

*THE EFFECT OF SELF-RECORDING
ON THE CLASSROOM BEHAVIOR
OF TWO EIGHTH-GRADE STUDENTS¹*

MARCIA BRODEN, R. VANCE HALL, AND BRENDA MITTS

UNIVERSITY OF KANSAS

The effects of self-recording on classroom behavior of two junior high school students was investigated. In the first experiment, study behavior of an eighth-grade girl in history class was recorded. Following baseline observations her counselor provided slips for the girl to record whether or not she studied in class. This resulted in an increase in study. When slips were withdrawn, study decreased and then increased once self-recording was reinstated. After teacher praise for study was increased, self-recording was discontinued without significant losses in study behavior. In the final phase, increased praise was also withdrawn and study remained at a high level. In the second experiment, the number of talk outs emitted by an eighth-grade boy were recorded during math period. Following baseline, slips for recording talk outs were issued for the first half of the period, for the second half, and then for the entire period. Talk outs decreased when self-recording was in effect and increased again when self-recording was discontinued. When self-recording was reinstated in the final phase there was a slight, though not significant decrease in talking out when compared to the baseline condition.

Helping a student acquire appropriate study behaviors has probably been a problem since schools began. Various techniques, including counseling, special classes, and use of the leather strap have been tried. Very often these approaches have been ineffective and parents, teachers, and students have resigned themselves to a year of problems and frustration.

Since the 1960s, a concerted effort has been exerted to apply systematically behavior modification principles in the public school classroom. A number of studies have shown that giving attention for a behavior immediately after it occurred caused this behavior to increase in strength, while consistently ignoring a behavior frequently resulted in a decrease in strength. Hall and Broden (1968), Hall, Lund, and Jackson (1968), and Thomas,

Becker, and Armstrong (1968) successfully used this technique to affect study behavior in the classroom by having teachers attend only to study or non-disruptive behaviors while ignoring non-study or disruptive ones. Hall, Fox, Willard, Goldsmith, Emerson, Owen, Davis, and Porcia (1970) used teacher attention, feedback, praise, and other available reinforcers to control disputing and talking-out behaviors in various classrooms.

The use of behavior modification principles was expanded to include varied techniques by other experimenters. Madsen, Becker, and Thomas (1968) assessed the effect of rules as well as ignoring and praising behaviors. Peer control of arithmetic and spelling scores was demonstrated in a study by Evans and Oswalt (1968). Barrish, Saunders, and Wolf (1968) used a loss of classroom privileges to reduce out-of-seat and talking-out behaviors in a fourth grade class. Hall, Panyan, Rabon, and Broden (1968) showed that teacher attention, a study game, and loss of time for a between-period break were effective in increasing an entire classes' study behavior.

McKenzie, Clark, Wolf, Kothera, and Benson (1968) used a token system backed by privileges and allowances to increase academic performance in a special education classroom. Broden, Hall, Dunlap, and Clark (1970) increased study behavior in a junior

¹The authors wish to express appreciation to observer Betty Smith and to Kenneth Tewell, Robert Clark, Larry Odom, and Leo Richter of the Bonner Springs, Kansas Public Schools for their complete cooperation in making this study possible. This study is part of the research conducted at the Juniper Gardens Children's Project and is partially supported by the National Institute of Child Health and Human Development (HD-03144-03) Bureau of Child Research and Department of Human Development and Family Life, University of Kansas. Reprints may be obtained from R. Vance Hall, Juniper Gardens Children's Project, 2021 North Third Street, Kansas City, Kansas 66101.

high special education class using a point system in which points were redeemable for privileges available in the class and school. They demonstrated that while praise was effective in modifying behaviors, praise coupled with points issued contingently for acceptable behaviors seemed more effective at the junior high level.

Each of the methods listed, while successful, involved a relatively systematic effort on the part of the teacher to initiate the behavior change or to monitor and reinforce the desired behaviors. None of these studies dealt with the problem of what to do with a student in a room where the teacher does not want to or "cannot" work with a specific student. Such situations are often found in secondary level classrooms where teacher lectures are a primary form of instruction.

The method used in the present study was self-recording. It was initially an effort to assess whether a subject's recording of his own behavior would help increase or decrease its occurrence, and whether someone not in the classroom could modify classroom behavior. It was also an attempt to assess a procedure whereby self-recording could be withdrawn with no significant decrease in study once higher study rates had been established.

EXPERIMENT I

Subject and Setting

Liza was an eighth-grade girl enrolled in a history class at Bonner Springs Junior High, Bonner Springs, Kansas. She was doing poorly in history (her grade was a D-) and had told the counselor she was interested in doing better in school. The counselor set up weekly counseling sessions with Liza but found that according to the teacher and to Liza, just talking over a problem had not carried over into the class setting.

Liza's history class met daily immediately after lunch for 40 min. The teacher, a young man, stood near the front of the room throughout most of the period. Liza sat toward the back of the room. Classes were primarily lecture sessions in which the teacher talked as he stood in the front of the class. There was some class discussion when the teacher interspersed questions within the lecture.

The counselor and the experimenter had

approached the teacher about giving increased attention to Liza for study. The teacher expressed a willingness to cooperate but felt that due to the lecture format of the class and the amount of material he had to cover each day he could not consistently attend to Liza for studying. For this reason it was decided to use self-recording with the counselor as the agent for initiating and carrying out the experimental procedures.

Observation

An observer entered the classroom during a 5-min break before the class and took a seat at the back of the room. She observed for 30 min of the 40-min session, beginning when the bell rang to signify the start of class. She left during a break at the end of the class session. Pupil behaviors were recorded at the end of each 10 sec of observation. Teacher attention to Liza was recorded whenever it occurred. Liza was not told that she was being observed.

Pupil behaviors were dichotomized into study and non-study behaviors. "Study" was defined as attending to a teacher-assigned task and meant that when it was appropriate, Liza should be facing the teacher, writing down lecture notes, facing a child who was responding to a teacher question, or reciting when called upon by the teacher. "Non-study" behaviors meant that Liza was out of her seat without permission, talking out without being recognized by the teacher, facing the window, fingering non-academic objects such as her makeup, comb, purse, or working on an assignment for another class.

Data were recorded on sheets composed of double rows of squares with each square representing the passage of 10 sec of time. (See Hall, *et al.*, 1968). The top row was used to record teacher attention which was recorded whenever the teacher called on or spoke to Liza. The bottom row was used to record Liza's study or non-study behaviors.

Reliability checks were made at least once during each phase of the study. During these checks, another observer made simultaneous and independent observations. After the observation the sheets were compared and scored interval by interval for the number of intervals of agreement. The total number of intervals of agreement were divided by the total number of intervals observed and this figure was multiplied by 100 to obtain a per-

centage figure. Agreement of the records for this study ranged from 87 to 96% for study behavior and 100% for teacher attention.

METHOD

Baseline

Baseline data were recorded for seven days before experimental procedures began. The counselor saw the subject twice during this time for a weekly conference (a procedure followed before recording data and continued throughout the study).

Self-Recording₁

On the eighth day of observation, the counselor met the subject in conference and gave her a slip containing three rows of 10 squares (See Fig. 1) and directed her to record her study behavior "when she thought of it" during her history class sessions. Some aspects of study behavior were discussed at this time, including a definition of what constituted studying.

Liza was instructed to take the slip to class each day and to record a "+" in the square if she was studying or had been doing so for the last few minutes, and a "-" if she was not

studying at the time she thought to record. Sometime before the end of the school day she was to turn it in to the counselor. The slips were available each day from the counselor and could be obtained during breaks between classes. At the weekly pupil-counselor conference, the self-recording slips were discussed and the counselor praised Liza's reports of study behavior emphasizing the days when the per cent of plus marks was high.

Baseline₂

Slips were not issued for five days (Days 14 through 18). When, on the second day of Baseline₂, Liza requested one, the counselor stated that she was out of slips and would tell her when she got more.

Self-Recording₂

Slips were once again handed to the subject by the counselor at some time before history period and Liza was instructed to record her study and non-study behavior.

Self-Recording Plus Praise

The teacher was asked to attend to Liza "whenever he could" and to praise her for study whenever possible. Slips for self-recording continued to be available to Liza and counselor praise continued to be issued for plus marks on the self-recording slips during the weekly conference.

Praise Only

No slips were issued to Liza. Teacher attention continued at a higher rate than during Baseline.

Baseline₃

Increased teacher attention was withdrawn.

RESULTS

Baseline

Figure 2 presents a record of Liza's study behavior and of teacher verbal attention. During baseline conditions, Liza had a low rate of study (30%) despite two conferences with the counselor and promises to "really try". The mean rate of teacher attention was two times per session.

Self-Recording₁

During the Self-Recording₁ phase, when Liza began to record her classroom behavior,

DATE _____									
+	+	-	-	+	+	-	+	-	+
-	+	-							

At the top of the page are several rows of squares. At different times during the period (whenever you think of it but don't fill them all in at the same time) put down a "+" if you were studying, a "-" if you weren't. If for example, you were ready to mark a square you would ask yourself if, for the last few minutes you had been studying and then you would put down a "+" if you had been or a "-" if you hadn't been studying.

Fig. 1. Sample of self-recording sheet used by Liza.

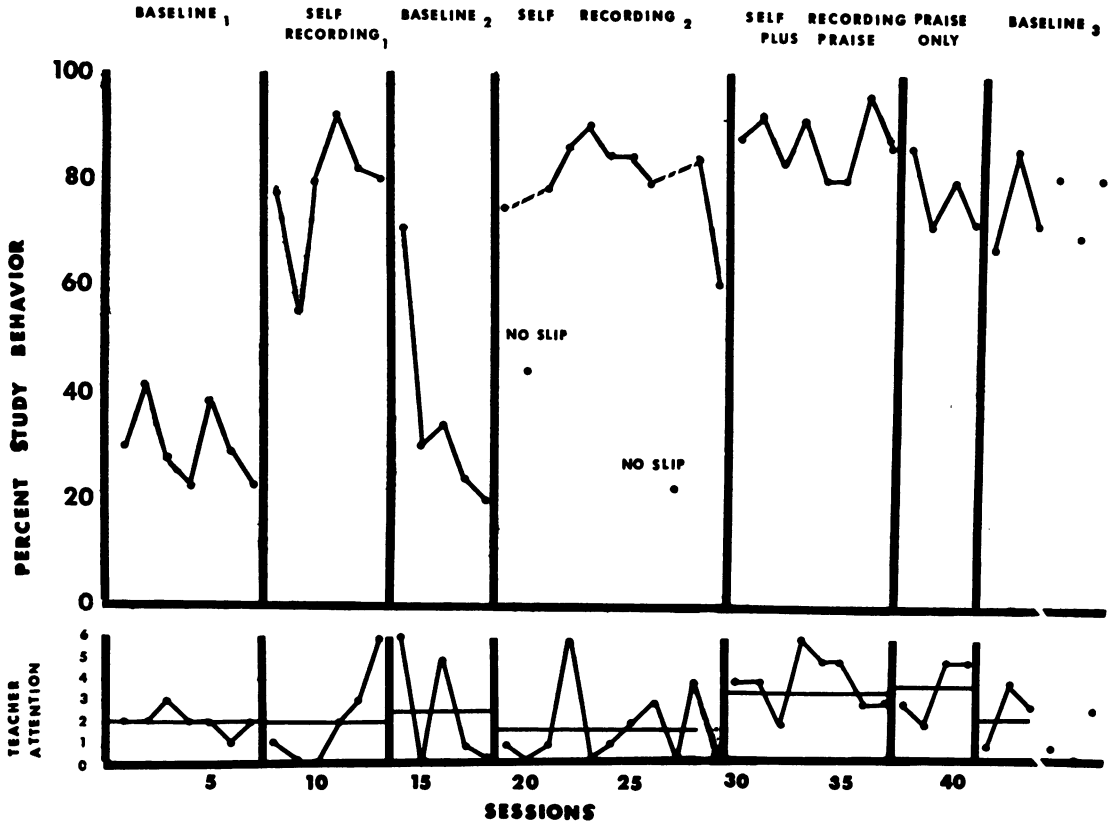


Fig. 2. A record of Liza's study behavior and/or teacher attention for study during: *Baseline₁*—before experimental procedures; *Self-Recording₁*—Liza recorded study or non-study on slips provided by counselor; *Baseline₂*—Self-recording slips withdrawn; *Self-Recording₂*—Self-recording slips reinstated; *Self-Recording Plus Praise*—Self-recording slips continued and teacher praise for study increased; *Praise Only*—Increased teacher praise maintained and self-recording withdrawn. *Baseline₃*—Teacher praise decreased to baseline levels.

a significant change in study behavior was noted. It increased to 78% and remained at that approximate level for the next six days. Teacher attention remained at a mean level of two times per session.

Baseline₂

On the fourteenth day of observation, Liza was told by the counselor that no more recording slips were available. The first day under these conditions the rate of study was 70%. It then dropped to an average of 27% for the next four days. Teacher attention averaged 2.5 times per session.

Self-Recording₂

When recording slips were again issued to Liza her study rate increased to an average of 80%. However, when on two days no slips were issued (Days 20 and 27) the rate declined to 30% and 22% respectively. During

this phase, the teacher gave Liza attention approximately 1.7 times per class session.

Self-Recording Plus Praise

On Day 30, the teacher was again asked to praise Liza or give her increased attention when she studied. At this point the teacher agreed to do so because Liza was now engaging in a higher rate of study and he felt it would be easy and justifiable to do so. In this phase, teacher attention increased to 3.5 times per session. Liza continued to carry slips to class, sometimes filling them out and sometimes not. Under these conditions study increased to 88%.

Praise Only

On Day 38 the Praise Only phase was begun and slips discontinued. Teacher attention was observed to be at a mean rate of 3.7 times per session. Liza's study rate averaged 77%.

Table 1

A record of per cent of study recorded by the observer and by Liza during self-recording phases of Exp. I.

EXPERIMENTAL PHASE	OBSERVER	LIZA	
SELF-RECORDING ₁	78 %	80 %	
	54 %	70 %	
	79 %	--	
	92 %	63 %	
	82 %	79 %	
	80 %	90 %	
MEAN	78 %	76 %	
SELF-RECORDING ₂	75 %	60 %	
	PROBE "A"		
	78 %	100 %	
	87 %	80 %	
	90 %	FORGOT	
	84 %	FORGOT	
	84 %	FORGOT	
	79 %	75 %	
	PROBE "B"		
	83 %	90 %	
	59 %	FORGOT	
	MEAN	80 %	81 %
SELF-RECORDING ₃ PLUS PRAISE	89 %	FORGOT	
	93 %	FORGOT	
	83 %	FORGOT	
	92 %	FORGOT	
	81 %	66 %	
	81 %	100 %	
	96 %	FORGOT	
	88 %	100 %	
	MEAN	88 %	89 %

Baseline₃

The teacher was then asked to decrease the amount of attention to Liza. During this Baseline₃ phase, no marked decrease in study rate was evident, though there was some decline. The first three joined points of the Baseline₃ phase represent consecutive days following the Praise Only phase. The three separated points represent post check days with approximately one-week intervals between observations, which further indicates increased study was being maintained.

Subject's Record Vs. Observer's Record

Table I presents the levels of study recorded by Liza and the observer during the Self-Recording phases. During the Self-Recording₁ phase, Liza recorded study or non-study on the average of 12 times per session. There was very little correlation between Liza's and the observer's estimates of the per cent of study on a day-to-day basis. Variations between records ranged up to 29%. However, the means of the overall subject-observer records were similar. For example, the mean of Liza's estimate of her study behavior during Baseline was 76%. The observer's record revealed that Liza actually studied an average of 78% of the time.

During the Self-Recording₂ phase, the number of times Liza recorded decreased to 11 marks per class. On four days she did not record at all. Liza's mean estimate of her study was 81%, the observer's was 80%. Again, there was little correlation between Liza's record and the observer's record on a day-to-day basis.

The number of times Liza recorded during the Self-Recording Plus Praise condition declined markedly to 2.3 times per session and Liza recorded on only three of the nine days during this experimental phase. Liza's mean estimate of study was 89%, that of the observer was 88%.

There was, of course, no self-recording during the other phases of the experiment.

EXPERIMENT II

Subject and Setting

The second subject, Stu, was an eighth-grade boy enrolled in a fifth-period math class at the same school. He was referred by his

teacher, a man, who expressed a desire to find some means to "shut Stu up". He reportedly talked out in class continually, disturbing both the teacher and his classmates. The class was composed of 28 "low" achieving students. It met for 25 min and then students went to lunch, returning afterward for another 20 min of class.

Observation

Observation records of Stu's behavior were made on sheets identical to those used in the previous experiment. The category of "talking out" was added, however, to the observation code. A talk out was defined as any verbalization that occurred during class which had not been recognized by the teacher and was recorded if it occurred at any time within each 10-sec interval. Since some of Stu's talk

outs were not audible to the observer, both audible talk outs and instances when Stu's lips moved while facing another student and while another student was facing him were considered as talk outs. Study behavior and teacher attention to the subject were also recorded. Reliability of observation during each experimental phase was assessed in a manner similar to that used in the first study. Agreement of the records on the number of talk outs ranged from 84 to 100%.

METHOD

Baseline₁

For nine days before experimental procedures were initiated, data were recorded during the first half (Session A) of the period. On Days 1, 4, 5, 6, and 8 data were recorded during the second half of the period (Session B) as well.

Self-Recording, Session A

During the first experimental phase, the teacher handed a slip of paper to Stu at the beginning of class with the instructions to use it and that it would be collected during lunch. A facsimile of the slip is shown in Fig. 3. On it was printed a rectangular box about 2 by 5 in. (5 by 12.5 cm) and the statement "record a mark every time you talk out without permission". At the top of the slip was a place for the subject's name and the date. No further instructions were given.

Self-Recording, Session B

Slips were not issued during Session A but were given to Stu just before Session B. No contingencies were in effect during Session A.

Self-Recording (Sessions A and B)₁

Stu was given the slip at the beginning of class and told to record all period (both Session A and Session B). He was told the slip would be collected at the end of class.

Baseline₂

Self-recording slips were not issued for any part of the math period.

Self-Record (Sessions A and B)₂

Self-recording slips were issued and Stu was told to record talk outs for the entire period and that the slips would be collected at the end of class.

Fig. 3. Sample of self-recording sheet used by Stu.

RESULTS

Baseline₁

During the Baseline phase, Stu talked out on the average of 1.1 times per minute for the first half of the period and 1.6 times a minute during Session B. (See Fig. 4.)

Self-Recording, Session A

When the teacher began issuing slips to Stu for Session A, the frequency of his talk outs declined during Session A to 0.3 times a minute. The frequency of these talk outs during Session B, however, remained at 1.6 times a minute.

Self-Recording, Session B

After giving Stu the sheet seven days for Session A the teacher commented that "it is the second half of the period which has always been the problem", so contingencies were reversed. Slips were issued only during the second half of the period. The rate of verbalizing without permission during Session B declined to 0.5 times a minute. However, the rate of talking out during Session A, which was not under self-recording contingencies, increased to 1.2 times a minute.

Self-Recording (Sessions A and B)₁

When slips were issued for both A and B Sessions, the mean talk-out rate during A was 0.3 times per minute while that for B was 1.0 per minute, both well below baseline rates that were recorded.

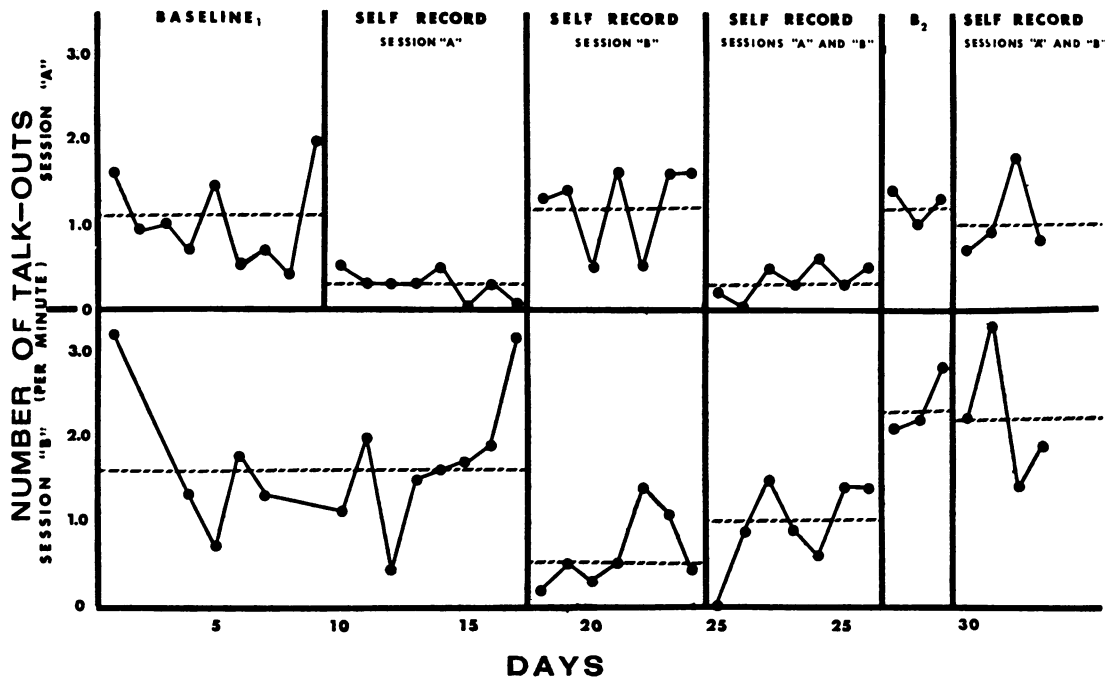


FIG. 4

Fig. 4. A record of Stu's talking-out behavior during Sessions A and B of fifth-period math class: *Baseline₁*—Before experimental procedures; *Self-Record, Session A*—Stu recorded his talk outs during Session A only; *Self-Record, Session B*—Stu recorded his talk outs during Session B only; *Self-Record, Sessions (A and B)₁*—Stu recorded his talk outs during both math class sessions; *Baseline₂*—Return to Baseline conditions, self-recording slips withdrawn; *Self-Record (A and B)₂*—Stu recorded his talk outs for both A and B Sessions.

Baseline₂

When slips were no longer furnished Stu during a second baseline phase, the rate of talk outs increased to a mean of 1.3 during Session A and 2.3 per minute during Session B.

Self-Recording (Sessions A and B)₂

When self-recording slips were again issued for the entire period, there was a slight but not significant decrease in the number of talk outs to a mean rate of 1.0 per minute in Session A and 2.2 per minute in Session B.

DISCUSSION

These studies indicated that it is possible to use self-recording procedures to modify behaviors of pupils in secondary-level public school classrooms. In Liza's case, self-recording was used to increase an appropriate behavior (study) while in Stu's case self-recording proved

effective in decreasing an inappropriate behavior (talking out).

In the experiment with Liza, someone outside the classroom, a counselor, was able to institute procedures that brought about an increase in study to a point that the teacher was able to maintain it with his attention and/or the other reinforcers already available in the classroom. Previous research had shown that systematic teacher attention can be used to increase study rates of elementary pupils (Hall, *et al.*, 1968; Hall, *et al.*, 1968). Broden and Hall (1968) demonstrated that teacher attention was also effective at the junior high school level. There were indications, however, that secondary level teachers were sometimes reluctant to carry out procedures that did not seem to fit their teaching style.

In Liza's case, initially the teacher did not feel that he could systematically increase his attention for study due to the lecture-discussion format he used. On the first day of *Baseline₂*, however, when the self-recording slips

had been withdrawn, Liza's study behavior had remained at a high level. An analysis of the data showed that she had received an uncharacteristically high rate of attention from the teacher on that day (five times). This indicated that it might eventually be possible to withdraw the slips and maintain high study rates and that the teacher might willingly increase his attention to Liza for study if her study rate was already at a high level. The drop in study rate on the second day and subsequent days of Baseline₂ indicated that Liza was still very much under the control of self-recording.

The effects of issuing self-recording slips was further confirmed in the Self-Recording₂ phase. When probes were inserted and she was given no slips on Days 20 and 27 there were accompanying drops in study rates on those days. It is of interest to note that study dropped on Day 27 despite the fact that by this second probe, Liza had begun "forgetting" to record her study and non-study behavior on some days. This would indicate the possibility that the slip itself had become a cue or discriminative stimulus (S^D) for study whether or not it was used for self-recording. Liza's record of her study behavior did not correlate with the observer's record. However, it is important to note that correlation between Liza's estimate and her actual behavior was not necessary to achieve or maintain high study rates.

When the slips were withdrawn in the Praise Only phase, study was maintained at an acceptable level. Even when increased praise was withdrawn in the Baseline₃ phase, study remained at acceptable levels. Although it would have been interesting to have continued the Baseline₃ phase for a longer period the experiment was terminated due to the close of the school term. Even so, the data indicated that once higher study levels were achieved and maintained for a period of time, slips and high rates of teacher attention could be withdrawn without significant reductions in study. There was some subjective evidence that Liza's increased study may have resulted in increased academic performance because her report card grade in history increased from D- to C.

Although the experiment with Stu was in many ways a replication of the first study there were several important differences. Liza

had expressed a desire, in fact had requested help, to improve her study behavior. Her counselor praised her when she reported high study rates on the self-recording slips. Later, her teacher began attending to her and praising her for study once higher rates were achieved.

Stu, on the other hand, had not expressed concern or asked for help in decreasing his talking-out behavior. The teacher rather than a counselor was the agent for dispensing the self-recording slips to Stu. Another difference was that no attempt was made to differentially reinforce Stu with praise or attention for the decreases in talking out that were observed. Previous research (Hall, Fox, Willard, Goldsmith, Emerson, Owen, Davis, and Porcia, 1970) indicates that doing so would have increased the effectiveness of the procedures used. In spite of these factors it seems that initially issuing slips and having Stu record on them did affect his talking-out behavior. As in Liza's case, this was true even though there was very little correlation between the number of talk outs recorded by Stu and the observer's record. This is illustrated by the fact that on Days 10, 11, and 12 the observer's record showed that Stu's talk outs were occurring at 0.4, 0.3, and 0.3 times per minute. On the same days however, Stu recorded 1.5, 0.5, and 0.8 talk outs per minute. That self-recording had little effect during the final phase of the experiment may have been due to the fact that no contingencies were ever applied to differential rates of talking out and the slips thus lost their effectiveness. Further research will be necessary to determine if this is the case. Furthermore, the records kept of his study behavior indicated that initially self-recording of talk outs may have affected his overall study rate. This effect was not conclusive or lasting, however. When self-recording was instituted for Session A, study increased from 30% to 55%. When self-recording was instituted for Session B, study increased from 24% to 42% while it decreased to 32% in Session A. When self-recording was instituted for the entire period, however, study decreased to 24%.

Perhaps the most promising feature of self-recording will be to use it as a procedure for initiating desirable levels of appropriate behavior to a point where the teacher can more easily reinforce the desired behavior with at-

tention, praise, grades, or other reinforcers available in the classroom.

REFERENCES

- Barrish, H., Saunders, M., and Wolf, M. M. Good behavior game: effects of individual contingencies for group consequences on disruptive behavior in a regular classroom. *Journal of Applied Behavior Analysis*, 1969, 2, 119-124.
- Brodén, M. and Hall, R. V. *Effects of teacher attention on the verbal behavior of two junior highschool pupils*. Paper presented at Council for Exceptional Children Convention, New York, 1968.
- Brodén, M., Hall, R. V., Dunlap, A., and Clark, R. Effects of teacher attention and a token reinforcement system in a junior highschool special education class. *Exceptional Children*, 1970, 36, 341-349.
- Evans, G. and Oswalt, G. Acceleration of academic progress through the manipulation of peer influence. *Behaviour Research and Therapy*, 1967, 5, 1-7.
- Hall, R. V. and Brodén, M. Behavior changes in brain-injured children through social reinforcement. *Journal of Experimental Child Psychology*, 1967, 5, 463-479.
- Hall, R. V., Fox, R., Willard, D., Goldsmith, L., Emerson, M., Owen, M., Davis, F., and Porcia, E. The teacher as observer and experimenter in the modification of disputing and talking out behaviors. *Journal of Applied Behavior Analysis*, 1971, 4, 141-149.
- Hall, R. V., Lund, D., and Jackson, D. Effects of teacher attention on study behavior. *Journal of Applied Behavior Analysis*, 1968, 1, 1-12.
- Hall, R. V., Panyan, M., Rabon, D., and Brodén, M. Teacher applied contingencies and appropriate classroom behavior. *Journal of Applied Behavior Analysis*, 1968, 1, 315-322.
- Madsen, C., Jr., Becker, W., and Thomas, D. Rules, praise, and ignoring: elements of elementary classroom control. *Journal of Applied Behavior Analysis*, 1968, 1, 139-150.
- McKenzie, H., Clark, M., Wolf, M., Kothers, R., and Benson, C. Behavior modification of children with learning disabilities using grades as tokens and allowances as backup reinforcers. *Exceptional Children*, 1968, 34, 745-753.
- Thomas, D., Becker, W., and Armstrong, M. Production and elimination of disruptive classroom behavior by systematically varying teacher's behavior. *Journal of Applied Behavior Analysis*, 1968, 1, 35-45.
- Zimmerman, E. and Zimmerman, J. The alteration of behavior in a special classroom situation. *Journal of the Experimental Analysis of Behavior*, 1962, 5, 59-60.

Received 29 April 1970.

(Revised 13 January 1971.)