

One of the most glaring obstacles to improving worker on-task performance in the present study was the management style of the line supervisor. This style (as observed during Baseline) involved attending to off-task behaviour and ignoring on-task performance. Moreover, she did not establish clear expectations with the workers in terms of specific behaviours which constitute on-task and off-task performance. This meant that the intervention was being imposed upon an environment which was in direct opposition to the principles underlying the intervention. This points out the potential value of pretraining in the basic principles of behaviour management with those who will be implementing behavioural interventions.

The importance of developing consistent general work behaviours with mentally handicapped workers is becoming more important as the move toward community



integration continues. One area for future research which would extend the present study would be to assess strategies which could be used to teach mentally handicapped workers a repertoire of work related and on-task work behaviours. Such a repertoire might include the following: independently procuring work materials, seeking assistance when experiencing a problem with a work task or when work needs to be checked, independent evaluation against a specific criteria of one's own and/or co-workers' productivity, engaging in alternate work tasks if unable to continue with the assigned task, engaging in appropriate work related verbal interactions during work time, and giving and seeking assistance to and from peers, e.g. demonstrating a work task. Strategies for teaching the appropriate implementation of each on-task behavior could involve training in small groups using demonstration, modeling, verbal and/or token reinforcement.

Another area which requires further research concerns ways to counteract the repetitive, monotonous, sedentary and solitary nature of many sheltered workshop tasks. Maintaining on-task behavior consistently in such an environment requires that there be frequent reinforcers built in on a regular or variable interval schedule. The presence of model

workers who work beside the mentally handicapped workers, and who provide feedback and verbal reinforcement as well as ongoing training, would seem to be one possible means of maintaining work rates and on-task behavior. It was observed that workers showed a keen interest in approaching and interacting with the model workers (observers). The presence of trained model workers could act as a powerful source of control in a job that offers little in the way of immediate positive reinforcement. In addition, modeling may be more consistent with the kind of contingencies operating in "normalized" work settings where much of the training and reinforcement comes from coworkers rather than management.

Although the present results were not encouraging in terms of the effectiveness of a group contingency involving exercise to maintain on-task behavior, exercise contingencies merit further research. Future research might examine the reinforcing quality of different types of exercise, such as a comparison of formalized exercise routines with exercise in the form of social dancing. A further comparison might involve that between: (a) contingent short (3-5 minutes) exercise break during work hours involving stretching and strengthening exercises and (b) an opportunity to

earn tokens backed up by longer exercise programs at noon hours or at the end of the day such as aerobics, jogging, dancing, or swimming. Given the reinforcing properties of social interaction for mentally handicapped workers, individual exercises requiring dyadic interactions might be examined as a contingency for increasing on-task behavior and production rates.

#### Summary

The present study compared the effects of "typical" staff supervision to two strategies for increasing on-task work behaviors of mentally handicapped persons in a sheltered workshop setting. Although the interventions were experienced by all workers in the department, data was collected with only six workers identified by the line supervisor as having inconsistent on-task behaviors. The research design was an ABACA reversal design with an additional replication of the best condition. Data on staff/worker interactions was obtained in order to quantify "typical" staff supervision. Results showed that the self-management strategy clearly increased on-task work behaviour with four of the six subjects, and had positive but less clear effects with two subjects.

The contingent exercise break showed an effect over baseline with only one subject. Control subjects showed no consistent changes in on-task behaviour during the study. Social validity data indicated that both the subjects and the line supervisor preferred the self-management strategy over the contingent exercise break.

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## Appendix A

**Instructions for Observers**General Instructions

- Observers should arrive at Versatech by 11:45
- Notify receptionist who you are and why you are there
- Observers should wear casual clothes e.g. jeans, sweat suit etc.
- Observers meet as a group at 11:50 in conference room or cafeteria
- Main observer will hand out materials needed:
  - two golf counters
  - apron
  - data sheets
- Main observer will assign each observer subjects to be observed at beginning of each observation half hour prior to entering work area.
- Check counters and make sure all numbers are at zero.
- Fill in information at top of data sheets.
- Put on apron and place counters in pocket.
- Synchronize wrist watches both minute and second hand.
- Enter work area at 12:00 p.m., speak to other workers but don't encourage conversation.



- If workers ask why you are there, respond by saying you are there to help out with the work and to help Etta. Do not talk about the project.
- Before taking your place at the work table ask Etta - line supervisor, to explain the work task that the subjects you will be observing are engaged in as well as the work task you are to do.
- Take your place at the work table at which the workers you are observing are seated or at least place yourself so you have a clear frontal view of the worker and work materials.
- During the observation periods, work at the task except during the five second observation of the subjects and subsequent recording. Your main task is to observe and record accurately and to do the work task as it has been explained. Do not be concerned with working quickly at the task but do work carefully as quality work is expected by the companies whose contracts are being completed.
- Watch the main observer carefully to be sure you observe and record at three minute intervals for each subject.
- Once you are in place make eye contact with the other observers and receive a nod from the main observer which is a signal to begin the session. Check the time on your watch.

- When you receive a nod from the main observer, look at the first worker being observed for five seconds. Count 1001, etc. beginning with the observer's nod. When looking at the worker, do so as unobtrusively as possible, try not to attract the attention of the observer or other workers. Don't make eye contact with the worker being observed or other workers.
- During the five second observation, observe whether the subject has hands on the work materials and is actively manipulating the materials toward task completion. Eyes should be on the materials for three of five seconds and hands should still be manipulating materials progressively toward task completion.
- If the subject is observed as described above for the five seconds, move the counter one turn and return to your work.
- Repeat the observation for the second subject 1 1/2 minutes after the beginning of the first observation when the main observer nods to you.
- You will observe subject one for five seconds, wait 1 1/2 minutes, observe subject two for five seconds, wait 1 1/2 minutes and observe subject one again and so on until 30 minutes have elapsed.

- After each half hour observation period, leave the work area quietly and meet the other observers, record your observations on the correct data sheets without any interaction with, and out of the view of the other observers.
- The main observer will assign the subjects for the next observation period, fill in the data sheets, put them in your apron and return to the work area.
- If workers persist in talking say "I can't talk, I have to work."
- Refer any questions from staff regarding the project to the main observer.
- Be polite and courteous at all times and in all areas of the building.
- Do not talk about the project, workers, or staff at other than the designated times and places as identified by the main observers.
- Do not communicate with other observers during the observation periods.
- When observing a subject, do not stare at the worker, focus eyes on a point close to the worker so you can see what they are doing but don't attract their attention.
- At the end of the day, give all data sheets and materials to the main observer.



## APPENDIX B

## Data Sheet for On-Task Behavior

Date: \_\_\_\_\_  
 Observer: \_\_\_\_\_ IOR Observer: \_\_\_\_\_  
 Condition: \_\_\_\_\_

Subject		Time	No. On-Task	Total Possible On-Task	Percentage On-Task	IOR
1. Shirley	L-	1. _____ to _____				
	R-	2. _____ to _____				
		3. _____ to _____				
		4. _____ to _____				
2. Jay	L-	1. _____ to _____				
	R-	2. _____ to _____				
		3. _____ to _____				
		4. _____ to _____				
3. Jack	L-	1. _____ to _____				
	R-	2. _____ to _____				
		3. _____ to _____				
		4. _____ to _____				
4. Peter	L-	1. _____ to _____				
	R-	2. _____ to _____				
		3. _____ to _____				
		4. _____ to _____				
5. Gordon	L-	1. _____ to _____				
	R-	2. _____ to _____				
		3. _____ to _____				
		4. _____ to _____				
6. Arthur	L-	1. _____ to _____				
	R-	2. _____ to _____				
		3. _____ to _____				
		4. _____ to _____				

Appendix C

Self-Recording of On-Task Behavior

Name: \_\_\_\_\_

Date: \_\_\_\_\_

12:00  
to  
1:40

2:15  
to  
3:30


- Eyes on Work

- Hands on Work

APPENDIX D  
Staff to Worker Interactions

Date: \_\_\_\_\_  
Observer: \_\_\_\_\_  
Condition: \_\_\_\_\_

Number of Interactions

Date & Time	Positive Work Related	Other	Undetermined Interaction	Total	IOR
Mon.					
Wed.					
Fri					
Mon.					
Wed.					
Fri					
Totals					

APPENDIX E

Social Validation Questionnaire for Line

Supervisor

1. Which intervention did you prefer?
  - 1) Self-Monitoring/Coupons \_\_\_\_\_
  - 2) Exercise Breaks \_\_\_\_\_
  - 3) Neither (your usual supervision approach) \_\_\_\_\_What was the basis for your preference? \_\_\_\_\_  
\_\_\_\_\_
  
2. Which of the approaches do you think the workers preferred?  
(use number) # \_\_\_\_\_  
On what do you base this conclusion? \_\_\_\_\_  
\_\_\_\_\_
  
3. Which intervention did you prefer?
  - a) Self-Monitoring/Coupons \_\_\_\_\_
  - b) Exercise Breaks \_\_\_\_\_
  
4. Which intervention did you find the least frustrating to use?  
Self-Monitoring \_\_\_ No difference \_\_\_ Exercise Break \_\_\_
  
5. Which intervention did you find required less of your time?  
\_\_\_\_\_
  
6. Which intervention do you feel is more consistent with the philosophy of Versatech?
  - a) Self-Monitoring \_\_\_\_\_
  - b) Exercise Break \_\_\_\_\_
  - c) Neither \_\_\_\_\_



Social Validation Questionnaire for Supervisors  
Page 2

7. Would you use the preferred intervention in the future?  
Yes (with no change) \_\_\_\_\_  
No \_\_\_\_\_ Why not? \_\_\_\_\_  
In a modified form \_\_\_\_\_ What changes? \_\_\_\_\_
8. Do you feel the project made you more aware of some of the factors that influence workers' performance? Yes \_\_\_ No \_\_\_  
If yes, please explain. \_\_\_\_\_
9. Do you feel it would have been easier for you to carry out the interventions if other departments had participated in the project as well?  
Yes \_\_\_ Please explain. \_\_\_\_\_  
No \_\_\_ Please explain. \_\_\_\_\_
10. Do you feel intervention strategies are important in helping workers to improve their work performance? Yes \_\_\_ No \_\_\_  
Please explain. \_\_\_\_\_
11. Other comments: \_\_\_\_\_

APPENDIX F

Social Validation Questionnaire for Workers

- 1. Self-Monitoring/Coupons            1
- 2. Exercise Breaks                    2
- 3. Neither

1. Which did you like better, earning coupons, earning exercise breaks, or working without either one?

\_\_\_\_\_

2. Would you like to continue to earn coupons or exercise breaks?

Yes \_\_\_      No \_\_\_      Which one? \_\_\_\_\_

3. What did you have to do to earn coupons/exercise breaks?

\_\_\_\_\_

\_\_\_\_\_