*TEACHING MENTALLY RETARDED ADULTS TO
TIME-MANAGE IN A VOCATIONAL SETTING*

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Three retarded adults who had minimal ability to tell time were trained to "time-manage." Each was given a card with clock face representations on which the hands of the clock were drawn, representing each trainee's assigned lunch and break times. Instruction was given before work to perform each of the required behaviors when the "real" clock matched the clock faces. Praise was given following correct responses, and reprimands, instruction, and, in some instances, delay or omission of the scheduled activity followed incorrect responses. Pre-instruction and instructional feedback were then sequentially withdrawn. Results indicated that the package consisting of pre-instruction, instructional feedback, and picture cues was effective in producing independent time management responding. When the first two components were withdrawn, two trainees maintained high levels of correct responding. Correct responding decreased for one trainee when pre-instruction was withdrawn. Reintroduction and subsequent withdrawal of the components resulted in maintenance by this trainee. Little improvement in time-telling ability resulted.

DESCRIPTORS: time management, visual cues, pre-instruction, instructional feedback, retardates

Research has shown that job success of retarded persons is significantly correlated not only to their performance of specific work assignments, but also to social and survival skills (Sali & Amir, 1971). Much research is beginning to appear in the literature related to the teaching of such skills: telephone usage (Leff, 1975), general housekeeping (Bauman & Iwata, 1977), leisure-time activities (Johnson & Bailey, 1977), coin usage (Lowe & Cuvo, 1976; Miller, Cuvo, & Borakove, 1977; Trace, Cuvo, & Criswell, 1977), travel training (Neef, Iwata, & Page, 1978; Sowers, Hudson, & Rusch, 1979), street crossing (Page, Iwata, & Neef, 1976; Vogensberg & Rusch, 1979; Yeaton & Bailey, 1978), clothing selection (Nutter & Reid,

1978), and toothbrushing (Horner & Keilitz, 1975; Lattal, 1969).

A survival skill that has not been systematically investigated is time management by retarded persons. Although several time-telling programs are available for teaching purposes, no controlled research is currently available in the literature. Performing behavior at specified times is an important skill. Time-scheduled behaviors include arriving for appointments, taking medications, eating meals, and catching buses. This skill is especially important in a job situation in which employers expect workers to perform certain behaviors at assigned times without prompting from employer or co-worker. Ozbek, Russo, and Cataldo (1978) described a device whereby nontime-telling populations could be taught to perform behaviors on a fixed-interval schedule. The device was a wristwatch which was modified by the addition of a colored disk on or under the crystal to serve as a visual cue. The individuals were trained to make a specific response when the clock hand pointed

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to the disk. No data, however, were presented in this brief communication.

The purpose of the present study was to investigate systematically the use of a similar device to teach nontime-telling retarded adults to perform specified behaviors independently in a vocational setting.

METHOD

Trainees and Settings

Three retarded adult males in a vocational training program participated in the study. The purpose of the vocational training program was to prepare retarded adults for placement into competitive jobs. All three trainees had previously been clients in a sheltered workshop for approximately 3 yr. All of them, Chris, Davis, and John, were diagnosed as trainable mentally retarded with reported IQ scores of 49, 54, and 43, respectively. Chris and David were able to read numbers 1 to 100; John was not. Each trainee's personal file indicated that previous attempts to train time-telling had failed.

The study took place in a public cafeteria located at the Child Development and Mental Retardation Center at the University of Washington. Chris, David, and John received training in dishwashing, utility-maintenance, and busing, respectively. These training stations were located in three different rooms, and thus the trainees were not able to communicate with or observe each other. The trainees worked approximately 6 hr per day. One trainer supervised each of the training stations with three trainees in each of the stations. Thus there were two trainees in each station who did not participate in this study.

Pretest and Posttest

Before the study began, each trainee was tested on his ability to tell time. The experimenter selected 33 different times including all of the "hour" times (e.g., 1:00, 2:00, 3:00), and two each of the "five-minute-interval" times

(e.g., 1:05, 3:50, 2:45). The pretest took place in a room with only the experimenter and trainee present. The experimenter sat at a table facing a wall clock. The experimenter moved the hands of the clock to each of the selected times and asked the trainee, "What time is it?" The experimenter recorded the trainee's verbal response. No feedback was provided. The procedures and order of presentation of times were the same for all trainees. After the study was completed, a posttest was conducted. The procedures and times selected were the same as those used in the pretest.

Dependent Measures and Recording

Each of the trainees was assigned a time during the workday to (a) go to lunch, (b) return from lunch, (c) go to break, and (d) return from break. These times remained constant throughout the study. The time allotted for the trainees' lunch was 30 min, and for the break, 5 min. The dependent measure was the difference between the time assigned for each behavior and the time at which the trainee actually first attempted to perform the behavior (e.g., go to lunch). For going to lunch or to break, an attempt was defined as the trainee stopping work and going to his locker or to the break area, or stating to the trainer "Is it all right if I go to lunch now?" or "I'm going to break now." For returning from lunch or break, an attempt was defined as the actual act of returning to the work area, or stating to the trainer "I'm going back to work now," or "Is it okay if I go back to work now?"

The word "attempt" is used because a trainee was never permitted to go to or return from lunch or break more than 10 min early or late. So, a trainee might attempt to go to lunch 20 min early, but he was not permitted to do so, even in baseline conditions. The attempt (e.g., +20 min), however, was recorded and used as the dependent measure. If a trainee had not attempted to return to work by 10 min after the end of lunch or break, he was not permitted to remain at lunch or break, even dur-

ing baseline conditions. Consequently, a 10-min ceiling for being late was established.

Only a response made at the *exact* assigned time was considered correct when the intervention procedures were implemented. Trainees were permitted to go to or return from lunch or break ± 10 min from the scheduled time during baseline only for purposes of assessment, i.e., to gain a measure of the degree that they would be early or late. A ± 10 -min limitation was established because the experimenter did not wish to have the trainees absent from the opportunity to receive vocational training for large portions of the day (e.g., if a trainee attempted to go to lunch an hour early). Neither did the experimenter want to deprive the trainee of an opportunity to rest and eat (e.g., if a trainee did not attempt to go to lunch because he did not know the correct time).

The trainer/observer recorded the assigned time for each behavior, and the actual time at which the trainee attempted to perform each behavior, on a standard data collection sheet. Assigned and actual times were then compared. An attempt made at exactly the assigned time was recorded as zero (on time). For an attempt made before or after the assigned time, the number of minutes deviation and the direction of deviation were recorded. Only the first attempt was recorded.

Procedures and Experimental Conditions

This study incorporated four experimental phases conducted over 113 consecutive days. The phases were: (a) baseline, (b) pre-instruction, instructional feedback, and timecard, (c) instructional feedback and timecard, and (d) timecard.

Baseline. At the beginning of the first 3 days of baseline, each trainee was told his assigned times to go to lunch, return from lunch, go to break, and return from break. No other pre-instruction was provided, and no positive or negative feedback was provided during the day. If the trainee attempted to go to lunch or to break more than 10 min before the assigned

time, the trainer recorded the time and said in a neutral voice "It's not time, go back to work"; if he attempted to return from lunch or break more than 10 min before the assigned time, the trainer said "It's not time, take it easy"; if the trainee did not go to lunch or to break by 10 min after the assigned time, the trainer said "Go to lunch"; if the trainee did not return from lunch or break by 10 min after the assigned time, the trainer said "Go back to work." The trainer made all of these statements (or similar ones) in a neutral manner. The purpose of the statements during baseline was not to alter the behavior but simply to get the trainee to go to or return from work or break within the time limit (± 10 min) established. If the trainee attempted to perform any of the behaviors within 10 min before or after the correct assigned time, the trainer said nothing and simply recorded the time. Again, this procedure (allowing the trainee to perform freely within ± 10 min of the assigned time) was used not because the response was considered correct but for purposes of assessment. If the trainee responded correctly—at the assigned time—no feedback was given during baseline.

All the trainees ate and took their breaks in the same room, although this was not required. Trainer/observers paid close attention to where the trainees went after eating in order to make sure that the data were accurately collected and to be able to give a prompt if the trainee was more than 10 min late.

Baseline measurements did not begin on the same day for all three trainees. Baseline data collection began on Day 1 for Chris and John and continued for 12 and 35 days, respectively, and on Day 9 for David, continuing for 14 days.

Pre-instruction, instructional feedback, timecard. Each trainee was given a 20-cm by 13-cm index card with four clock faces pictured on one side (Figure 1). The first clock face was labeled "To Lunch," and the second "From Lunch." Between these two clocks, a representation of a lunch box was pictured. The third clock face was labeled "To Break," and the fourth "From

Fig. 1. Timecard used by trainees.

Break." Between these two clocks, a soft drink bottle was pictured. The hands of the clock representing each assigned time were drawn in pen for each trainee.

Pre-instruction took place each morning in a room with only the trainer and trainee present. The trainer sat next to the trainee facing a wall clock. The first part of pre-instruction consisted of identification of the correct clocks on the timecard. The trainer explained the importance of being on time, and of going to and returning from lunch and break without someone having to tell the trainee. The trainer then explained, "Each of the clocks on the timecard shows what the 'real' clock should look like when you are supposed to go to lunch (trainer pointed to correct clock on timecard), when you come back from lunch (pointed), when you go to break (pointed), and when you come back from break (pointed)." The trainer then said, "Point to the clock that you use to go to lunch." If the trainee pointed to the correct clock, praise was given. If he pointed to the incorrect clock, the trainer said, "No," and showed him the correct one. This procedure continued until the trainee responded correctly eight consecutive times.

The second part of pre-instruction consisted of matching the correct time representations on the time card with correct times on a "real" clock. The trainer moved the hands of a wall clock to match the lunch clock face, and said,

"Point to the clock on your card that looks like the 'real' clock." If the trainee responded correctly, praise was given. If he pointed to the incorrect clock, the trainer said, "No," pointed to the correct clock, and explained why the two matched. This procedure was continued until the trainee matched each clock face with the wall clock twice correctly, for a total of eight consecutive correct responses. The items were randomized. Following this pre-instructional training, the trainer and the trainee taped the timecard to a wall in an easily and continuously visible location in the vocational training station. The trainee took the timecard with him to lunch and break. No time limits were placed on the pre-instructional period; no data were collected on the session duration.

Instructional feedback consisted of the trainer verbally praising the trainee each time he attempted to go to lunch, return from lunch, go to break, or return from break at the exact assigned time. If the trainee made an attempt to respond before the exact assigned time, the trainer said in a stern voice, "No, that's wrong, it's not the right time. Get your timecard, and let's go to the practice room." The procedures used during the pre-instructional period were then implemented. During these sessions, trainees were required to practice until four consecutive identification responses and four consecutive matching responses occurred. After the practice session, the trainee was allowed to go to or return from lunch or break, if it was at or past the assigned time. However, if it was still earlier than the exact assigned time, the trainee was sent back to work and instructed to go or return at the correct time. If the trainee again attempted to go early, the instructional procedures were repeated. If the trainee attempted to respond after the exact assigned time or did not respond by 10 min after the assigned time, the trainer said, "You are late. Get your card and let's go to the practice room." The same instructional procedures were then used.

Because only 5 min was allotted for break due to work constraints, the instructional session

sometimes occupied the entire break period. The trainee in this case did not receive a break (although he did have an opportunity to rest from work during the instruction) and consequently did not have an opportunity to return from break on these occasions.

For any of the assigned times, a trainee could have multiple instructional sessions per day. For example, if a trainee who was assigned to return from lunch at 1:30 attempted to return at 1:00, 1:10, 1:20, and 1:25, and then was prompted to return at 1:36, a total of five instructional sessions would be required.

Although a trainee might miss out on work because of instructional sessions, the workday was not extended.

This phase was continued until the trainee had responded correctly on all four measures both during the pre-instruction session and during the work day with no errors for 3 consecutive days. The pre-instruction, instructional feedback, and timecard phase lasted 10 days for Chris, 14 days for David, and 18 days for John.

Instructional feedback and timecard. The procedures during this phase were exactly the same as those used in the previous ones, except that the pre-instructional sessions were discontinued.

The phase was continued for 27 days for Chris, 29 days for David, and 27 days for John.

Timecard. During this phase, the instructional feedback was discontinued. The procedures used were the same as baseline conditions, except for the presence of the timecard.

Table 1 shows the trainer's behavior for each possible trainee response during each condition of the study.

Experimental Design

The present study used a multiple-baseline design across subjects to show that the treatment package was the variable responsible for the behavior change. Each of the components was then individually withdrawn in the same order for two of the trainees, Chris and John. In the case of the third trainee, David, a deterioration of the behavior during the second phase of the maintenance programming necessitated a return to the first phase. After a return to a high level of correct responding, the second and third phases of maintenance programming occurred.

Interobserver Agreement

Interobserver agreement checks were made by a second observer simultaneously and indepen-

Table 1
Trainer Behavior for Each Possible Trainee Response during Each Condition

<i>Trainee response</i>	<i>Conditions</i>			
	<i>Baseline</i>	<i>Pre-instruction, instructional feedback, and timecard</i>	<i>Instructional feedback and timecard</i>	<i>Timecard</i>
> 10 min before assigned time	Neutral command to stop	Reprimand and instruction	Reprimand and instruction	Neutral command to stop
10 min after assigned time	Neutral command to respond	Reprimand and instruction	Reprimand and instruction	Neutral command to respond
< 10 min before assigned time	None	Reprimand and instruction	Reprimand and instruction	None
< 10 min after assigned time	None	Reprimand and instruction	Reprimand and instruction	None
On time	None	Praise	Praise	None

dently recording the behaviors. Agreement scores were calculated by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100; they are reported as percentages. An agreement was scored only if the times recorded by both observers were the same. Since a total of 4 behaviors was possible each day for each trainee, 1-4 agreements were recorded per trainee per day. This accounted for agreements of 25%, 50%, 75%, or 100% per day per trainee.

During baseline conditions, 4, 3, and 7 agreement checks were made for Chris, David, and John, respectively; during the pre-instruction, instructional feedback, and timecard phases, 3, 6, and 3; during the instructional feedback and timecard phase, 3, 5, and 5; and during the timecard-only phase, 9, 6, and 5. Interobserver agreement checks were not performed for the pre- and posttests.

The mean agreement was 92%. The discrepancy between the two independent observers was more than 2 min on only one occasion.

RESULTS

The number of minutes each trainee deviated (early or late) from his exact assigned time going to lunch, returning from lunch, going to break, and returning from break for each training day is shown in Figure 2. Where no data are shown for returning from break, no break was taken due to the instruction.

During baseline conditions, Chris and David never responded at the correct time for any of the assigned times. John returned from lunch on time on five occasions, but was never on time going to lunch, going to break, or returning from break. Both Chris and David were almost always late performing each of the behaviors and on the majority of occasions had to be prompted by the trainer. John, on the other hand, exhibited extremely variable behavior, except for consistently attempting to go to lunch early, at a mean of 31 min before the assigned time.

When the training package, consisting of pre-instruction, instructional feedback, and the timecard, was introduced, the trainees soon began going to and returning from lunch and break on time. By 10, 14, and 17 days of this condition, Chris, David, and John, respectively, had identified each of the clock faces correctly, had matched to sample correctly during the morning sessions, and had been on time for all four responses during the day for three consecutive days.

When the pre-instruction was discontinued, two of the trainees, Chris and John, continued to go to and return from lunch and break on time with few exceptions. Out of 104 total opportunities during the 26 days of this phase, Chris was on time 101 times. John was on time 94 times out of 96 total opportunities during the 26 days of this condition.

David's going to and returning from lunch also maintained well, deviating from the assigned times on only 3 days out of 29. His break time behavior also maintained well up to day 19. On the next 11 days, however, David deviated from his assigned time for either going to or returning from break five times. These deviations always required a prompt by the trainer 10 min past the assigned time. When pre-instruction was reinstated, David began to go to and return from break on time again. After 5 days in which there were no deviations, pre-instruction was again discontinued. Although there followed some deviations from the assigned times, David's behavior consequently maintained relatively well. In a total of 44 opportunities, David showed only seven deviations.

When the trainees no longer received instructions or feedback but simply had the timecard visually displayed or in their possession, the results showed that of the 256 total opportunities, Chris performed each of the behaviors at the assigned times. Of 68 opportunities, David deviated from his assigned times on five occasions, and John deviated from his assigned times only once out of 124 opportunities.

Fig. 2. Number of minutes each trainee went to and returned from lunch and break, early and late.

Pre-instruction and Instructional Feedback Sessions

Because criteria for the pre-instruction session were eight consecutive correct clock identifications and eight consecutive correct clock matches, and for the instructional feedback sessions, four consecutive correct identifications and four consecutive matches, 16 trials during the pre-instruction sessions and eight during the feedback sessions would indicate that no incorrect responses were made during that session. The number of instructional feedback sessions provided each day depended on the number of incorrect responses made by the subject, and multiple incorrect responses per assigned time could conceivably occur.

The data show that the mean number of trials per pre-instructional session that were required to reach criteria was 16, 18, and 27 for Chris, David, and John, respectively. The mean number of trials per instructional feedback session was 11, 11, and 13 for Chris, David, and John, respectively. In short, almost from the beginning, Chris and David were able to identify the correct clocks and to match each to the "real" clock. John had much more difficulty, as shown by the higher number of trials to criteria and the higher number of instructional feedback sessions required.

Although the duration of the pre-instruction and instructional feedback sessions was not measured, those sessions with between 8 and 20 trials took approximately 5 to 10 min. The duration of sessions with more trials varied greatly. No session took longer than 30 min.

DISCUSSION

The results show that nontime-telling retarded adults, provided with visual cues, and instruction and feedback on their use, can be trained to go to and from lunch and break independently. This study is the first systematic investigation of training procedures related to time-management responses in retarded persons.

The time-telling pretest and the baseline data demonstrate that the trainees were not time tellers nor did they use the clocks in their environment to cue them to respond on time. When pre-instruction, instructional feedback, and a timecard were provided to them in a multiple-baseline fashion, each began to perform the required behaviors at the assigned times. When pre-instruction and instructional feedback were withdrawn sequentially, two of the trainees continued to maintain high levels of correct responding. One trainee, David, began failing to go to break when pre-instruction was discontinued. This trend began after he had responded correctly for 23 consecutive days. Based on this and his past history of responding—initial high levels of performance followed by deterioration—the most likely explanation for this occurrence was not one of learning but of motivation. This is further supported by an analysis of the contingencies. Break time consisted of a very brief opportunity to sit down and drink a cup of coffee or soft drink rapidly. The reinforcing value of this, in comparison to continuing to work, completing work 5 min earlier, and leaving for the day, may have been poor for this particular trainee. This is substantiated by the fact that he continued to go to lunch at the correct time with few exceptions. Here he had the opportunity to relax for 30 min and, of course, to eat lunch. When pre-instruction was reinstituted, he began responding correctly again, and then maintained this fairly well during the subsequent sequential withdrawals. The second pre-instruction phase served as an opportunity to emphasize the importance of this behavior and possibly as an aversive consequence.

As demonstrated by David's behavior, the time-management response is a function of two important variables. The first variable is learning or acquisition. The person must first learn how to use the timecard—to identify the correct clock face, to match the real clock to the timecard face, and to perform the correct behavior when a match is made. The second important variable is motivation—the person uses the

timecard to continue to perform the behaviors correctly. A person may in fact be a time teller but still not use the skill to go to and return from lunch and break on time.

The rapidity of these procedures in producing behavior change is especially advantageous for those in settings concerned with preparing retarded adults for independent functioning. Retarded persons often acquire fairly rapidly many skills which require little conceptual mastery, such as dishwashing, toothbrushing, or floor sweeping. However, they may be retained in institutions or sheltered workshops because of lack of mastery of more conceptual skills, such as time telling and money skills. Miller et al. (1977) and Trace et al. (1977) demonstrated a procedure whereby retarded adolescents can be taught quickly to use money. The procedures in the present study provide an efficient and functionally effective approach to preparing retarded persons to manage their own time.

This study did not attempt to analyze the role of each of the components of the training package: pre-instruction, instructional feedback, and timecard. One or more of the components may, in fact, not be necessary for this population to learn to use the clock to time-manage. Perhaps if the trainees were simply given the card and feedback during the day, they would begin responding correctly without pre-instruction. On the other hand, perhaps they could just be instructed on what the clock should look like when a response is to be emitted, and given feedback, without the necessity for a timecard.

Several other important questions remain unanswered by the present study. Two are related directly to the issue of maintenance. First, would the responses have been maintained if the timecard had been taken away from the trainees? The major reason the card was retained was because the trainees were nearing readiness for competitive placement. The staff felt that by retaining the card, the trainees could more easily be trained to respond correctly to the new lunch and break times on the new jobs. Second, was the sequential removal of the components neces-

sary for maintenance, or could all the components have been withdrawn at once with continued correct responding? In addition, would trainees trained on specific times generalize this skill to new times, and would the timecard training for specific behaviors generalize to different behaviors (e.g., coming to work, leaving work, sweeping the floor)?

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