

*SELF-RECORDING IN TRAINING GIRLS TO
INCREASE WORK AND EVOKE STAFF PRAISE IN AN
INSTITUTION FOR OFFENDERS¹*

FREDERICK W. SEYMOUR² AND TREVOR F. STOKES³

NYANDI TREATMENT AND RESEARCH CENTER FOR ADOLESCENTS,
WESTERN AUSTRALIA

Self-recording procedures were used by four adolescent girls to increase work and comments (cues) that evoked staff praise during vocational training sessions in a maximum-security institution for offenders. The girls were selected on the basis of their not responding to a staff-directed token program. The self-recording procedures were directed by a therapist who saw the girls outside the vocational training sessions. According to a multiple-baseline design, self-recording of work was introduced sequentially to each of the two or three settings the girls attended each day. A few days after work had increased, self-recording of cues was introduced. Tokens were delivered by the therapist for work and cues recorded by the girls. Work and cues increased following self-recording for three of the girls and increased cues evoked higher rates of staff praise. Girl and staff behaviors were maintained during short follow-up periods when tokens were not given for the girls' records. The procedures failed to effect desirable changes with a fourth girl's work, and self-recording of work was terminated without introducing cueing.

DESCRIPTORS: self-recording, work behavior, staff praise, institution for offenders, multiple baseline, delinquents, adolescents

Several studies have shown that student self-recording effectively maintains classroom behavior originally modified by teacher or observer reinforcement (Bolstad and Johnson, 1972; Drabman, Spitalnik, and O'Leary, 1973; Glynn, Thomas, and Shee, 1973; Kaufman and O'Leary, 1972). In these studies, the teacher or observer first recorded student behavior and delivered contingent token reinforcement; after the target behavior was modified, the students commenced self-recording, and tokens were then

delivered by the teacher on the basis of the student's records.

Glynn and Thomas (1974) used self-recording with third-grade children who noted whether or not they were on-task when an intermittent signal sounded. At the end of each period they received free time according to their records. On-task behavior increased in the nine children observed. Broden, Hall, and Mitts (1971) also used self-recording but without tokens with two children in regular classes. Self-recording of work led to increased work by the first subject, but self-recording of talk-outs by the second subject met with limited success; an initial effect that attenuated with time.

Santogrossi, O'Leary, Romanczyk, and Kaufman (1973) examined self-recording procedures with a group of disruptive adolescents in a psychiatric hospital special class. In the first intervention phase, self-recording was introduced, and tokens (points) not exchangeable for backup reinforcers were delivered for behavior records. These procedures did not reduce disruptive be-

¹The authors are grateful for the support of the Department for Community Welfare, Western Australia. Particular thanks are due to Mr. Bill Montgomery, Acting Superintendent of Nyandi. We also thank Nyandi staff who participated in the study: Thora Abbott, Betty Armstrong, Ray Flanagan, Les Harrison, Lesley Hoare, and Ruth Jodrell. Drs. J. S. Birnbrauer, E. L. Glynn, and D. M. Baer offered valuable comments on earlier drafts of this manuscript. Reprints may be obtained from either author.

²Now at Department of Psychiatry, University of Auckland, Private Bag, Auckland, New Zealand.

³Now at Department of Human Development, University of Kansas, Lawrence, Kansas 66045.

havior. Furthermore, self-recording with backup reinforcement was unsuccessful in maintaining disruptive behavior reduced during a teacher-directed token program. This failure was unexpected because the subject population and self-recording maintenance procedure had been similar to that of a successful study by Kaufman and O'Leary (1972). Santogrossi *et al.* (1973) suggested that the different outcome related to differences in the preceding conditions, in particular, a much shorter period of external reinforcement. They suggested that the subjects had not had time to develop appropriate academic skills, and/or a social milieu that encouraged social behavior had not yet evolved. Also, without controls on inaccurate recording, the students soon found that they could misbehave but still receive the backup reinforcers by awarding themselves high self-evaluations.

The failure of self-recording as an intervention procedure in the Santogrossi *et al.* (1973) study seems typical of research using self-recording without contingent back-up reinforcers. In a different setting, Fixsen, Phillips, and Wolf (1972) found that self-recording without contingent backup reinforcers was ineffective in modifying room-cleaning behavior of predelinquent boys in a family style treatment setting. Nor did self-recording have a lasting effect with one subject in the Broden *et al.* (1971) study.

The present study followed Glynn and Thomas (1974) in using self-recording with backup reinforcers as an intervention procedure. The subjects were four adolescent girls in a maximum-security unit for offenders selected because they were considered to be particularly resistant to intervention. The teaching staff of the institution were not involved in administration of the program, self-recording procedures being directed by a therapist who saw the girls each day in his office. Any procedure that does not rely on teacher participation should be useful when teachers are uncooperative or where a number of teachers are involved with a single student, as in a high school, and training each teacher in appropriate procedures is not practical. In any

case, teachers relieved of administering a behavior-management program have more time to develop and present educational activities.

As well as recording work behavior, three girls also recorded comments to staff intended to evoke their praise. Graubard, Rosenberg, and Miller (1971) showed that special-class children were able to increase a teacher's positive attention after receiving training to maintain eye contact, ask questions, and make teacher-reinforcing comments. A similar approach to increasing staff praise was adopted here, when it was found that staff praise did not increase in response to improvements in the girls' work.

Finally, this study evaluated self-recording where applied to a full educational and vocational program involving 6 hr in activities per day, in several different settings and with different staff. Previous studies of self-recording (Bolstad and Johnson, 1972; Broden *et al.*, 1971; Drabman *et al.*, 1973; Glynn and Thomas, 1974; Glynn *et al.*, 1973; Kaufman and O'Leary, 1972; Santogrossi *et al.*, 1973) have involved programs that are applied only to 30-to-45-min periods of each day, periods that were often distinct from the children's usual program. If self-recording is to be of wider practical use, it must be shown to be effective in more demanding educational and training programs such as the present one.

METHOD

Subjects and Setting

Four girls in the maximum security unit of Nyandi, a center for adolescent girls aged 14 to 18 yr located in Perth, Western Australia, participated in the study. These girls, Yvonne, Patricia, Michelle, and Rebecca, had been admitted to Nyandi after persistent offending. Some other characteristics of the girls taken from the institution's records are summarized in Table 1. The girls were selected because they had not responded to the staff-directed token program. Staff reported that these girls evidenced low rates of attention to work; all but Michelle were also disruptive and noncompliant.

Table 1
Some Characteristics of the Four Subjects

<i>Subject</i>	<i>Age (years)</i>	<i>Race</i>	<i>IQ (WISC)</i>	<i>Pre-admission School Behavior</i>
Yvonne	14	European	76	Truancy Disruptiveness Low attention span
Patricia	17	European	68	Disruptiveness Low attention span
Michelle	15	European	104	Truancy Social isolate
Rebecca	15	Australian Aboriginal	96	Truancy Low motivation Uncooperative

According to the institution's treatment program, the girls earned tokens (small aluminum disks) for various vocational, social, and self-care behaviors, and lost tokens for inappropriate behaviors. About 350 tokens could be earned each week, and used to purchase special activities and privileges such as swimming, movies, television, outings from the institution, and commissary articles such as candy, cigarettes, clothing, and cosmetics.

The study was conducted during the vocational skill-training sessions. During weekdays, the girls spent from 8:45 a.m. to 4:30 p.m. in any of four training areas: classroom, office, workshop, or kitchen. They stopped for 20 min during the morning and the afternoon for tea breaks and had a 1-hour break for lunch. Approximately 45 tokens could be earned each day during vocational training.

A description of each vocational training area follows.

Classroom. The girls worked on individual programs in academic subjects basic to suitable employment, and such "living skills" as using bus timetables, telephone and street directories, banking procedures, *etc.* The area was supervised by a female teacher with 7 yr teaching experience. She began work at Nyandi five days after observation commenced.

Workshop. The girls were employed in assembling paper carrying bags for a local manufacturing company or were receiving training to

be machinists. The four present subjects were engaged in assembling carrying bags. The area supervisor was a female paraprofessional staff member who had been employed at Nyandi for 3 yr.

Office. The girls were taught typing and general office procedures. However, they were sometimes engaged in other activities because of lack of room in the other areas. Of the four girls, only Michelle attended the office; she spent the majority of her time on a task associated with the assembling of paper carrying bags—cutting and sizing strips of cardboard. The area was supervised by a female paraprofessional staff member who had worked at Nyandi for 3 yr.

Kitchen. The girls assisted in preparing food, washing dishes, and cleaning the kitchen and dining-room areas. The area was supervised by the cook, who had been at Nyandi only a few months; she had no formal training.

During the study, seven to 10 girls were present in each area, except the kitchen, where only two to four girls worked at any time. Girls who attended three settings each day spent approximately 2 hr in each setting, and those who attended only two settings, spent approximately 3 hr in each setting.

Dependent Variables

Behavior was classified according to five categories of girl behavior and three categories of staff behavior. Girls' behavior categories were:

Work. Looking toward task material, hands working continuously on set task (except classroom); when moving to another task or to fetch or return some article, not dawdling or looking around. The behavior must have occurred for the entire 10 sec. Talking to peers was allowed in the workshop and kitchen, but not in the classroom or office.

Interrupted Work. Interruption of work by looking away from task material; hands ceasing to work on set task (except classroom); or, in the classroom and office, talking to peers. In moving to another task or to fetch or return some article, dawdling or looking around. Interruption was for 1 to 5 sec.

Nonwork. Interruption of work for 5 to 10 sec or any disruptive behavior such as making loud noises, calling out, or banging or throwing objects.

Cues. Comments to staff that invited them to comment favorably on the girls' general behavior or work, e.g., "Am I working well?", "Look how much work I've done", "How's that Miss . . . ?".

Attention. Interaction with staff, including talking to and answering or asking questions of staff and/or when staff were speaking to the girl. Cues were not scored as part of this category.

Staff behavior categories were:

Praise. Praise, statements of approval of work or general behavior, e.g., "That's very good", "You're working well".

Attention. Interaction with the girl, including instruction, comments about work and other topics, and attention to the girl when she was speaking. Also included reprimands, disapproval, and threats of penalties. Praise was not scored as part of this category.

No Response. No staff interaction with girl being observed.

In addition to these observation data, the number of work units produced was recorded for Michelle. In the office, the units were cardboard strips that she sized and cut, and in the workshop, the paper carrying bags that she assembled. These data were collected by workshop and

office supervisors as a routine part of their responsibilities and were recorded on standard institutional forms.

Recording and Observation

All observation data were collected by an experienced observer, who sat at the rear of the room with a clear view of the subject. Girls were observed at the same time each day for periods of 5 or 10 min. Total observation periods were 20 min in each setting for all girls except Michelle, for whom 30 min of data were collected in each setting. A 10-sec interval-by-interval recording procedure was used. Each 10 sec, both girl and staff behaviors were recorded according to the categories defined above. Intervals were measured by reference to large wall clocks placed in a prominent position in each room. No standardized time was allotted to recording the data: data were quickly noted at the completion of each interval.

Only one category of girl behavior and one category of staff behavior could be recorded in each 10-sec interval. Any interaction with staff would preclude the recording of one of the girls' three "work" categories. If interaction occurred, Cues were coded in priority to Attention. If interaction did not occur, Work, Interrupted Work, or Nonwork was scored. With staff, Praise was recorded in priority to Attention and No Response.

The categories of behavior were defined to reduce the likelihood that more than one category would apply in any interval. The three "work" categories were mutually exclusive. Cues and Praise were discrete examples of interaction, and therefore could be coded separately from Attention. Nevertheless, it was possible that Cues and Praise might occur together with the Attention categories in a single interval. This was one reason why the method of priority scoring was introduced: the observer could quickly determine the appropriate category, and recording could be completed without imposing on observation time. A more important reason for this hierarchical scoring was to allow experimental

control for daily variations in interaction. In most instances, interaction was a function of the nature of the work, or the demands of other girls requiring individual attention. By excluding interaction data, the work categories would be scored only when the opportunity for independent work occurred.

Reliability of observation was assessed by having a second observer, who was naive regarding experimental conditions, record behavior simultaneously with, but independently of the regular observer. A reliability check was completed for each girl in each setting, at least once during each experimental condition of baseline and self-recording. An agreement was scored when both the observer and the reliability checker recorded the same category of behavior during a 10-sec observation interval. Disagreements were scored when one observer recorded one category of behavior and the other did not. The reliability percentage was computed by dividing the number of observer agreements by the total number of agreements plus disagreements, and multiplying by 100.

The combined reliability for categories of girl behavior was 84% and for staff categories 98%. Reliabilities of the various behavior categories are shown in Table 2. Only two instances of praise, and no cues, were recorded during reliability checks, so that the reliability of measurement of these categories was not established. This

is a general problem of all infrequent data, and in the present case restricts conclusions that can be drawn from the training of girls to evoke staff praise.

No reliability assessment was made of Michelle's production data. This restricts the conclusions that may be drawn from these data, but high reliability of recording could be expected because it was a routine and uncomplicated recording of permanent product data that are typically recorded with high reliability.

Procedure

Four case studies each utilized a multiple-baseline design (Baer, Wolf, and Risley, 1968). The studies were conducted concurrently, but with some variation in starting and ending dates, and in the experimental conditions operating at any one time. Figure 1 is a summary of the procedures, which shows that experimental effects could not have been due to the simultaneous introduction of the same procedures with all girls, *i.e.*, behavior changes with each girl occurred independently of changes with any of the other subjects.

Baseline. During baseline, three tokens were delivered by vocational training staff at 30-min intervals, contingent upon appropriate work during the interval. Disruptive behavior was followed by a "warning", and, if the behavior continued, loss of the three tokens for that 30-min interval. If disruptive behavior continued further, the girl was required to leave the room for 5 min (timeout). A new 30-min interval would commence when the girl returned.

Daily sessions with the therapist for Yvonne, Patricia, and Rebecca involved the three girls seeing the therapist together on each morning for approximately 15 min. In the therapist's office, which was outside of the vocational area, the girls were encouraged to discuss their individual progress in vocational training, but no instructions or systematic reinforcement were given.

Self-recording of work only. The therapist saw the girls individually for 5 to 15 min after

Table 2

Observer reliabilities for each category of girl and staff behavior.

<i>Behavior Categories</i>	<i>Percentage Agreement</i>
<i>Girls:</i>	
Work	91
Interrupted Work	64
Nonwork	86
Attention	94
Cues	*
<i>Staff:</i>	
No Response	99
Attention	96
Praise	50†

*No events from which to calculate reliability.

†Based on two events only.

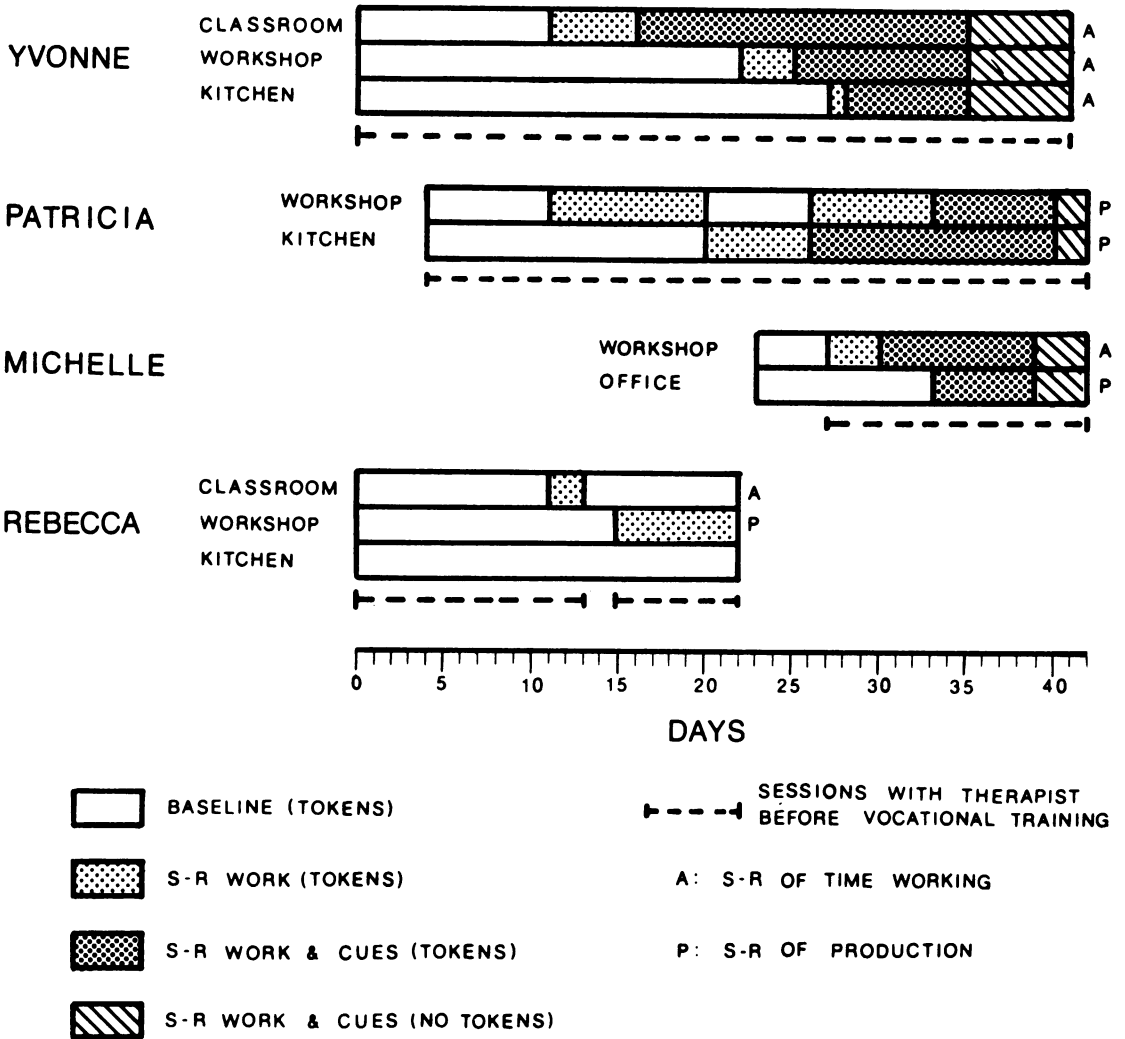


Fig. 1. Procedures for each subject, showing the experimental conditions, number of days in each condition, and the days over which the studies took place in relation to each other.

self-recording of work was introduced. Individual sessions were necessary because different self-recording procedures were used by each girl.

To introduce self-recording, the therapist presented a rationale that the girls needed to work efficiently if they were to reduce conflicts with staff at Nyandi, and if they were to succeed at school or in employment. These were issues that the girls had discussed during baseline sessions. In discussion with the girls, work behaviors were defined and then written on the 20 by 12.5 cm lined cards used in self-recording. The list of work behaviors, which was the same for all girls,

included the following: hands working continuously (except in the classroom); looking at work; doing the work set and not something else; not fiddling; when getting something, not dawdling; and not talking out of place.

Girls were instructed to mark the back of their cards by writing the first letter of their name in the column appropriate to the setting, provided that they had worked throughout a certain interval of time. The precise way of measuring these intervals varied. Yvonne, Michelle, and Rebecca recorded work for 3-min intervals measured by reference to the room's wall clock. Patricia,

Michelle, and Rebecca recorded work during the production of a specified number of work units, e.g., five carrying bags in the workshop, each of a list of jobs in the kitchen. This variation in procedures was necessary for Patricia and Rebecca because they could not tell the time.

During self-recording, the therapist, rather than the vocational training staff, determined the contingencies and delivered the tokens to the girls. This procedure meant that there were no tangible consequences for the girls' behavior in the vocational areas. Typically, one token was delivered for each two marks on the girls' cards. Tokens were delivered at the end of each session at first. After self-recording was introduced in all settings, tokens were given at the end of the day.

Cheating in self-recording was checked by comparing the girl's record with the actual time in the setting or the actual work produced. Thus, if a girl had recorded 40, three-min intervals of work, it would be known that she had cheated if the training session had lasted less than this time. Obviously, this method of checking for cheating could prevent only flagrant overscoring, because a girl could still mark herself as having worked up to the maximum time in the room, or number of bags produced, and not be detected. Checks for cheating were made each day for those girls who recorded work during 3-min intervals. For those girls who recorded work during production of work units, checks were made randomly, about each third day. A 10-token response cost was imposed for cheating for all girls except Michelle.

Self-recording of cues. Self-recording of cues was introduced a few days after self-recording of work, except for Michelle, for whom recording of work and cues in the office were introduced on the same day. The delay of self-recording of cueing was to allow examination of the effect that improved work alone might have on staff praise. If there was no effect, any subsequent increase in staff praise could be considered the result of increased cueing for praise by the girls. Girls were requested not to reveal that they were cueing for praise.

The therapist introduced the idea of cueing by evoking from the girls the opinion that staff had not been responding to the improvement in their work. The girls were told they would have to point out their improvements by comments called "cues". Cues were defined and practised in role-playing with the therapist. Appropriate occasions on which to cue were discussed, such as at completion of an article of work, at the end of a period of work as the girls left for recess, or when staff stood at close proximity inspecting the girl's work. Role-playing and discussion of when to cue were continued each day at first, but were included less frequently when it became apparent that the girls understood the procedures.

The procedure for recording cues was for girls to mark the first letter of their name in a column beside their "work" marks. The therapist delivered one token for each cue at the same time as he delivered tokens for work behavior.

Self-recording without tokens. In the last few days of the program for Yvonne, Patricia, and Michelle, no tokens were delivered. Morning sessions with the therapist continued and he inspected their cards at the end of the day and delivered contingent praise.

Postexperiment questionnaire. The four girls were not told that they were being observed as part of a study. Observers were familiar in the institution and girls generally understood that they took records of girl and staff behavior. To assess whether the subjects became aware that they were the targets of observation, they were asked the following questions: (1) "What do you think [the observer] has been doing these last few weeks?"; (2) "Do you think he looks at you?"; (3) "What do you think he is writing?"

Staff agreed to being observed but were not informed of the behavior categories used. However, the girls' self-recording procedure for work behavior was explained. Procedures and results were explained to the staff after the study was completed, and consent to report all data was obtained. After the study was completed, staff

were also asked to respond to a questionnaire to assess their knowledge of both observer and girl behavior. They were also asked questions about the girls' knowledge of the observer's behavior. The questions were: (1) "What do you think [the observer] was recording?"; (2) "What did you think the girls were recording?"; (3) "Do you think the girls knew they especially, and not others, were being watched?"; (4) "Do you think the girls saw a connection between [the observer's] recording and the self-recording program?"

RESULTS

Work Behavior

The per cent of intervals in which work behavior was recorded by the observer is presented for each subject. Work was calculated as a per cent of total intervals scored for Work, Interrupted Work, and Nonwork. By excluding behavior categories describing interaction with staff, there was control for daily interaction, which varied between a mean of 10% and 14% of the observation intervals during the various experimental conditions. Thus, the figures showing the percentages of work present work as a percentage of the total opportunities for independent work.

Yvonne. As shown in Figure 2, Yvonne's work behavior increased immediately when self-recording was introduced in each setting. In the classroom, work increased from an average of 45% during baseline to 77% over the three conditions in which self-recording was present. Similarly, work increased in the kitchen from 29% to 59%, and in the workshop from 26% to 42%. Work was maintained at similar levels in two of the three settings during the six days of self-recording without tokens. A 10-token response cost was imposed for cheating on the fourth day of self-recording in the classroom. No further instances of flagrant cheating were noted.

Patricia. Patricia's work behavior, shown in Figure 3, improved when self-recording was

introduced in the workshop. Work increased from a baseline average of 38% to 51% in the first self-recording condition. However, on the last two days, work decreased to below baseline average. It was determined that Patricia had not followed instructions for recording on these days, marking her card more or less randomly. Therefore, self-recording was temporarily withdrawn. During the return to baseline, work averaged 26%. Reintroduction of self-recording increased work to 49% over the remaining experimental conditions. In the kitchen, work averaged 25% during baseline, and increased to 57% in the experimental conditions with self-recording. In both settings, work was maintained in the two days when no tokens were delivered. A 10-token response-cost was imposed for cheating on the third day of self-recording in the workshop. No further cases of cheating were detected.

Michelle. Figure 4 shows the observer's record of Michelle's work. During baseline, there were large differences in work behavior between the two settings. Work averaged only 4% in the workshop, compared with 75% in the office. This was possibly a result of fewer distractions in the office. In the workshop, girls sat facing each other around a table, talking was allowed, and a radio played quietly. In the office, where greater concentration was required, talking was considered inappropriate, no radio played, and most of the girls faced one wall, thus minimizing opportunities for talk.

Self-recording of work immediately and dramatically increased work in the workshop. After the first three days however, work deteriorated and continued to do so until the end of the study. Over the three experimental conditions in which self-recording was present, work averaged 34%. In the office, work increased from 75% during baseline to an average of 86% during self-recording. Because work showed an upward trend during baseline it cannot be concluded that this increase was a result of self-recording.

The effects of self-recording on work output shown in Figure 5 were in contrast to observed work. Work output increased when self-record-

YVONNE

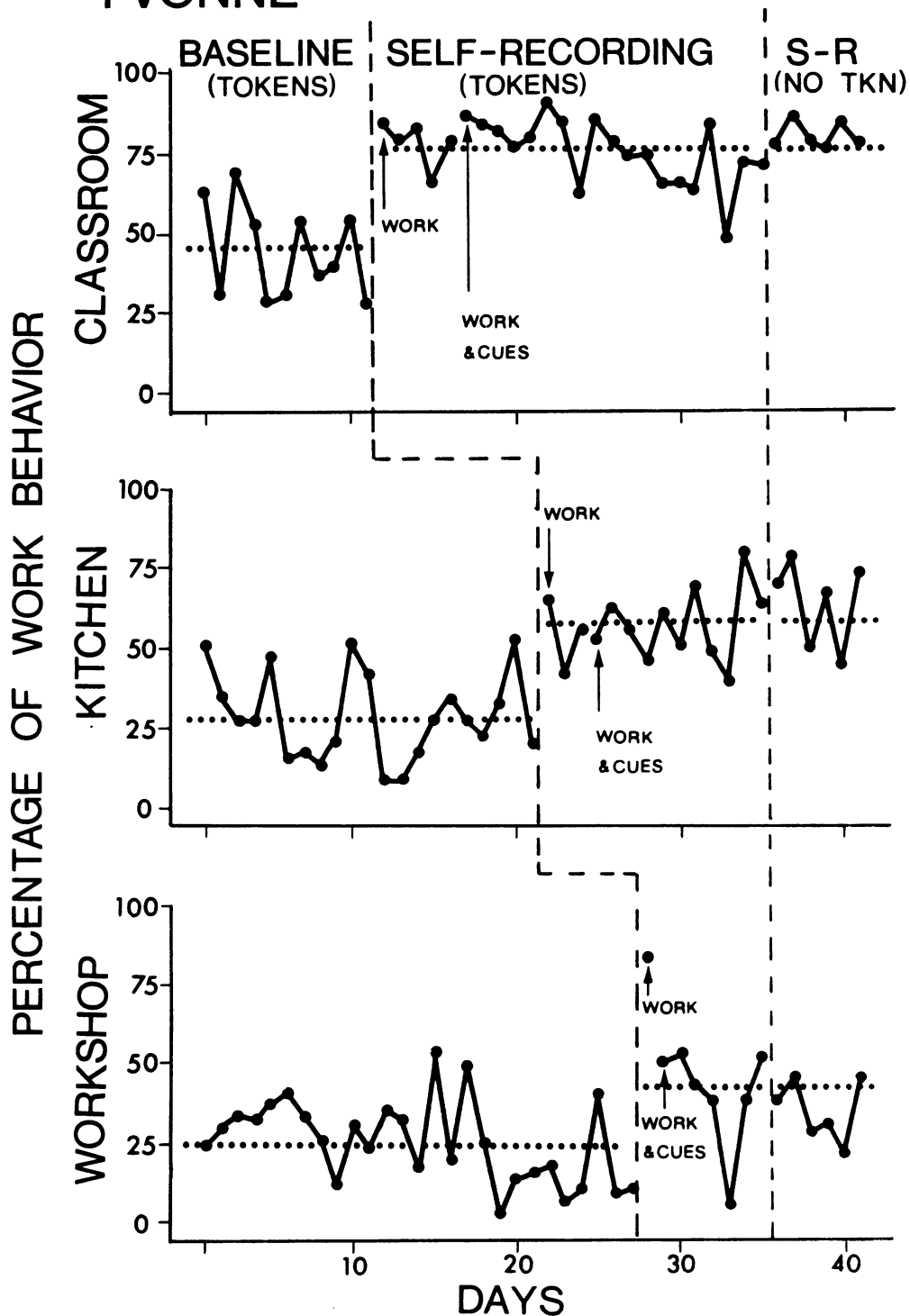


Fig. 2. Yvonne. Observed Work each day in each setting, calculated as a percentage of the combined categories of Work, Interrupted Work, and Nonwork. The average percentage of Work during baseline and the combined self-recording conditions is shown by the horizontal dotted line.

PATRICIA

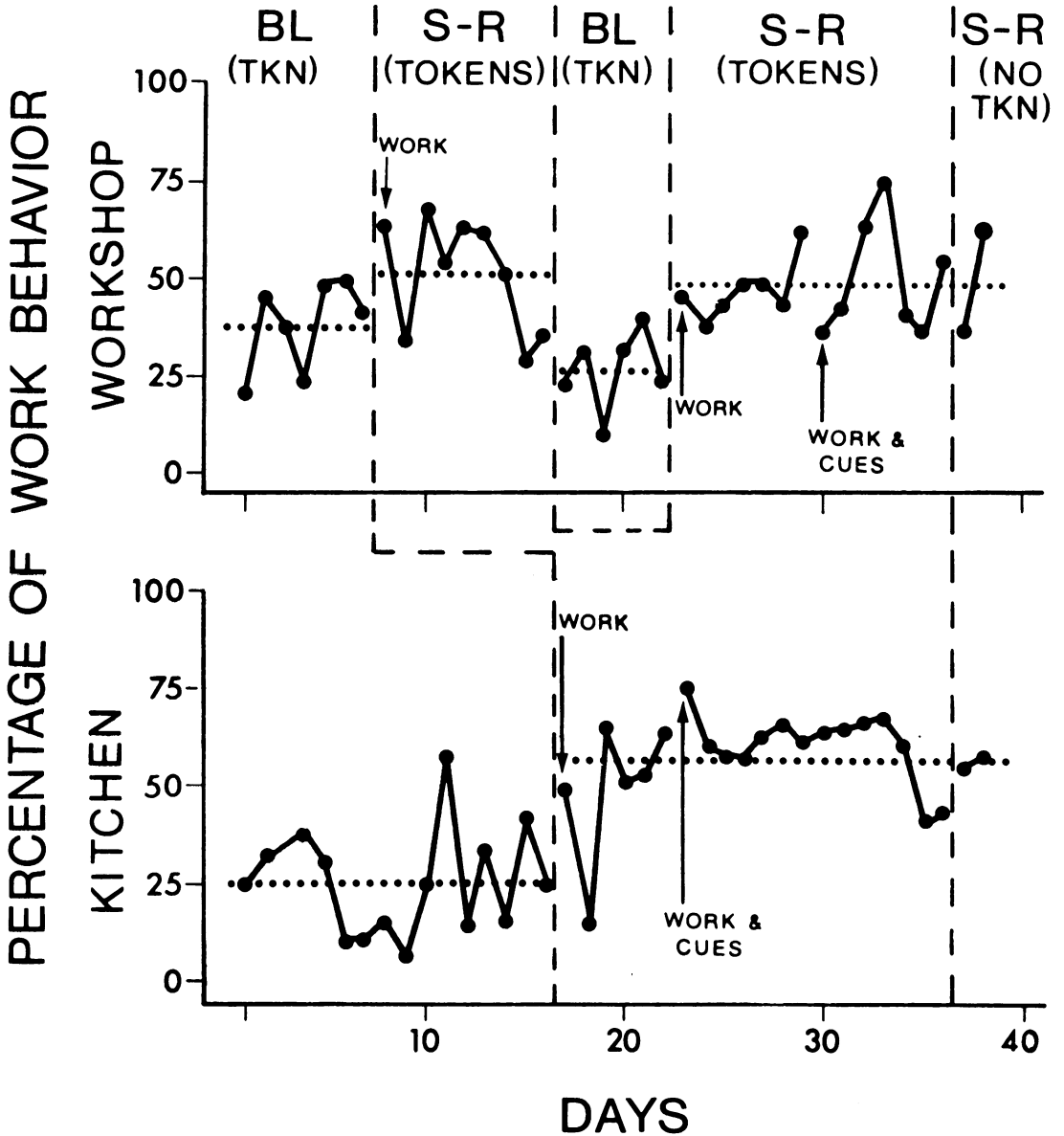


Fig. 3. Patricia. Observed Work each day in each setting, calculated as a percentage of the combined categories of Work, Interrupted Work, and Nonwork. The average per cent work behavior during baseline and the combined self-recording conditions is shown by the horizontal dotted line.

ing was introduced and the changes persisted in both settings. In the workshop, the work units produced increased from a daily average in baseline of 116 to 218 during self-recording. In the office, the increase was from 198 units to 276 units. There was little change on the first day of

self-recording in the office, because Michelle had not followed the recording procedure correctly.

Rebecca. With Rebecca, self-recording was first introduced in the classroom (data not shown). However, no change occurred and self-recording was withdrawn after two days. After

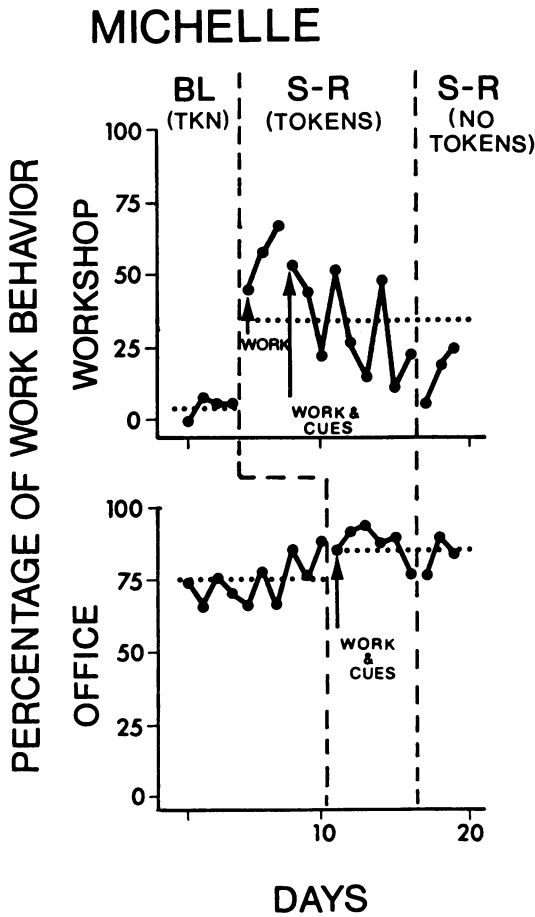


Fig. 4. Michelle. Observed Work each day in each setting, calculated as a percentage of the combined categories of Work, Interrupted Work, and Nonwork. The average work units during baseline and combined self-recording conditions is shown by the horizontal dotted line.

self-recording procedures were introduced in the workshop, work increased initially but then deteriorated. The 10-token response-cost for cheating was imposed on three separate occasions but had no effect on cheating. Because self-recording procedures were not successful with Rebecca, the study involving her was terminated without further experimental manipulations.

Cueing and Staff Behavior

Table 3 shows the observer's record of girls' cues and staff praise, with each girl, in each set-

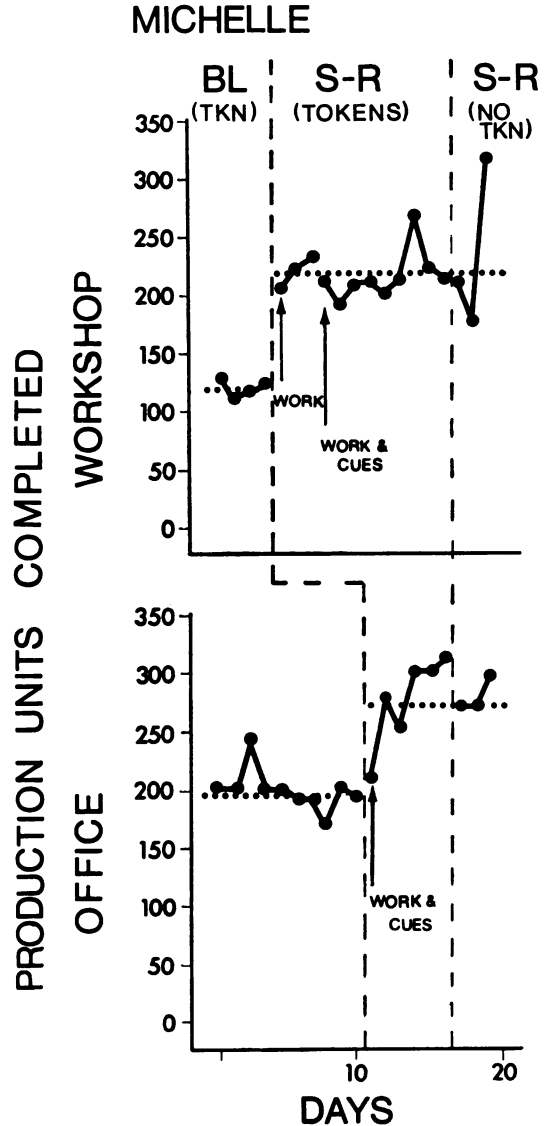


Fig. 5. Michelle. Number of work units produced each day in each setting. The average work units during baseline and combined self-recording conditions is shown by the horizontal dotted line.

ting, and during each experimental condition. Rates per 20-min observation period are presented. Neither cues nor praise occurred frequently in baseline or during intervention. However, both behaviors increased for all girls and staff in most settings, as a result of introducing self-recording of cues.

The mean rates of the girls' cues and staff praise per 20 min of observation for all girls and

Table 3

Observer's record of girls' cues and staff praise, calculated as a rate per 20-min observation, averaged for each experimental condition. Rates of praise are shown in parentheses.

Subject	Setting	Baseline (Tokens)	S-R Work (Tokens)	S-R Work and Cues (Tokens)	S-R Work and Cues (No Tokens)
Yvonne	Classroom	0.5 (0.5)	0.4 (0.0)	1.2 (0.6)	0.7 (0.5)
	Kitchen	0.1 (0.0)	0.3 (0.0)	1.7 (0.6)	0.7 (0.7)
	Workshop	0.3 (0.1)	0.0 (0.0)	0.9 (0.3)	0.8 (0.3)
Patricia	Workshop	0.0 (0.2)	0.0 (0.0)	1.7 (0.6)	0.0 (0.0)
	Office	0.0 (0.0)	0.5 (0.2)	1.8 (0.4)	0.5 (0.0)
Michelle	Workshop	0.3 (0.0)	0.0 (0.0)	0.3 (0.1)	1.3 (0.0)
	Office	0.1 (0.9)	— —	1.2 (1.7)	1.3 (2.0)

settings combined, during each experimental condition, are shown in Figure 6. Rates of cues or praise did not increase from baseline to self-recording of work. However, both cues and praise increased substantially during self-recording of work and cues: an increase from one cue each 123 min to one each 17 min, and from one staff praise comment per 154 min to one praise comment for 40 min.

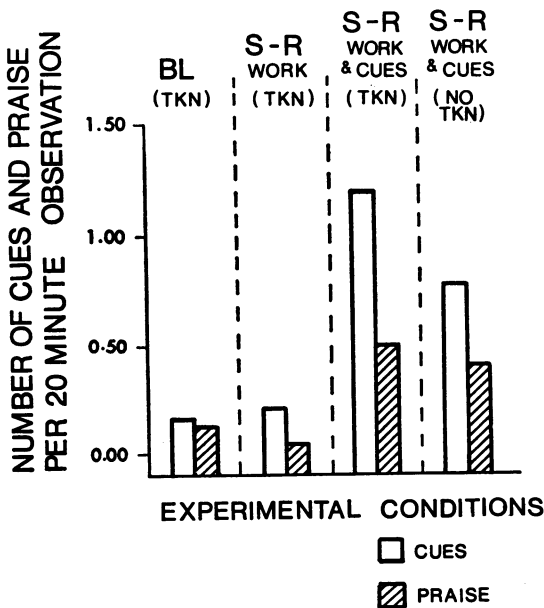


Fig. 6. The mean rates of the girls' cues and staff praise per 20 min of observation for all girls and settings combined, during each experimental condition.

Comparison of Tokens Delivered During Baseline and Self-Recording Conditions

Two of the three girls with whom the self-recording procedures were effective received no more tokens during the self-recording phases of the study than they had received during baseline. Yvonne received an average 43 tokens daily during baseline and an average 39 tokens during self-recording. Patricia received an average 40 tokens per day during baseline and an average 42 during self-recording. As a result of Michelle's overscoring, she received an average 46 tokens per day during baseline and an average 79 during self-recording. Thus, the success of the self-recording procedures with Yvonne and Patricia, at least, were not attributable to increase in the number of tokens received each day.

Postexperiment Questionnaires

Girl and staff answers to questions regarding the girls' knowledge of the observers' behavior indicated that girls did not know that they were being observed or that the observer was in any way connected with the self-recording program. The girls thought that all Nyandi girls and staff were observed. Three of the girls included work among the many behaviors they thought were recorded. Staff responses to the questionnaires indicated that they thought the girls recorded work behavior only, and that they were not aware of girls' cueing.

DISCUSSION

Self-recording with tokens was successful in increasing the work output of three of the four girls, extending the probable usefulness of this procedure to special-class groups in addition to children in regular classes (Glynn and Thomas, 1974). Since self-recording was introduced following the failure of a staff-directed token program, the results suggest that self-recording may be an adjunct intervention procedure for traditional token reinforcement programs.

In addition, the results showed that self-recording procedures were practical in a full educational program with four different staff in various vocational training settings, and that such a program may be directed by a therapist outside the class settings. The procedure did not require any direct participation by the institution staff, a valuable saving of time. This contrasts with the study of Broden *et al.* (1971), where a student counsellor managed a student's self-recording program, but later involved the teacher by training him to deliver contingent praise.

The experimental design controlled several variables not controlled in previous studies, thus allowing clearer analysis of the effects of self-recording. Tokens were delivered in baseline as well as during self-recording. Furthermore, an analysis of the average tokens earned each day showed that Yvonne and Patricia received approximately the same number of tokens in all conditions. Also, there were no changes in staff rates of praise when self-recording was first introduced to increase work. Rates of praise increased only in response to the girls' cueing, which was introduced several days after girls' work had improved. Finally, therapist attention was controlled for Yvonne and Patricia by their attending sessions with the therapist and discussing their work behavior during baseline. A variable of possible importance that was not controlled was the delay in evaluating a girl's behavior. During baseline, behavior was evaluated by staff members each 30 min, or immediately

when disruptive behavior occurred; during self-recording, self-evaluation of behavior occurred approximately each 3 min.

The results of self-recording of Michelle's behavior in the workshop differed between observed recordings of work and work units produced. Whereas work production was maintained at a high level throughout self-recording, observed work declined to the baseline level by the end of the study. Nonwork, or interruptions of work longer than 5 sec did not show a corresponding increase; rather, the intermediate category of Interrupted Work increased. Michelle apparently learned to maintain high work production while taking short interruptions (shorter than 5 sec) to look around, or stop working with her hands. These interruptions apparently were not noted by her in her own evaluation of work behavior, as she frequently overscored: she consistently awarded herself the maximum or more points than could have been earned during her time in the workshop.

The imposition of a 10-token response cost for cheating, or overscoring, appeared to be successful in preventing this behavior with Yvonne and Patricia, but had no effect on Rebecca's recording. After a single fine for overscoring, neither Yvonne nor Patricia overscored again. No response cost was imposed for Michelle's overscoring because her production rates remained high. As a result of overscoring, Michelle received 72% more tokens during self-recording than during baseline.

Although the importance of accurate self-recording for behavior control in classroom programs has not yet been clearly established, several studies have attempted to teach accuracy of recording. Without contingencies for accurate recording, subjects may record high evaluations of their behavior in order to receive backup reinforcers, but continue to display inappropriate behavior (Santogrossi *et al.*, 1973). Similar to the present study, a response cost for inaccurate recording was employed by Bolstad and Johnson (1972). In addition to a response-cost for inaccurate recording, Drabman *et al.* (1973) reinforced

accuracy. Positive procedures such as those used by Drabman *et al.* (1973) may be more effective than response cost alone, particularly with uncooperative subjects like Rebecca.

The results of girls' cueing to evoke staff praise were unfortunately affected by the failure to establish reliability of observation. Both cues and praise occurred infrequently in baseline and intervention, averaging fewer than two instances per 20 min of observation. The low frequency of cueing was partly a function of the nature of the behavior. Too-frequent cueing may have been considered inappropriate, and therefore may have evoked negative attention from staff, rather than praise. In addition, the low recorded frequency of both cueing and praise was also partly due to the observer's rarely recording at the times these behaviors were most likely to occur, *i.e.*, at the end of the session, or just before breaks for lunch or morning or afternoon tea.

The results obtained did however, show that self-recording of cues increased cueing in all three girls, in most settings. Cueing was introduced after self-recording of work, which controlled for the fact that staff praise may sometimes increase spontaneously in response to improved work (Sherman and Cormier, 1974). In the present case, praise remained low during self-recording of work only, so that subsequent increases could be considered to have resulted directly from cueing. The possibility that staff praise will not automatically increase following improvements in adolescents' behavior emphasizes the importance of developing procedures such as those of Graubard *et al.* (1971), which are designed to evoke such praise. The importance of staff praise in the maintenance of work behavior modified by self-recording has been indicated by Broden *et al.* (1971). It is possible that evoked praise functioned to maintain behavior change in the present study, but the possi-

bility of such a controlling function was not analyzed.

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Received 6 September 1974.

(Final acceptance 22 May 1975.)