

A Self-Management Package with Recruitment of Praise  
for Work Production of Severely Mentally Handicapped Adults

by

Patricia Furer

A thesis  
presented to the University of Manitoba  
in partial fulfillment of the  
requirements for the degree of  
Master of Arts  
in  
Psychology

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A SELF-MANAGEMENT PACKAGE WITH RECRUITMENT OF PRAISE FOR  
WORK PRODUCTION OF SEVERELY MENTALLY HANDICAPPED ADULTS

BY

PATRICIA FURER

A thesis submitted to the Faculty of Graduate Studies of  
the University of Manitoba in partial fulfillment of the requirements  
of the degree of

MASTER OF ARTS

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## ABSTRACT

This research examined the effectiveness of a self-management package to increase the productivity of severely mentally handicapped adults in a sheltered workshop. Four severely retarded employees served as subjects. A multiple-baseline-across-subjects design was used to evaluate the effects of the self-management package on production rate of a golf-tee packaging task. Typical workshop supervisory conditions constituted the baseline phase. The Self-Regulation Package for the severely retarded (SRP(S)) involved self-monitoring, goal-setting by the experimenter, and self-recruitment of praise. The self-management package did not affect the subjects' production rate, percentage of correct production, or percentage of time on-task. Clear evidence was provided, however, that the workers preferred the SRP(S) over the typical workshop supervisory system, and that severely retarded adults can acquire self-management skills. Several explanations for the failure of the SRP(S) to increase productivity were discussed. Future research should investigate the possibility of enhancing the efficacy of the SRP(S) by providing praise on a continuous reinforcement schedule, or by introducing a more powerful reinforcer, such as tokens or edibles.

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A Self-Management Package with  
Recruitment of Praise for Work Production  
of Severely Mentally Handicapped Adults

The current trend in our society is to attempt to integrate mentally handicapped persons into the community (Fowler, 1984). This integration necessitates that such handicapped individuals be capable of independent living which in turn necessitates employment opportunity. Since a minimum level of productivity is typically a prerequisite for access to, and maintenance of, employment, it is important that programs be developed that increase the production rates of mentally handicapped workers.

Various productivity-enhancing procedures, including both self-control and staff-managed programs, are effective with mildly and moderately mentally handicapped employees (e.g., Hanel & Martin, 1980; Martin, Pallotta-Cornick, Johnstone, & Goyos, 1980). Staff-managed programs have also increased production rates of severely handicapped workers (e.g., Pallotta-Cornick & Martin, 1983). However, self-control programs have been less successful with severely retarded populations (e.g., Didenko & Martin, 1986).

Despite their lack of success to date with the severely retarded, self-control programs remain an attractive option for two important reasons. First, behavior modification programs have been criticized for increasing the power of those who already have power, and further subjugating those with little power (Holland, 1974). Mentally retarded persons in institutional settings are clearly in a less powerful position relative to staff. The use of self-control procedures with this population would permit a reduction of the amount of formal, external control required for behavior modification and management. The second attractive feature of self-control procedures is that they provide the individual with skills which may generalize to settings outside of the training setting (Fowler, 1984; Jackson & Boag, 1981).

#### Terminological issues

Before reviewing the research which has been conducted in the area of self-control with mentally handicapped persons, two problems of terminology contributing to confusion in the area will be addressed. First, the term self-control is inherently misleading since it implies that there are no external variables acting on the self-controlling behavior. This is not what Skinner meant when he first used the term in his book Science and Human Behavior (1953):

He [a person] controls himself precisely as he would control the behavior of anyone else--through the manipulation of variables of which behavior is a function. His behavior in doing so is a proper object of analysis, and eventually it must be accounted for with variables lying outside the individual himself [italics added]. (pp. 228-229)

Ultimately then, the variables controlling the controlling behavior are to be found in the environment. This is an important issue because it points to the inadequacy of self-control programs which fail to identify the environmental contingencies supporting the self-control behaviors. These environmental contingencies were clearly identified in the present research. Several authors (e.g., Baer, 1984; Brigham, 1980) have suggested that replacing the term self-control with some other term such as self-management may eliminate some of this confusion. The conceptualization of self-control used in this research, which circumvents the above problem, is to consider self-control as a continuum in which procedures range from complete therapist control to complete individual management (e.g., Mahoney & Thoresen, 1974; Martin & Pear, 1983). It is important to remember, however, that the end points of such a continuum refer to control of behavior in the short run. In the long term, control lies with contingencies in the society in which we live (Skinner, 1953).

The second terminological problem plaguing the literature in the self-management area is inconsistent usage of terms to denote the various components of self-management programs. For example, Jackson and Boag (1981) make a distinction between self-observation, self-monitoring, and self-recording, whereas other researchers subsume these three processes under the term self-monitoring (e.g., Mullen, 1986). To avoid any confusion, each component of the self-management package used in this research is operationally defined in the Method section.

#### Self-management and productivity of the mentally retarded

Recent reviews (Browder & Shapiro, 1985; Dennis & Mueller, 1981; Jackson & Boag, 1981) of the literature examining the efficacy of self-management strategies with the mentally handicapped suggest that self-management techniques can be used to modify a wide variety of behaviors. For example, Gardner, Clees, & Cole (1983) and Cole, Gardner, & Karan (1985) found disruptive verbal and physical behaviors of retarded adults to be virtually eliminated upon introduction of a self-management package involving self-monitoring, self-instruction, and self-reinforcement.

Several studies have examined self-management techniques as a means of increasing the productivity of severely mentally handicapped persons in vocational settings. For

example, Bates, Renzaglia, and Clees (1980) evaluated the effects of a package incorporating goal-setting by the experimenter, self-administered monetary reinforcers, and experimenter praise. Production rates on two tasks, assembly of drapery pulleys and packaging paperclips, were assessed. Monetary reinforcers were delivered following production of each unit and were exchanged for edibles at the end of each 80 min work period. The authors reported that each of the three subjects' production rates increased from unacceptable levels to levels well above the minimum rates required of sheltered workshop employees.

McNally, Norusis, Gentz, and McConathy (1983) examined a self-management package incorporating self-monitoring and self-administered token reinforcement, plus goal-setting by the experimenter. The production rates of 10 moderately and severely mentally handicapped adults engaged in a packaging task were targeted. The task involved inserting a napkin, eating utensils, and packets of salt, pepper and sugar into a plastic bag. The subjects self-delivered tokens after each unit of production. If the daily production goal were met or surpassed, the client was permitted 30 minutes of extra leisure time at the end of the day. The results indicated a substantial increase in productivity upon introduction of the self-management program. The effectiveness of the package was further enhanced when a group contingency component was added. This group

contingency involved allowing the group earning the most tokens 30 min of extra leisure time at the end of the day (regardless of whether or not each group member met their personal reinforcement criterion). Again, frequent and immediate reinforcement was available.

McNally, Kompik, and Sherman (1984) used a similar self-management package consisting of self-monitoring and self-administered token reinforcement, with an added component of public performance feedback. The package targeted productivity on two tasks: eight subjects capped glass bottles and placed them in a rack while the other five packed these bottles in boxes. Token reinforcers were self-administered after each unit of production. The performance feedback was provided by a light system consisting of 13 electric lights adjacent to the names of each client. When a client met his/her daily production goal the appropriate light was turned on by the supervisor and this client was permitted 30 min of leisure activities at the end of the day. Further performance feedback was provided by a bar graph illustrating the weekly progress of each client. This package increased the production rates of the 13 mildly to severely retarded subjects.

In a series of five studies, Martin and his colleagues have examined a self-management package for increasing the productivity of mentally handicapped persons in sheltered workshop settings. Hanel and Martin (1980) investigated the

effects of this Self-Regulation Package (SRP) on the production rates of eight sheltered workshop employees with degrees of mental retardation ranging from mild to severe. The package incorporated self-monitoring, self-administration of reinforcement, and goal-setting techniques. A marble-dispensing device was used which permitted the clients to self-monitor their production, receive immediate token reinforcement for task completion, and gain visual feedback regarding their performance relative to their goal. The token marbles were cashed in for pennies at the end of every 20-min SRP session. The clients also earned bonus pennies at the end of the session if they exceeded the production goal set by the experimenter. The pennies could be used to purchase edibles at the end of the morning and afternoon work periods. The SRP increased the productivity of all the clients as compared to baseline rates, with a mean increase of 43%. The authors also reported very accurate client self-monitoring with the mean accuracy across sessions for all clients ranging from 88% to 98%. The results of a social validation preference test indicated that seven of the clients favoured the SRP conditions. Only one client showed a preference for the baseline condition.

Jackson and Martin (1983) replicated the Hanel and Martin (1980) study with a few modifications to increase the efficiency of the SRP. Jackson and Martin used a self-



monitoring and goal-setting chart as a simple, time-efficient alternative to the more time-consuming marble-dispensing device used in the Hanel and Martin study. Also, rather than having experimenter-set production goals which were fixed across all sessions as Hanel and Martin did, Jackson and Martin had the clients set their own goals, in consultation with the experimenter, based on an adjusting goal-setting criterion. Jackson and Martin also furthered the investigation of the SRP by examining the additive effects of each of the components of the package. They compared self-monitoring (SM) to self-monitoring plus goal-setting (SMGS) to self-monitoring plus goal-setting plus self-administration of token reinforcement (SRP) for increasing the production rates of one mildly and two moderately mentally handicapped clients in a sheltered workshop. The three conditions were introduced sequentially for each client and examined in a multiple-baseline-across-subjects design. The results of this study replicated Hanel and Martin's findings that the SRP was effective in increasing the production rates of all subjects. The SMGS increased the productivity of two clients, but to a lesser degree than the SRP. The self-monitoring alone was ineffective. The authors noted that the SRP had a greater effect on the two moderately retarded workers than it did on the mildly retarded worker. The social validation preference tests indicated that all three clients preferred the SRP treatment over the baseline conditions. Choice

between the SRP and the other treatment conditions was not assessed.

Srikameswaran and Martin (1984) replicated the Jackson and Martin (1983) study with modifications in the research design to control for possible order effects of the treatment phases. Three of the sheltered workshop employees involved in this study were mildly mentally retarded and the fourth was moderately mentally handicapped. A combined multiple-baseline-across-subjects and reversal-replication design was used. The production rate of each client was assessed across baseline, SM, SMGS, SRP, and through individual reversal and replication phases. The order of the treatment phases was different for each of the subjects. The effect of the SRP was not as pronounced or as consistent across subjects in this study as it was in the Hanel and Martin study (1980) and in the Jackson and Martin study. The results indicated that two of the clients were maximally productive under the SRP condition. However, only one of these subjects showed a substantial improvement upon introduction of the SRP. For the third subject, the SRP resulted in a smaller increase in productivity over baseline rates than did the SM phase, and for the fourth subject productivity decreased somewhat with the introduction of the SRP. The authors reported that the accuracy of both the self-monitoring and the self-administration of token reinforcement was maintained at a high level during the

self-management phases. The social validation preference tests indicated that two of the clients chose to work under the baseline conditions and two clients favoured the SRP.

The cumulative results of these three studies suggest that the SRP is an effective self-management strategy for improving the production rates of mentally handicapped workers. The SRP increased the production rates of 13 out of 14 clients above that observed during standard workshop supervision with an average increase of 38% and a range of 11% to 121%.

A limitation of the SRP used in these three studies by Martin and his colleagues, and of the self-management programs used in the other studies reviewed earlier, is that they did not closely approximate typical workshop conditions. For example, the SRP was applied during 1/2 hour sessions rather than during sessions equivalent to a typical working day; tokens were exchanged for back-up reinforcers at the end of each 1/2 hour session while workshop clients are typically paid on a weekly or biweekly basis; and production goals were set every 30 min which is too time-consuming for an applied setting.

Didenko and Martin (1986) investigated the effectiveness of a modified Self-Regulation-Package which addressed these shortcomings and could easily be implemented in a sheltered workshop on a daily basis. Specifically, each 1/2 day was

treated as an experimental session with production goals being set only once each session, and tokens were exchanged for back-up reinforcers on a weekly basis. In addition, this study utilized an adjusting goal-setting criterion and a self-monitoring device that was easy and efficient for both clients and staff to manage. This research also differed from the previous studies in that it examined the effectiveness of the modified SRP with severely mentally retarded clients. Of the 14 clients involved in the first three studies of this series only 2 were severely mentally handicapped. A multiple-baseline-across-subjects design was used to evaluate the effectiveness of the modified self-regulation package (M-SRP) as compared to an SMGS phase and a baseline constituting typical supervisory conditions. The phases were sequentially introduced for each client, three clients receiving the M-SRP prior to the SMGS and the remaining four subjects receiving the SMGS phase first. At the beginning of each SMGS session, the experimenter helped the client set production goals based on the client's average production rate for the two previous sessions. The client self-monitored production using a device which provided visual feedback for productivity and progress toward the goal. At the end of each 1/2 day session, the client was praised for his or her work and for achieving or exceeding the production goal. During the M-SRP sessions, the self-monitoring and goal-setting were implemented as during the SMGS phase. Clients also self-administered

tokens contingent upon meeting or exceeding the production goal, which were exchanged for edibles at the end of each week.

The results of this study were quite different from the three earlier studies in this series. The M-SRP produced a moderate increase in productivity for only one subject. The SMGS intervention also produced a moderate increase for one subject. However, neither effect was replicated within those subjects. The production rates of the other five clients were unaffected by both the SRP and the SMGS, though the authors reported that on-task behavior was, in general, more favorable during the experimental conditions as compared to baseline. Accuracy of self-monitoring across all treatment phases for the seven subjects ranged from 39.5% to 94.5%. The social validation tests were somewhat inconclusive: two clients preferred the M-SRP condition but the remaining clients chose each of the three conditions once. Two of the staff members expressed satisfaction with the results of the program and one did not.

The main conclusion that can be drawn from this study is that the M-SRP and the SMGS strategies were generally ineffective for improving the production rates of severely mentally handicapped workshop employees. Didenko and Martin (1986) provided two possible explanations for this failure. They suggested that the effectiveness of the SMGS and M-SRP may have been reduced by the low levels of self-monitoring

accuracy. However, as these authors point out, other researchers (e.g., Shapiro, Browder, & D'Huyvetters, 1984; Zegiob, Klukas, & Junginger, 1978) have suggested that accuracy is not necessary for self-monitoring to be effective. The more plausible explanation is that the self-management procedures were ineffective mediators of the delayed reinforcement contingencies. More immediate reinforcement contingencies may be necessary with severely retarded populations.

As suggested by Mullen (1986), it is difficult to determine whether the ineffectiveness of this self-management package, as utilized by Didenko and Martin (1986), was a result of extending the procedures to more closely approximate typical workshop conditions, or whether the failure occurred because a different population, that is severely retarded persons, was targeted. This problem was addressed in Mullen's research. Like Didenko and Martin, Mullen compared the effectiveness of a SMGS package and the M-SRP. Both packages were also compared to a baseline constituting typical supervisory conditions. As in the Didenko and Martin study, the procedures were examined under typical workshop conditions: each 1/2 day was treated as an experimental session, goals were set only once each session, tokens and praise were provided at the end of each session, and tokens were exchanged for back-up reinforcers on a weekly basis. However, Mullen examined the effectiveness of

these procedures with mildly and moderately retarded workers, a population with which earlier studies had achieved success (e.g., Hanel and Martin, 1980). Mullen also extended the previous research in several other ways: the training and supervision of the eight clients was conducted by a regular workshop staff member; the social reinforcement contingent upon the self-monitoring, goal-setting, and self-administration of token reinforcement was clearly specified; and the staff behaviors supporting the self-management responses were streamlined. This therefore served as a second field-test of the M-SRP to determine whether or not it could be extended to typical workshop conditions. The results of this study indicated that both the SMGS and the M-SRP improved the production rates of all subjects when compared to baseline. A direct within-subject comparison of the two self-management strategies provided little data to recommend the use of one package over the other in terms of maximizing the increase in productivity. However, since the SMGS was simpler to implement, the author suggested that this might be the self-management package of choice with this population. Preference tests indicated that the majority of the clients chose to work under one of the experimental conditions (either M-SRP or SMGS) over baseline conditions, and that they showed a slightly greater preference for the M-SRP.

These studies suggest that the M-SRP is an effective strategy for increasing the productivity of mildly and moderately mentally handicapped persons in sheltered workshops, even under typical workshop conditions. What remains to be developed is an effective self-management strategy for severely mentally handicapped persons that can be easily implemented in a sheltered workshop on a daily basis.

Several of the self-management programs reviewed earlier did effectively increase the productivity of severely retarded workers (Bates et al., 1980; Hanel & Martin, 1980; McNally et al., 1983, 1984). However, none of these programs approximated typical workshop conditions. In each case, praise or token reinforcers were delivered very frequently, typically after each unit of production. Back-up reinforcers were generally provided once a day. A comparison of the early version of the SRP used by Hanel & Martin, and the M-SRP used by Didenko & Martin (1986), which approximated typical workshop conditions, suggests that this frequent reinforcement may be necessary to increase the productivity of severely retarded workers. Hanel and Martin found the SRP to improve the productivity of the two severely retarded subjects included in their research. The crucial difference between the self-management package used in this study and the ineffective M-SRP used by Didenko and Martin seems to be the delay in the receipt of social



reinforcement and back-up reinforcers. Clients in the Hanel and Martin study received praise and cashed in their tokens for pennies at the end of each 20 min session, and obtained back-up reinforcers at the end of each 1/2 day. In the Didenko and Martin study, clients were praised for their work only at the end of each half-day session, and tokens were exchanged for back-up reinforcers at the end of each work week. The disadvantage of the SRP used in the Hanel and Martin study and of the other effective self-management programs utilized with severely retarded workers is that they were generally too time-consuming and inefficient and are therefore unlikely to be adopted by workshop staff.

The current research evaluated a self-management package incorporating relatively immediate reinforcement, as was done in the successful programs, but which was not too time-consuming. This package differed from the earlier programs in two major ways. First, praise was the only programmed consequence because the literature suggests that praise is at least as effective as token reinforcers with a severely mentally handicapped population. The value of praise as a reinforcer was demonstrated in a series of studies by Zigler and his colleagues (Zigler, 1961; Zigler & Balla, 1972; Zigler, Balla, & Kossan, 1986). These authors used a "Marble-in -the-Hole" game as a measure of responsiveness to social reinforcement (see Zigler, 1961, for a detailed description of this game). They found that the motivation

for praise of institutionalized, mildly to severely retarded children increased with decreasing mental age. Therefore, it would seem that severely mentally handicapped workers should be very responsive to praise.

A direct comparison of token reinforcement and praise was provided by Zimmerman, Zimmerman, and Russell (1969). These authors targeted instruction following behavior in retarded students. Of the two severely retarded boys included in the study, one was not affected by either contingency. However, the other severely retarded student displayed similar increases in instruction following behavior under both reinforcement conditions. In other words, the praise was as effective as the tokens in increasing and maintaining the desired behavior.

The effectiveness of praise with this population was further demonstrated by Flexer, Newbery, and Martin (1979). These authors compared the relative efficacy of praise and monetary bonuses in increasing the productivity of 14 severely mentally handicapped workers engaged in a ballpoint pen assembly task. The reinforcers were delivered contingent upon meeting session production goals established by the experimenter. The results of this study indicated that the contingent praise was significantly more effective than the contingent monetary bonuses at increasing production rates.

A second major modification of this self-management package from the programs used in the earlier studies was the addition of a self-recruitment of praise component. Training the worker to recruit reinforcement from the workshop staff is a time-efficient self-management technique, which may have great potential for increasing the productivity of the severely retarded. Anecdotal observations by Mullen (1986) suggested that some of the higher functioning workers in her study spontaneously recruited praise from the staff. Mank and Horner (1987) have suggested that, in order for self-management programs to maintain behavior over extended periods of time, it is necessary to combine self-management and external-management systems. One way of combining these two systems is having the workers recruit praise from their environment. It is possible that the spontaneous recruitment of praise witnessed by Mullen may have been partially responsible for the increase in productivity of her subjects. With a more severely handicapped population, it may be necessary to train the workers to recruit reinforcement from the staff in order to achieve and maintain this increase in productivity.

Several studies have trained non-handicapped students to recruit reinforcement and have found this to effectively increase rates of positive feedback from teachers (Hrydow, Stokes, & Martin, 1984; Stokes, Fowler, & Baer, 1978) and vocational training staff (Seymour & Stokes, 1976). Only

one study (Mank and Horner, 1987) has examined the effectiveness of a self-management program involving recruitment of reinforcement with mentally retarded persons. Six subjects participated in this study, one diagnosed as severely retarded, the others as moderately retarded. In the first phase of the study, self-monitoring alone was used to increase productivity at six tasks that were part of the workers' restaurant jobs, including washing pots and pans, restocking dishes, and bussing. After an initial task training phase, the clients' work performance was assessed in the production setting. Work rate for three of the six subjects, including the severely retarded worker, was maintained at or near the rate achieved at termination of training. No further intervention was applied for these three subjects.

In the second phase of the study, a multiple-baseline across the three remaining subjects, whose productivity declined following training, was conducted to determine whether self-recruitment of praise could enhance maintenance. Recruitment involved self-monitoring of the target behavior, self-evaluation of performance against a pre-determined criterion, and recruitment of contingent feedback from the staff. Clients self-monitored time spent working and the number of work units completed using a stopwatch and a counting device. At the end of each work period, the workers compared their self-monitored data with

a pre-determined criterion for acceptable work performance. The participants then recruited feedback from their supervisors (the authors do not explain how this "recruiting" was done). The supervisor's feedback consisted of either praise, if the goal was met, or, if the goal was not achieved, of disapproval and encouragement to do better the next day. No other reinforcement procedures were involved in this program. The recruitment intervention was also compared within each subject to a self-monitoring only phase, and a third phase in which neither self-monitoring nor recruitment occurred.

The results indicated that with each task, there was improvement in level and/or trend upon introduction of the recruitment procedure. When this component was removed in reversal phases, production decreased. The authors also noted that there was no change in the frequency or duration of restaurant supervisor contacts across phases. The major change was in the content of these contacts: during the recruitment phase contacts were more contingent on work behavior. An additional finding was that training of the skills necessary for this self-management package did not substantially increase regular task training time, and that the program required minimal supervisor time.

The purpose of the present study

The current research evaluated the effectiveness of a package, which was primarily client-controlled, but which also involved staff-managed components, to increase the productivity of severely handicapped sheltered workshop employees. The procedures involved were less time-consuming than those employed in the successful studies (e.g., Hanel & Martin, 1980; Martin et al., 1980), and provided more immediate consequences than the SRP used in the unsuccessful study (Didenko & Martin, 1986). Self-recruitment of praise, as described in Mank and Horner (1987), was also incorporated into the self-management program.

Specifically, in the first part of the research the experimenter set short-term goals at the beginning of each 1/2 day session. The clients were taught to recruit praise from the experimenter upon completion of each short-term goal, so that the delivery of social consequences was relatively immediate. An advantage of this method of reinforcement over the schedule of reinforcement delivery implemented in the earlier studies is that the frequency of praise was directly dependent upon production rate rather than on an experimenter-fixed time interval. This package was also time-efficient in that it only required the experimenter to set goals twice a day and provide praise approximately once every 15 min.

## Method

### Subjects

Subjects were four severely mentally handicapped individuals residing at the Manitoba Developmental Centre in Portage-La-Prairie, a provincial institution for mentally handicapped persons. Subjects were selected on the basis of staff recommendation of individuals with low production rates, a low probability of displaying behavioral problems, freedom from serious impairments in vision, hearing, and manual dexterity, availability on a daily basis for the duration of the study, and familiarity with the experimental task. Clients ranged in age from 33 to 45 years, with mental ages ranging from 2 years 2 months to 4 years 3 months. Client characteristics are summarized in Table 1.

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Insert Table 1 about here  
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### Setting

The study was conducted in a sheltered workshop at the Manitoba Developmental Centre. The workshop was a large room containing several production tables. The subjects were all seated on the same side of one table. Wooden partitions were used to divide the production table into

Table 1  
Subject Characteristics

Client	Age	Test(s)	Test results	Institutional Diagnosis
Lenny	43	Stanford- Binet	MA=3yrs 7mos	unknown etiology: severe retardation
Mary	33	Stanford- Binet	MA=2yrs 7mos	unknown etiology, cerebral aplasia: severe retardation
Bob	45	Stanford- Binet	MA=3yrs 4mos	Down's syndrome: severe retardation
		Peabody Picture Vocabulary Test	MA=2yrs 2mos	
Herbie	39	Wechsler Adult Intelligence Scale	FSIQ=38	Post-natal infection: severe retardation
		Peabody Picture Vocabulary Test	MA=4yrs 3mos	



four sections so as to minimize visual distractions. Each subject's workspace was 1.5m by 0.6 m. There was typically a great deal of noise and activity in the workshop and popular music was often played over the workshop's sound system.

### Apparatus

A self-monitoring and goal-setting device was used by the clients during self-management sessions. This apparatus was also used by the researcher to set short-term goals for the client, and permitted the client to publicly self-monitor production and to gain visual feedback regarding his or her performance relative to the short-term goals. It also served as a prompt for the client to recruit reinforcement from the experimenter. The apparatus is shown in Figure 1.

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Insert Figure 1 about here  
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### Experimental task

The subjects packaged wooden golf tees. This task required each client to fill a pegboard jig with 20 golf tees, transfer the tees into a plastic bag, and place the bag in a receiver tray. Both a jig and a receiver tray were

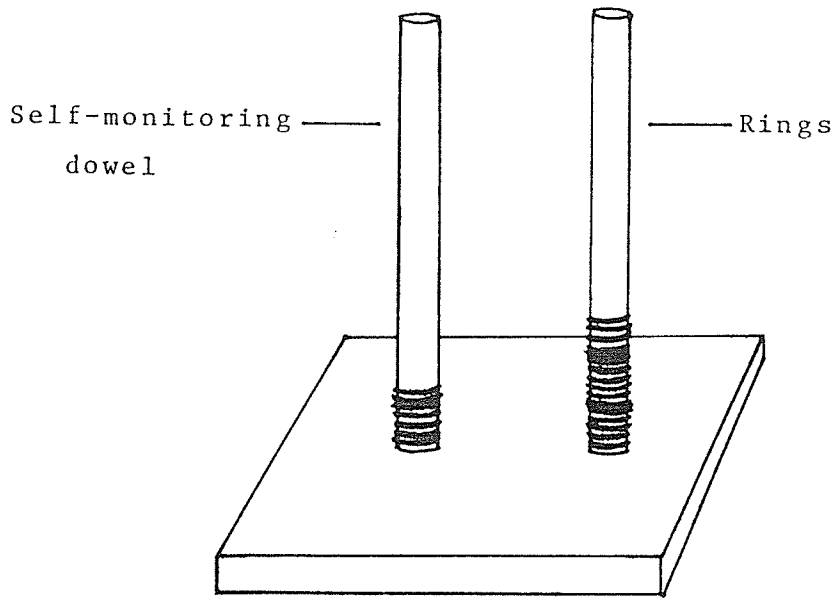


Figure 1. The self-monitoring device.

located on the production table in front of each client.

### Experimental sessions

Session characteristics. Typically, clients worked 5 1/2 hours per day in the workshop, with approximately 1 1/2 hours for lunch and two, 20-min coffee breaks (one in the morning and one in the afternoon). For this research, each half-day (approx. 2 1/2 hours) was treated as one experimental session, so there were two sessions per day. Sessions were run three to five days a week. The subjects were supervised by regular staff and did not work on the experimental task on the days that the experimenter was absent.

On the days when experimental data were collected, subjects were provided with work materials and given a general prompt to start work at the beginning of each session. During the sessions, finished products were removed from the work stations and raw materials were provided as needed.

Experimenters. All experimental sessions were conducted by the author, a graduate psychology student. Reliability assessments were made by two undergraduate psychology students and one high school student.

Dependent variables

Production rate. The experimenter monitored the production of each client by counting the number of packaged golf tees in the client's receiver tray. Total session length for each client was timed from the experimenter prompts for clients to begin working at the start of the day, after coffee breaks and after lunch, to experimenter prompts to stop work. Times when the client was engaged in off-task behavior prompted by workshop staff and when the client was out of the production room were not included in the calculation of total session time. At the end of each session, the total number of finished products was divided by total session time (in hours) to yield the hourly rate of production.

Percentage of correct production. All items produced by each client were checked against a standard for correctly packaged golf tees that was established by the workshop supervisor. This standard simply required that each package contain 20 golf tees. If a finished product did not meet this standard, it was counted as an error in production. Percentage of correct production was calculated by dividing the total number of errors by the total production, and multiplying by 100. This percentage error rate was then subtracted from 100 to provide a percentage of products correctly assembled.

Percentage of time on-task. On-task behavior was defined as those subject behaviors primarily directed toward the assembly of golf-tees and included being seated at the production table and visually attending to the task, and all of the component behaviors of the assembly task as described in the Experimental Task section. Interaction with peers and staff was considered on-task as long as it did not interfere with work behavior. Off-task behavior included all behaviors other than task-related activities (e.g., playing with the raw materials, disruptive behavior etc.). Measures of on-task behavior were determined during 45% of the experimental sessions on a 10-sec observe, 5-sec record basis for one 15-min observational interval per client. The clients were required to be actively engaged in work-related behaviors for the entire 10 sec of the observation interval in order for the behavior to be categorized as on-task. The number of observation intervals in which the client was considered on-task was divided by the total number of observation intervals which occurred for that client during that session, and multiplied by 100 to yield the percentage of session time the client actually spent working.

#### Experimental design

A multiple-baseline-across-subjects design was used to evaluate the effectiveness of the self-management package for severely mentally handicapped persons (for a description

of this design see Kazdin, 1982; Martin & Pear, 1983). The baseline phase constituted typical workshop supervisory conditions. The self-regulation package for the severely retarded (SRP(S)) involved self-monitoring, goal-setting by the experimenter, and self-recruitment of social praise. This package is described below in more detail.

### Controlled variables

Several variables were monitored so that they could be held relatively constant across experimental phases. The frequency and type of verbal interactions that occurred between the workshop staff and the clients were assessed prior to baseline data collection. These observations were made during six 15-min periods over two working days. Three types of interactions were monitored: (a) positive interactions concerning work, for example, "Bob, you really are working hard today."; (b) negative interactions, such as "Mary, sit down in your seat."; and (c) general work-related questions or instructions, and social interactions, for example, "Let's start working now, everyone", and "How are you today?". Data obtained from this assessment were then averaged with Didenko and Martin's (1986) prebaseline assessment, in order to obtain a more representative sample of interactions. Didenko and Martin's research was conducted in the same workshop as the current research. They obtained interaction data during ten, 15-min sessions

over five working days. This averaged data indicated that the workshop staff interacted with the workers 1.05 times with each client every 10 minutes.

During baseline sessions, the experimenter maintained an interactional pattern with the clients that was within the range observed during this prebaseline assessment. During the self-management phase, this interactional pattern was supplemented with the social contingencies supporting the self-management behaviors.

Another standardized feature of this study was corrective feedback. Clients were given corrective feedback for errors to maintain accuracy of production. The experimenter instructed the client as to the nature of the error and requested correction. If the client still responded inappropriately, the correct task assembly was modeled and the client was praised when the product was made correctly.

The workshop pay system was also held constant across phases. All clients normally received a stipend at the end of each work week. The amount of this stipend for the weeks of the study was determined individually for each client by averaging the weekly stipends the client received over the six weeks prior to the start of the study. Average weekly stipends were established at \$9.50 for Lenny, \$8.00 for Mary, \$5.00 for Bob, and \$7.00 for Herbie. Each client received this amount of pay across each of the experimental phases.

### Experimental phases

Baseline. The baseline phase involved supervisory conditions typical of those used by the regular workshop staff. The clients were given general work prompts and the necessary working materials, and they were paid according to the existing workshop incentive system. The experimenters maintained an interactional pattern similar to the one observed during the prebaseline assessment of client-staff interactions, that is, one interaction per client every ten minutes. The production tables were also set up as they normally were in this workshop: the raw materials bin and the receiver tray were placed adjacent to each other directly in front of the client.

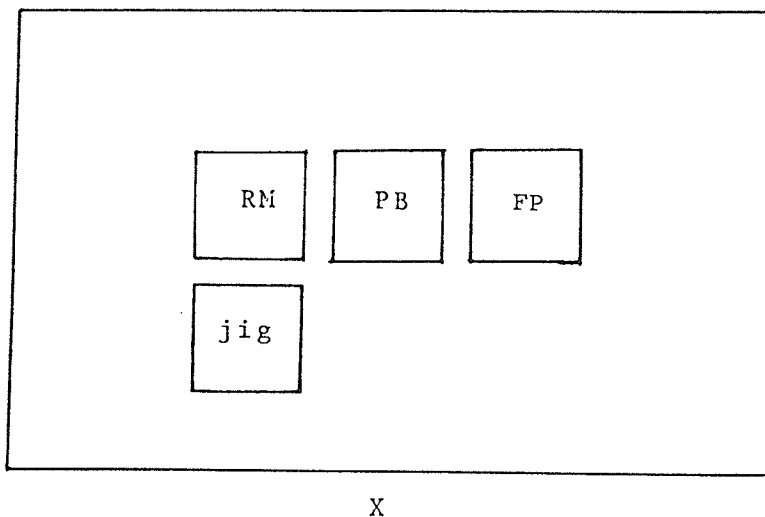
SRP(S). After the training trials (which are described in a later section of this paper), the self-management package was implemented. During SRP(S) sessions, the bin of raw materials was placed on the far right of the production table and the receiver tray was placed to the client's left. The self-monitoring device was placed directly to the right of the receiver tray (note that this is different from the baseline set-up; see Figure 2). The self-monitoring

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Insert Figure 2 about here  
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FP=finished products  
PB=plastic bags  
RM=raw materials  
SMD=self-monitoring device  
X=client

## Baseline



## Self-management

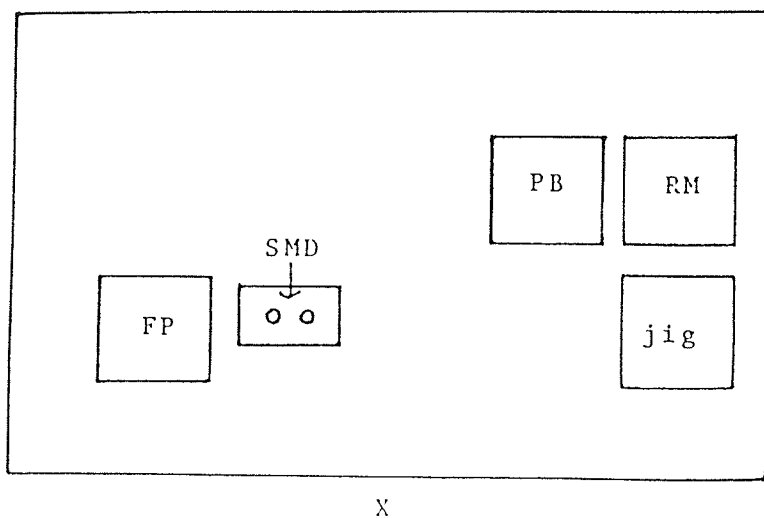


Figure 2. Diagrammatic representation of the production table set-up during baseline and self-management phases.

apparatus was directly in the path of placing a finished product into the receiver tray so as to maximize its obtrusiveness and therefore increase the accuracy of the self-monitoring (Nelson, Lipinski, & Boykin, 1978). Short-term goals were set by the experimenter at the beginning of each half-day session. These goals were equal to the average of the hourly production rates of the previous two half-day sessions divided by 4 to get an average production rate per 15 min. The experimenter then stacked the red and white rings on the left dowel of the self-monitoring device. Several white rings were interspersed with a red ring so that each red ring indicated a short-term production goal. During the experimental session, the client transferred one ring from the left dowel to the self-monitoring dowel each time he or she completed a product. In this way, self-monitoring prior to meeting the short-term goal was done with the white rings, and the response that met the goal was self-monitored with a red ring. The red rings served as prompts for the client to raise his or her hand to recruit praise from the experimenter. When the experimenter saw a raised hand, she approached the client, checked the accuracy of the self-monitoring, and determined whether the short-term goal had been reached. She provided praise contingent upon accurate self-monitoring (to increase the accuracy of the self-monitoring, as suggested by Nelson, Lipinski, and Black, 1976), completion of the goal, and appropriate recruitment of praise. The praise had several components:

(a) a smile directed at the client; (b) general praise, such as "That's fantastic! You really are working hard today."; (c) prescriptive praise, such as "You've met your goal and moved the red ring, and then you raised your hand. Great!"; and (d) physical contact, such as a touch on the shoulder or a gentle squeeze on the arm. If the accuracy of the self-monitoring were below 85%, the experimenter responded as follows: (a) she did not smile at the client; (b) she said something like "No, you didn't do it quite right. You put all these rings over here, but you didn't make enough bags."; (c) the experimenter walked away from the production table; and (d) a booster training session was given (this procedure is described in a later section). Inappropriate recruitment of praise was handled similarly to inaccurate self-monitoring. Inappropriate recruitment was defined as the client recruiting praise too early (i.e., the client did not transfer a red ring but raised his or her hand) or failing to recruit (i.e., the client transferred a red ring but did not raise his or her hand). Booster training sessions were provided when the client recruited praise too early more than twice as he or she worked towards a short-term goal, and each time a client failed to recruit praise that he or she had earned. The experimenter then provided prompts for the client to work towards the next short-term goal, and the client's production was removed from the production table. Each client's production was stored in a separate bin so that the accuracy of production and total

production could be monitored at the end of the 1/2 day session. The client thus received praise on a fixed-ratio schedule within each session, contingent upon the behavior chain of packaging golf tees, self-monitoring, and appropriate recruitment of praise. The size of the FR schedule operating in any given session was determined by the client's production rates during the two previous sessions.

#### SRP(S) training

Training of the components of the self-management package was conducted in a training room and at the work station. Training trials to teach the client to use the self-monitoring device were conducted by a female undergraduate psychology student in a training room near the workshop. Training involved instructions, modeling, praise, and corrective feedback. A smaller 6-hole jig was used instead of the standard 20-hole jig in order to reduce time spent packaging and to maximize opportunity for self-monitoring during the training trials. Training was continued until the client self-monitored correctly for six consecutive trials on the small jig (each trial constituting the assembly of one bag and self-monitoring), and then for one trial on the standard-sized jig.

The client was then trained to recruit praise. In the initial phase of training, the subject worked with the

undergraduate psychology trainer in the training setting. Red and white rings were placed in an alternating sequence on the left dowel of the self-monitoring device, and the small 6-hole jig was used for the assembly task. An alternating sequence was used in order to maximize opportunity for recruitment while also training the discrimination between the red and white rings. The first four trials (each trial constituting the assembly of one bag, self-monitoring, and recruitment of praise if appropriate) involved modeling, verbal prompting and physical guidance. Over the next eight (or more, if necessary) trials, the modeling and prompting were faded out and the distance between the trainer and the client was gradually increased to approximately two meters. This phase of training was continued until the client transferred eight consecutive rings correctly, recruited praise on all four red rings, and refrained from inappropriately recruiting praise on at least three of the four white rings.

In the second phase of recruitment training, the client's short-term production goals were gradually increased such that, although transferring rings and recruiting praise occurred on a ratio basis, the size of the ratios meant that the client transferred a red ring and recruited praise approximately every 10 min. The standard 20-hole jig was also introduced at this time. Finally, in the last training phase, the client was moved to the workshop and was trained

to recruit praise from the experimenter, and short-term goals were further increased such that the client transferred a red ring and recruited praise approximately every 15 min. The standard-sized jig was used consistently during this phase. Passing criteria for each step within these last two phases stipulated (a) that the client recruit praise with 100% accuracy when they transferred a red ring, (b) that the client refrain from recruiting on the white rings with 100% accuracy for 75% of the short-term goals, and (c) that there not be recruitment errors during any two consecutive short-term goals. Therefore, by the end of this training procedure the subject had demonstrated a high level of accuracy in both self-monitoring and recruitment of praise.

If accuracy in self-monitoring fell below 85% at any time during the experimental phases, the client was given a booster training session. The experimenter unobtrusively observed the client and provided instructions and corrective feedback, and, if necessary, prompted recruitment of praise. Training continued until the client self-monitored and recruited praise accurately during the completion of one short-term goal (i.e., approximately 15 min).

If the client did not recruit praise appropriately at any time during an experimental session (i.e., failed to recruit praise that he or she had earned, or recruited unearned praise more than twice as he or she worked towards a short-

term goal), a booster training session was given. During the booster sessions, the production goal was increased over three trials such that the client recruited praise after approximately 5 min for the first trial, after 10 min for the second trial, and after 15 min for the third trial. Corrective feedback and prompting of the desired behavior was provided as needed.

### Reliability assessments

Reliability assessments were collected for the dependent variables (production rate, accuracy of production, and time on-task), as well as for client-experimenter interactions and accuracy of self-monitoring, during a minimum of 25% of the sessions.

Reliability data were gathered on the two components of production rate: total session production and total session length. Two observers independently counted the total number of golf tees packaged by each client during 82% of the sessions. Agreement on total session production was calculated by dividing the smaller number by the larger number and multiplying by 100. Mean interobserver agreement across clients was 99.9% for this measure. The observers also monitored total session time and IORs were calculated by dividing the smaller number of minutes by the larger and multiplying by 100. Agreement was 100%.

Approximately 25% of each client's total session production was independently checked by two observers for accuracy of production. IORs for accuracy of production were calculated by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100. Agreement was 100% for all sessions.

On-task data were recorded during approximately 45% of the sessions for one 15-min interval per client. Interobserver agreement checks were conducted for approximately 60% of these assessments. IOR scores between the two independent observers were calculated by dividing the agreements by agreements plus disagreements and multiplying by 100. Mean interobserver agreement for on-task data across subjects was 95.0%, with a range of 90.7% to 99.0%.

During 81% of the baseline and experimental sessions, the experimenter was monitored to assess the frequency and types of interactions between her and the clients. Interactions were assessed by two independent observers (not including the experimenter) during 18% of these sessions. Checks were conducted by the experimenter and one observer during an additional 31% of the sessions. The experimenter alone monitored interactions during the remaining 51% of the sessions. Reliability was again calculated by dividing agreements by agreements plus disagreements and multiplying by 100. Agreement on total frequency of client-staff



interactions during each session was 93.4%, with a range of 76.5% to 100%.

The clients' accuracy of self-monitoring was checked by having the observers compare the number of rings monitored during a session to the number of packages of golf tees. Accuracy of recruitment of reinforcement was assessed by having the observers check that the client recruited praise each time he or she transferred a red ring. These measures were assessed by two independent observers (plus the experimenter) during 18% of the sessions. Checks were conducted by the experimenter and one observer during an additional 10% of the sessions. The experimenter alone checked the accuracy of the self-monitoring and recruitment of praise during the remaining 72% of the sessions. IORs for these two measures were calculated by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100. Interobserver agreement scores for client accuracy of self-monitoring and recruitment of praise were both 100%.

Procedural reliability data were gathered by two independent observers (plus the experimenter) for 47% of the sessions to ensure that the independent variables were being implemented as outlined (Billingsley, White, & Munson, 1980). Procedural checks were conducted by the experimenter and another observer for an additional 24% of the sessions. The experimenter alone completed the procedural checklist

for the remaining 29% of the sessions. A checklist outlining the experimenter's duties in carrying out the experimental procedures was used to collect the procedural reliability data. Reliability was calculated by dividing the total number of agreements on items of the checklist by the number of agreements plus disagreements and multiplying by 100. The procedural reliability checks showed that the procedures were accurately followed throughout the experimental phase. Mean interobserver agreement for this measure was 99.8%.

#### Social validation

The importance of socially validating treatment programs has been stressed by many authors (e.g., Kazdin, 1977; Wolf, 1978). At the conclusion of this study, the clients' choices of supervision condition were assessed using a preference test (Mithaug & Hanawalt, 1978). Two work areas were set up with the materials appropriate to the baseline condition and the SRP condition. The client was positioned equidistant from the two tables and asked to pick one of the areas to work in. The client then worked at the chosen station for 15 min or until he or she came into contact with the normal contingencies for that condition. Each client was given four preference tests with the position of the work stations changed for each.

Interobserver agreement measures were obtained by having a second observer monitor the clients' choices during all of the preference tests. Reliability was measured by dividing the total number of agreements by the total number of disagreements plus agreements, and multiplying by 100. Interobserver agreement for all of the preference tests was 100%.

Staff preference was not assessed in this study. Given the increased staff input necessary for the self-management program over typical supervisory conditions, it was deemed that the lack of experimental effect precluded the possibility of implementing this program in the workshop on a regular basis.

## Results

Data were analyzed through visual inspection of graphical displays of each subject's individual data. The criteria suggested by Martin and Pear (1983) were used to evaluate the outcome of the current research. Results were judged on the basis of the number of times an effect was replicated, the number of overlapping points between baseline and treatment phases, the immediacy of the effect following the introduction of the treatment, and the magnitude of the treatment effect.

Production rate

Figure 3 depicts the production rates of 3 of the 4 clients during the baseline and the self-management phases.

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Insert Figure 3 about here  
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The data for the fourth subject, Herbie, is not provided as he did not perform all of the self-management skills during training. Although he was trained to self-monitor with moderate accuracy after 15 sessions (9.2 hours of training time), he did not perform the recruitment component after a further 22.3 hours of training. Since the package could not be implemented in its entirety with this subject, Herbie's data were not considered in this analysis.

The graphed data indicate that the SRP(S) did not affect the productivity of the three subjects. A comparison of the mean production rates during baseline and the self-management phase for each of the subjects supports this graphical evidence. Lenny's mean production during baseline was 18.24 bags per hour, and his production rate during the SRP(S) was 19.58. There is an increasing trend in the data path during the self-management condition, but this is clearly not an immediate effect, nor a large effect, and can therefore not be definitively attributed to the introduction of the SRP(S). Mary's production was 14.99 bags per hour

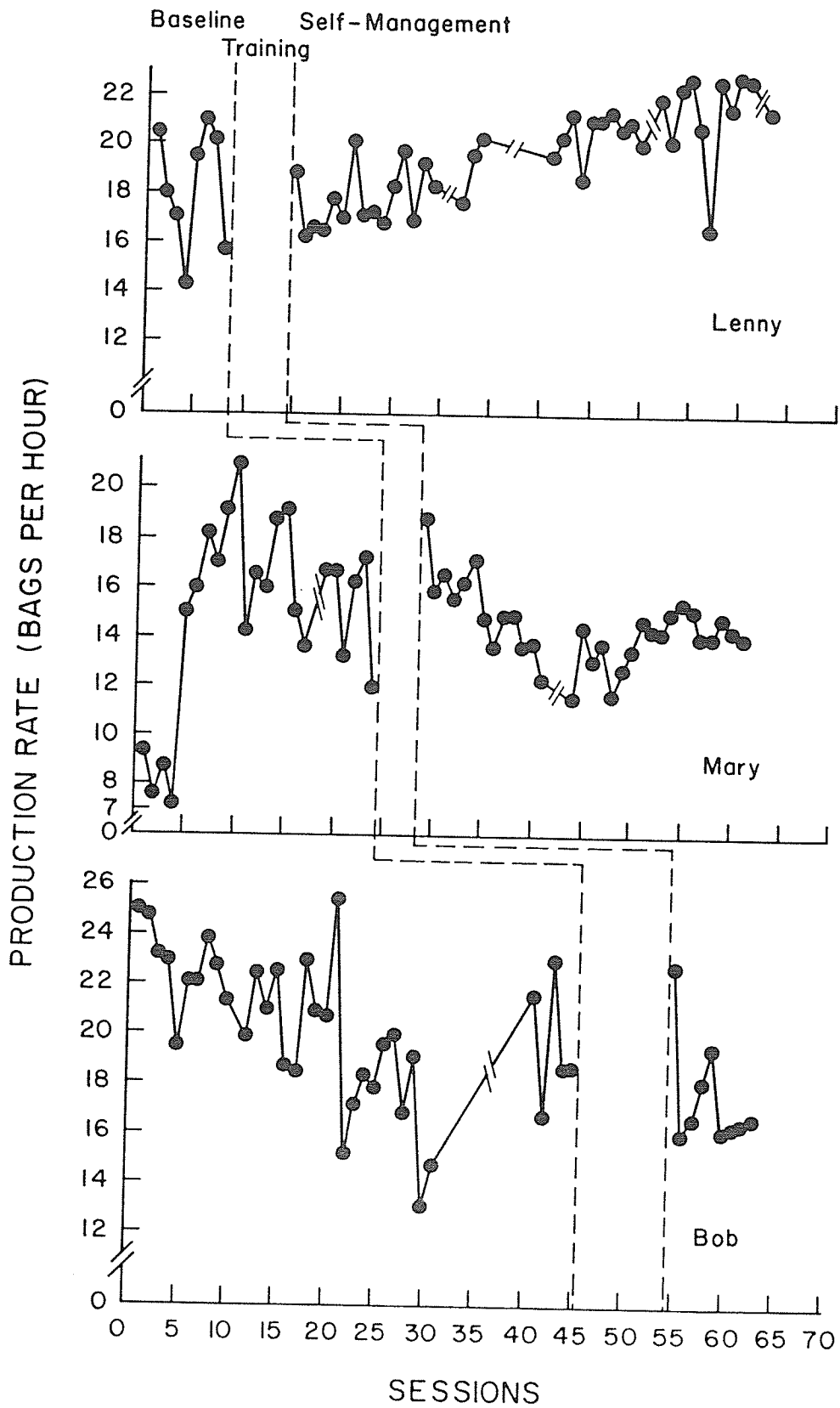


Figure 3. Hourly production rate per 1/2 day session. Slashes indicate absence from experimental sessions.

during baseline and 14.46 during the SRP(S) condition. There appears to be a downward trend in both the baseline and self-management phases for this subject. Also, the first four data points are substantially lower than those of the remainder of the baseline sessions. This lowered production was likely a result of the workshop having moved to a new building just prior to the first session. Mary appeared to take longer to adjust to the new surroundings than did the other subjects, with her production rate stabilizing only after the fifth session. Bob's mean production rate decreased somewhat from 20.30 during baseline to 17.54 during the self-management condition. This decrease does not, however, coincide with the introduction of the self-management package.

#### Percentage of correct production

All items produced by each client were checked for errors in assembly. Accuracy of production was very high for each of the clients and generally consistent across phases. Lenny's mean accuracy was 98.1% during baseline and 99.6% during the SRP(S) condition. Mary's accuracy increased from 90.4% during baseline to 97.2% during the self-management intervention. This increase coincided with the introduction of the SRP(S). Although there are overlapping points between the two phases, all of Mary's low accuracy scores (i.e., scores below 90%) were eliminated during the self-

management phase. Bob's accuracy decreased from 96.5% during baseline to 88.7% during the SRP(S). His accuracy did not, however, appear to vary as a function of the experimental conditions.

#### Percentage of time on-task

Measures of on-task behavior were obtained for each client during 45% of the experimental sessions. Lenny's time on-task was quite inconsistent but did not appear to vary as a function of the experimental phases. His mean percentage on-task was 80.7% during baseline and 79.0% during the SRP(S).

Mary's on-task behavior was very variable with scores ranging between 23% and 88% across both phases. Her mean percentage time on-task was 58.3% during baseline and 45.1% during the intervention. The fluctuations in on-task behavior did not appear to vary as a function of the experimental manipulations.

Bob displayed an increase in mean percentage on-task behavior upon introduction of the self-management program, from 72.1% during baseline to 88.7% during the SRP(S). The large variability in percentage on-task evidenced during baseline was reduced upon introduction of the SRP(S). Also, high scores were obtained more consistently during the self-management phase.

Accuracy of self-monitoring and recruitment of praise

The accuracy of self-monitoring during the self-management phase was very high for all subjects. Lenny's mean accuracy of self-monitoring was 97.0%. Mary's accuracy was 99.7% and Bob's accuracy was 96.8%. Lenny did, however, require a large number of booster training sessions (31, 15-min sessions) to achieve this high level of accuracy. Mary and Bob only needed 2 and 5 booster sessions respectively.

Accuracy of recruitment was also high for all three subjects. Lenny recruited inappropriately or failed to recruit three times, requiring one booster session. Mary made one recruiting error, requiring one booster session, and Bob made two errors, necessitating two booster sessions.

Client-staff interactions

The types and frequencies of interactions for each subject during baseline and the SRP(S) are shown in Table 2. The total frequency of interactions for each subject increased from baseline to the SRP(S) phase. The interactions accounting for this increase were

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 Insert Table 2 about here  
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positive interactions concerning work and general work-related instructions. The frequency of negative interactions was similar during both phases. The increase



Table 2  
 Frequency of Client-Staff Interactions (per 10 min)  
 During Each Experimental Phase for Each Subject

type of interaction	Lenny		Mary		Bob	
	B	SRP(S)	B	SRP(S)	B	SRP(S)
positive	.24	.64	.37	.73	.44	.76
negative	.20	.18	.41	.30	.06	.08
other	.62	.93	.54	.78	.39	.99
total	1.06	1.76	1.32	1.83	.90	1.82

in positive interactions and instructions was a direct result of the contingencies associated with the SRP(S). Each time a subject recruited praise, the experimenter provided positive interactions as well as instructions to work towards the next short-term goal.

### Social validation

Four preference tests were conducted with each of the clients. Lenny and Mary chose the SRP(S) condition on all four tests. Bob selected the baseline condition on the first test but subsequently chose the self-management condition on the other three tests. All three subjects thus clearly preferred the SRP(S) condition over baseline.

### Discussion

The results of the research indicated that a self-management package involving self-monitoring and recruitment of staff praise did not increase the productivity of three severely mentally handicapped workers. The most obvious explanation for this failure is that praise was not a reinforcer for these individuals. This hypothesis does run counter to much of the literature (e.g., Zigler, 1961; Flexer et al., 1979) which suggests that praise is a powerful reinforcer with this population. It is also inconsistent with casual observations of these three

subjects which suggested that they enjoyed social interactions with the experimenter. They frequently smiled at her, sought physical contact and greeted her enthusiastically at the start of sessions. Also, Mary and Bob always seemed pleased, smiling and nodding their heads, when the experimenter praised their work behavior. Lenny seemed less responsive than the other two to such praise.

In order to assess the reinforcing power of experimenter praise with these subjects more formally, a series of tests were conducted to determine if other client behaviors could be modified using praise. In Test 1, each subject was presented with two opaque plastic containers which were placed on the production table equidistant from the client. The experimenter then handed the client between 50 and 100 golf tees one at a time at 4 sec intervals. The client was instructed to "put the golf tees in here (the experimenter pointed to the right-hand container) or in here (the experimenter pointed to the left-hand container). One of the two containers was designated as the 'correct' one for each session (consisting of the 50 to 100 trials) with the position of the correct container being alternated across the four sessions. The instructions to the client did not indicate which of the two containers should be favoured. Experimenter praise, involving general praise (e.g., "That was good, Mary!") and physical contact (pat on the shoulder), was delivered on a continuous reinforcement

schedule (CRF, FR1) and was contingent upon placing golf tees into the correct container. An increase in the number of golf tees placed in the correct container as compared to the number placed in the other container would thus indicate that the experimenter's praise operated as a social reinforcer for this response.

The results of this test for one of the subjects, Mary, provided a clear demonstration of the reinforcing value of experimenter praise. The percentages of golf tees that Mary placed in the correct container during the four sessions were 61%, 90%, 70%, and 86%. The experimental effect, particularly in the last three trials, was clear. The high frequency of correct responding was maintained when the schedule of reinforcement was increased to FR2 and FR3. Interobserver agreement checks on frequency of correct responding were conducted by the experimenter and a second graduate psychology student. Agreement scores were calculated by dividing agreements by agreements plus disagreements and multiplying by 100. Agreement scores were 100% for each trial.

Clear experimental effects were not obtained for the other two subjects, Lenny and Bob. Lenny's pattern of responding was consistent across trials: he placed between 15 and 30 pegs into one container, then placed the next 15 to 30 pegs into the other container, and continued in this manner until the termination of the session. Bob simply

kept placing all of the golf tees in the same container, irrespective of which response was being reinforced. When the experimenter repeated the original instructions in the middle of a trial, Bob then placed the golf tees into the other container until the instructions were again repeated. The experimenter could thus switch Bob's responding back and forth between the two containers with these instructions, although the instructions did not specify in which container to place the golf tees.

A second test was conducted with Lenny and Bob to assess whether another client behavior could be modified using experimenter praise. A replication could not be done with Mary as she moved from the institution at this time. An electro-mechanical device was used in this test. The device constituted a 2"x 3" hand-operated pedal and a small light bulb mounted on a 5"x 6"x 7" metal box containing a counter. When the client depressed the pedal the counter was operated, each press causing the counter to advance by one, and the light bulb was illuminated. Thus the frequency of pedal presses was tabulated mechanically. The light served as an easily distinguishable stimulus for the experimenter, indicating that the client had pressed the pedal. During the baseline assessment of frequency of pedal presses, the experimenter observed the client unobtrusively and no consequences were delivered contingent upon operation of the device. During the intervention, the experimenter

approached the client and provided praise and physical contact (as in Test 1) each time the light was illuminated. In the first version of this test (Test 2a), the apparatus was placed in front of each client on the production table along with the work materials. The subjects were instructed by the experimenter to "work here packaging tees (or whatever task was being done in the workshop at that time), but if you want to you can push this pedal." The experimenter then demonstrated the operation of the device. The results of this experiment indicated that praise did not increase the frequency of pedal presses for either of the two subjects. Lenny displayed very low rates of pedal pressing during baseline (.05 presses per min) and the social praise phase (.02 presses per min). The work materials on his table appeared to have strong control over his work behavior and he rarely interrupted his task to manipulate the device. Bob depressed the pedal frequently, pressing the pedal once upon completion of each unit of work. This behavior was interesting in that he appeared to be utilizing the apparatus as a type of self-monitoring device, suggesting possible generalization of the self-monitoring behaviors learned during the original research. However, this interfered with the purpose of the experiment which was to determine if praise could increase the frequency of pedal presses.

Because the work materials appeared to have a high degree of control over these two subjects' behavior, the work materials were removed from the work stations and the above test repeated. In Test 2b, the possibility of competing behaviors interfering with the pedal presses was thus reduced. An ABA design was used to demonstrate experimental control of the pedal pressing behavior, with each phase being 10 min in duration. The results of this test indicated that experimenter praise did serve as a social reinforcer for Bob. During the initial baseline phase, Bob pressed the lever 4 times in the 10 min interval. In the experimental phase, during which each lever press was consequted with experimenter praise, Bob pressed the lever 32 times during the 10 min. During the reversal to baseline phase, he only pressed the lever 6 times in the 10 min interval. Rate of pedal pressing thus showed a dramatic increase upon the introduction of the social contingencies and a rapid reversal upon the withdrawal of these contingencies. Unfortunately, this test could not be completed with Lenny as he became very angry when the production materials were removed from his table and he refused to remain at his work station.

It can therefore be concluded that experimenter praise could operate as a social reinforcer for Mary and Bob with some response. No definitive conclusions in regard to the reinforcing value of praise for Lenny can be made. Although

none of the paradigms tested demonstrated that praise was a reinforcer for Lenny, it is nonetheless possible that such a demonstration could have been successful with another response or in another setting.

The question of interest, then, is why, if praise operated as a reinforcer with some responses for Mary and Bob, experimenter praise was ineffective at increasing the productivity of these clients. There are several possible explanations. The different schedules of reinforcement operating in the original study and in the subsequent tests might have been responsible for the different results. In the original production research, the subjects had to work for approximately 15 min, packaging between 3 and 5 bags of golf tees, in order to meet the short-term production goal and to recruit praise. In the other tests, the subjects had to perform a very brief response (requiring less than 1 sec) and were reinforced on a CRF schedule (for one subject this was successfully increased to FR2 and FR3). It is possible, therefore, that a CRF procedure with praise consequating each unit of production, may be necessary in order to increase the productivity of these subjects. Another possibility would be to implement the CRF schedule only during the initial sessions in the workshop and then to gradually increase the ratio of reinforcement.

An alternative conceptualization of this issue is to examine the target behavior in terms of the response effort



involved. Clearly, the amount of effort or work output involved in assembling a package of golf tees is far greater than the effort involved in placing one golf tee into a container, or in pressing a pedal. A reinforcer may effectively increase the frequency of a behavior requiring minimal effort but not be sufficiently powerful to modify a behavior involving more work output.

A comparison of Mank and Horner's (1987) study and the current research suggests two other explanations for the failure of the SRP(S) in increasing productivity. These programs were similar in that they both targeted production of retarded workers using recruitment procedures and social consequences. Mank and Horner's program successfully increased productivity, however, whereas the current research did not. There are two major variables which may account for this differential effectiveness. First of all, the subjects in Mank and Horner's study were classified as moderately mentally handicapped while the subjects in the current research were severely retarded. Other researchers have suggested that some self-management procedures may be less effective with more severely retarded workers (e.g., Didenko & Martin, 1986), and it is possible that recruitment of reinforcement is also less effective with severely retarded workers than with moderately retarded workers. A second variable that may have been responsible for the discrepant results was the work tasks targeted in these

studies. In the current research, subjects worked at a repetitive, monotonous task which required them to sit at a production table designed to minimize distractions. Mank and Horner's subjects worked on more complex and varied tasks in a restaurant setting, some of which (e.g., bussing) involved moving around the restaurant. It would seem that the increased productivity at the restaurant tasks would be more likely to be maintained by natural contingencies existing in the environment than would changes in production at the golf tee packaging task. The restaurant workers may have received praise from co-workers for improved work or come in contact with satisfied restaurant clientele. The workers in the current research had less opportunity for exposure to other potential sources of reinforcement for the desired behavior. A final difference between the two programs was the frequency of recruitment. However, subjects recruited praise much more frequently in the current research than in the Mank and Horner study. This higher frequency of praise would be expected to enhance the efficacy of the procedure and not to detract from it. The failure of the SRP(S) is therefore likely caused, at least in part, by the two variables mentioned earlier, that is, the level of retardation of the subjects involved and the targeted production tasks.

A final explanation for the failure of the SRP(S) involves the reinforcement the workers received for

behaviors other than production-related tasks. It was mentioned earlier that there was little reinforcement for high production from sources other than the experimenter. There did, however, appear to be numerous sources of reinforcement for competing behaviors in the workshop. For example, both Mary and Bob displayed idiosyncratic, repetitive, off-task behaviors. Mary manipulated the golf tees in the jig, lifting each tee out of the jig, replacing it, removing it again, and so on, often for extended periods of time. Bob also played with the work materials, spending many minutes stuffing the packaged golf tees into the receiver tray, taking them out, and replacing them. These behaviors seemed to have acquired conditioned reinforcing properties, perhaps through association with staff attention (e.g., staff approaching the client and saying "Don't play with those golf tees."). Another frequent off-task behavior, especially for Lenny, involved looking around the workshop. This behavior may have been developed and maintained through sensory reinforcement obtained from the activity-filled workshop environment. Any sensory reinforcement that may have been originally obtained from the work materials themselves would certainly have been satiated after the many weeks of working at the same task. It is therefore possible that the social contingencies in the SRP(S) were ineffective at increasing the productivity of these workers because the reinforcers supporting the competing behaviors were more immediate and more powerful.

To summarize, there are at least four possible explanations for this failure of the SRP(S) with severely retarded workers: (a) praise may not have operated as a reinforcer of work productivity for these individuals due to the intermittent schedule of reinforcement and the response effort involved in the production task; (b) the severity of retardation of the subjects involved in this study may have reduced the efficacy of the recruitment procedures; (c) there was minimal opportunity for exposure to natural contingencies of reinforcement for high production; and (d) there appeared to be powerful reinforcers for behaviors incompatible with work.

Given the difficulties involved in developing an effective self-management program for severely retarded individuals that can be easily implemented in a sheltered workshop on a daily basis, it may be tempting to abandon this endeavor. There are, however, three important reasons why further research should be conducted in this area. First of all, this study provided clear evidence that the workers preferred the SRP(S) over the typical workshop supervisory system. Clients' preferences should be considered very seriously when developing programs designed to benefit them. Secondly, self-management programs encourage independence and are, therefore, particularly important for severely retarded individuals, who are generally considered to be too dependent. Finally, this

study demonstrated that severely retarded workers can acquire self-management skills: 3 of 4 clients were trained to self-monitor and recruit praise with high accuracy in 6 1/2 to 8 1/2 hours of training.

Further research is needed to investigate the effectiveness of the SRP(S) using a CRF procedure, with praise consequating each unit of production. Another possibility would be to implement the CRF schedule only during the initial sessions in the workshop and then to gradually increase the ratio of reinforcement. Future research might also examine the possibility of enhancing the efficacy of the SRP(S) by introducing a more powerful reinforcer. Token reinforcers, with edible or activity back-up reinforcers, may increase productivity despite the difficulties described above, that is, despite the intermittent schedule of reinforcement, the response effort involved in the production tasks, and the existing reinforcement for competing behaviors. Future research should also investigate the application of the SRP(S) as a program to maintain increases in productivity incurred by intensive programs involving token or edible reinforcers.

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