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# The Effects of Self-Monitoring on the Disruptive Behavior of Students Identified as Severely Behavior Disordered

Claire Thompson VanVickle

*Eastern Illinois University*

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The Effects of Self-Monitoring on the Distructive Behavior  
of Students Identified as Severely Behavior Disordered  
(TITLE)

BY

Claire Thompson VanVickle

**THESIS**

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS  
FOR THE DEGREE OF

Master of Science in Education

IN THE GRADUATE SCHOOL, EASTERN ILLINOIS UNIVERSITY  
CHARLESTON, ILLINOIS

1984

YEAR

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## Abstract

The study investigated the effects of self-monitoring on the disruptive behaviors of four male senior high school students who were identified as having severe behavior disorders. Using a multiple baseline across subjects design, the students were randomly assigned to 30, 25, 20, and 15 days, respectively, of intervention conditions. The independent variable consisted of self-monitoring of ten appropriate behaviors that had been cooperatively identified by the students and teacher; each student was required to classify his behavior as appropriate or inappropriate at five intervals during their mathematics class. The dependent variables, measured daily, were the mean frequency of occurrence of appropriate behaviors and the percentage scores on mathematics assignments. Inter-rater reliability checks indicated high reliabilities for both dependent variables. The agreement for each subject was 98%, 96%, 97%, and 93%, respectively. The results showed an increase in the mean number of appropriate behaviors during intervention conditions and a slight decrease during the maintenance phase. The mathematics scores, while variable during intervention, showed a high net increase between baseline and maintenance phase. The author concluded that, for high school students identified as having behavior problems, self-monitoring may have a positive effect on both disruptive behavior and academic achievement.

## Dedication

I dedicate this thesis to my parents, Marilyn and Glen Thompson.

To my mother, for giving me courage and faith to stand up for myself against others, thank-you. Your warmth and understanding has and will always be my strength.

To my father, when I thought you were pushing me, I realize now you were really guiding me; when I thought you did not like me, I now know you were letting me learn for myself; whenever I was in doubt of my ability, you had enough faith in me to know I could do it. Thank-you, Dad, for being there for me.

Mother and Dad, this one is for you.

## Acknowledgements

The love, encouragement and friendship of a number of people over the past years have made this thesis and my education possible. I am most grateful to my husband, Randy, for giving me his full support and encouragement in this endeavor but most of all for his love; my dear friend, Valerie, who believed in my ability to succeed and helped me prove this to myself by using her knowledge of writing to get me through this thesis; to my fellow teacher and friend, Sarah, who was always there to listen when I needed to talk; to Andy Brulle whose knowledge of research guided my pen in writing; to my thesis committee, Steve Jenkins and Jim Martin for their individual expertise in research made this thesis a culmination of the best; to Erma Williams for her time and talent to fill in on the spur of the moment. I thank each of these people for helping me broaden my ideals and beliefs in education. Education is not only found in books but in the minds and hands of family and friends.

Very special thanks goes to Andy Houpt, my aide, for his help in executing an important part of this study. I, also, am grateful to my students, the faculty, and administrators at Danville High School, Danville, Illinois where the study took place.

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Self-monitoring or self-recording has been most prevalent in the literature in the past decade. Self-monitoring refers to an individual noticing and recording the occurrences of his or her own target behaviors. This popularity is congruent with other trends in contemporary behavior therapy. One primary source of data is observations by trained, independent observers. In some instances the use of trained observers is impractical because of unavailability, cost, or inconvenience. An alternative to data collection by observers is data collection by the subject. Self-monitoring is a two-fold operation: the subject must first determine the target behavior then record the occurrence of that behavior by some determined procedure (Nelson, 1977).

Nelson (1977) also stated that self-monitoring can be useful for both assessment and therapeutic purposes. With reference to assessment, self-recording could be used to collect data. O'Leary and Dubey (1979) discussed self-monitoring as an assessment instrument when they were questioned about which procedures can children use to control effectively their own behavior. As an assessment tool, Sagotsky and Patterson (1978) revealed that self-monitoring provides feedback allowing comparisons of one's actual behavior with one's goals. As a therapeutic function self-recording could cause reactive changes in the target behavior (Nelson, 1977). Litrownik and Freitas (1980)

observed that the therapeutic effect of self-monitoring may be determined "by an individual's causal attribution for success and/or failure as well as his/her knowledge of how to effectively adapt to failure" (p. 254). In their research on self control, Sagotsky and Patterson (1978) learned that the simple procedure of monitoring can produce increases in the target behavior thus lending credence to the claim that self-monitoring is a therapeutic device.

### Review of the Literature

The present literature review concentrates on the reactivity of self-monitoring, its accuracy and how it effects self-monitoring, the various types of recording procedures, subject characteristics, and self-monitoring alone verses self-monitoring with reinforcement. Nelson (1977) felt that the main goal of research was to find the controlling variables. The research reviewed attempts to address the various influences made upon the subject by these variables.

### Reactivity of Self-Monitoring

Hayes and Cavior (1977) defined reactivity as the process wherein "the behavior being monitored changes as a function of the initiation of a self-monitoring program" (p. 819).. Nelson (1977) felt that reactivity is a crucial issue. She also described maximum reactivity as having two elements. First, the subject must be motivated to change the behavior. Secondly, the subject should be given performance goals with

feedback plus reinforcement for when these goals are met.

Gottman and Fall's (1972) study utilized self-monitoring as a reactive data gathering procedure when monitoring the oral class participation or nonparticipation of seventeen inner city high school sophomores. Results indicated an increase in the behavior being monitored. A subsequent 1975 study by Lipinski, Black, and Nelson noticed that self-recording had a reactive effect on face touching. Another study on face touching (Lipinski & Nelson, 1974) observed self-recording to be reactive in that it decreased the target behavior. In single case studies of retarded adolescents on cessation of nose and mouth picking, it was discovered that self-monitoring produced reactive decreases in the target behavior (Zegiob, Klukas, & Junginger, 1978).

Nelson, Lipinski, and Black (1976) researched the reactivity of self-monitoring compared with token reinforcement using one of three target behaviors; talking, face touching and object touching. The results indicated that self-recording was more effective in increasing the frequency of the three desirable target behaviors than was the token economy. This study indicated that the self-recording of a desirable behavior thus would result in positive self-evaluation and a consequent increase in the frequency of the desired behavior.

A similar study was conducted on the preparation for the Graduate Record Exam using twenty-seven college students,

who were randomly assigned to four conditions: continuous self-monitoring, intermittent self-monitoring, performance feedback, and control (Mahoney, Moore, Wade, & Moura, 1973). An analysis of the amount of time spent reviewing showed that self-monitoring subjects remained for significantly longer review sessions and that this effect was more pronounced under the continuous rather than the intermittent schedule. They' learned that self-recording was response specific or in other words accuracy on the quantitative problems was improved by self-monitoring.

In their research using a combination of face touching, nonfluencies and value judgements as the target behaviors, Hayes and Cavior (1977) arrived at three conclusions. First, recording more than one target behavior at a time reduces the reactive effect of self-monitoring; secondly, nonverbal behaviors are more reactive than verbal behaviors; and finally, motivation and accuracy did not influence reactivity. Multiple tracking was found to be a new variable which influences reactivity. "In this study multiple tracking resulted in a definite decrease in the reactive effects of self-monitoring" (p.827).

Kazdin (1974) conducted a study on self-monitoring the usage of pronouns. One study examined the effect of providing a performance standard on self-monitoring and compared the reactivity of self-monitoring and being observed by someone

else. He found that monitoring one's own behavior or being monitored by someone else were equally reactive. Nelson, Lipinski, and Black (1976) found the contrary. It seemed that external monitoring reduced face touching but self-monitoring was more reactive and produced more consistent reactivity across subjects. Nelson et al. (1976) conducted another study which showed that self-monitoring was more reliable when the subjects knew they were also being externally monitored.

An important variable in achieving the reactive effects of self-recording is the motivation of the subjects to change the target behavior (Lipinski, Black, & Nelson, 1975). Further more, Lipinski et al., (1975) stated that "monetary reinforcement contingent on decreases in the target behavior further enhances reactivity" (p. 645). In their study on eyeblinking, Sieck and McFall (1977) concluded that the subject must want to change the target behavior by perceiving the value of that behavior. Nelson et al. (1976) also felt that reactive effects could occur if the subject was more aware of the target behavior. In conclusion, a point made by Epstein, Miller, and Webster (1976) and Zegiob, Klukas, and Junginger (1978) was that accuracy does not affect reactivity. Epstein et al. (1976) used single case designs with retarded adolescents. The subjects accuracy in self-recording was quite low. Zegiob's et al. (1978) study was

conducted with 12 subjects and found that self-monitoring errors occurred more frequently in the group than when done alone by each subject. Both studies found that the reactive effect of self-monitoring did not significantly change because of the accuracy.

### Accuracy

Nelson (1977) stated that there are three ways to determine the accuracy of self-recording: (a) to compare the simultaneous recordings made by self-recorders and other observers, (b) to compare the simultaneous recordings made by self-recorders and by mechanical recording devices, and (c) to compare self-recordings with a by-product believed to be related to the self-recorded target behavior. She added that there are several variables affecting accuracy. Out of these variables, the one stressed the most was the awareness of accuracy assessment or that the self-observer needs to know that the accuracy is being monitored.

"The feedback from self-recording may also help children improve the accuracy of their work when they are motivated through a reinforcement program" (Wall, 1982, p. 29). He found that the children who recorded as well as reinforced their work received higher accuracy and answered more items. Fixsen, Phillips, and Wolf (1972) did a study at Achievement Place, a community based, family style, behavior modification program for delinquents based on a token (point) economy.

Two experiments were applied to measure the reliability of the boys reporting their own behavior and the behavior of their peers. The target behavior was cleaning their rooms and the instrument used for self-recording was a checklist. It was noted that if points were used as reinforcement the accuracy of recording would be improved.

Another study using clean-up as the target behavior (Layne, Rickard, Jones, & Lyman, 1976), found that reinforcement of both clean-up and accurate self-monitoring simultaneously on a continuous schedule increased both behaviors and that a variable schedule of reinforcement sustained high levels of both clean-up and accurate self-monitoring. Lipinski, Black, and Nelson (1975) learned that by reinforcing for increasing their subjects' reliability increased the accuracy without concomitantly reducing face touching. They also discovered that monetary reinforcement can enhance the accuracy of self-monitoring. Epstein, Webster, and Miller (1975), whose research dealt with recording respiration, provided that any incentive for accurate self-monitoring influences accuracy and the behavior being monitored.

Another variable in accuracy of self-monitoring is that clear definitions of the target behaviors should be provided (Wall, 1982). Nelson, Lipinski, and Boykin (1978) concurred with Wall that training for self-recording could help and improved the accuracy. In the developing of



self-monitoring skills Meyers, Mercatoris, and Artz (1976) added that training in self-observation appears essential. They continued by stating that modeling and rehearsal training exercises appear to help individuals in the observation and reporting of self-instructional behavior.

Spates and Kanfer (1977) hypothesized that training in self-monitoring alone would not produce significant effects. This was supported by their study with first grade children who were not allowed to know their assessment of addition problem accuracy, nor could they compare their procedures to the proper arithmetic operations. Mahoney et al. (1973) concluded by saying that those who recorded their own frequencies of accurate responding maintained their efforts of review longer than those who did not self-monitor. However, Nelson and McReynolds (1971) stated "it should be recognized that in many cases, data from which reliability (accuracy) estimates may be derived cannot be collected" (p.594).

To summarize, the importance of accuracy in self-monitoring is questioned in the literature. Kaufman and O'Leary (1972) reported low levels of disruptive behavior despite a poor relationship between pupils' evaluations and teachers' ratings. Additional research is needed to determine the role of accurate self-evaluation.

#### Recording Procedures

Nelson, Lipinski, and Boykin (1978) concluded that the

type of device used to record may influence both accuracy and reactivity. In Nelson's (1977) study four different recording procedures and devices were discussed. When the target behavior is distinct or detached from others, she recommended using frequency counts, i.e. keeping track of how many times the target behavior had occurred. Nelson, Lipinski, and Black (1975) used this method by having the subjects record the occurrence of the target behavior on paper. However, Litrownik, Freitas, and Franzini (1978) had their subjects put a ring on a peg for correct target behavior.

Duration measures can be used for varying time intervals (Nelson, 1977). A duration measure was used by Broden, Hall, and Mitts (1971) on study behavior. In a period of 30 minutes data were collected every 10 seconds. Lipinski and Nelson (1974) used 6 intervals of 8 minutes duration in their work with behavior modification of ten college students.

Time sampling is also a recording procedure which is used for non-distinct behaviors whose occurrences vary in length and when the target behavior occurs frequently or continuously (Nelson, 1977). In 1976, Nelson, Lipinski, and Black used 18 5-minute intervals per class period on face touching. Zegiob, Klukas, and Junginger (1978) did a study on nose and mouth picking with retarded subjects using 5-minute time sampling intervals. In another study, (Sieck

& McFall, 1977) had subjects self-record eyeblinking for each of 10 consecutive 30 second intervals.

Finally, Nelson (1977) discussed mechanical devices or automatic recording devices, such as a wrist counter which was used by Maletzky (1974). Maletzky's study used the wrist counter to count unwanted responses in five cases of maladaptive behavior. Each patient totaled his own responses and charted the total daily. Long lasting remission of symptoms was produced by using the wrist counter.

Epstein, Webster, and Miller (1975) used a response key which was pressed by subjects for the measure of respiratory. This study showed that by using the response key or any environmental contingency may produce unreliable data which could be misleading.

In summary one requirement for a self-recording procedure is that it fits the target behavior being self-monitored (Nelson, 1977) and that these procedures fit the needs of the subjects.

### Subjects

Many different subjects have been used in studies on self-monitoring from first graders (Spates & Kanfer, 1977) to college students (Mahoney et al., 1973). Single subject studies have also been tried using an eighth grade girl and eighth grade boy (Brodén, Hall, & Mitts, 1971) where it was found that by self-monitoring the target behavior improved and

when the monitoring was discontinued the target behavior regressed. Subjects who are identified as mentally retarded have been used in some studies (Lirtownik & Frietas, 1980; Litrownik, Freitas, & Franzini, 1978). These studies found that self-monitoring facilitated independent functioning in the subjects. Also, both studies stated that students who are retarded should be given more responsibility in recording their own behavior.

Layne, Rickard, Jones, and Lyman (1976) used behaviorally disturbed boys to show that self-monitoring alone was not enough but that reinforcement of the recording was needed. A young boy with Gilles de la Tourette's syndrome was researched using self-monitoring to control the symptoms (Hutzell, Platzek, & Logue, 1974). The study supported the hypothesis that "self-monitoring is a useful therapy for the control of various abnormal behaviors emitted by persons with this symptom" (p. 71). Self-monitoring appears to work for all of these researchers, no matter who the subject is.

Self-Monitoring Alone vs. Self-Monitoring with Reinforcement

It has been stated that self-monitoring alone is not effective on the target behavior (Lipinski et al., 1975; Epstein et al., 1975; Layne et al., 1976). Wall (1982) concurred that this may apply to academic performance, but felt that monitoring helps if self-reinforcement is added. Sagotsky, Patterson, and Lepper (1978) felt that because

self-monitoring makes a child more conscious of a behavior, he is more likely to change that behavior.

In summary, Epstein et al. (1975) found that the rate of the monitored response remained stable during reinforced self-monitoring while they decreased during self-monitoring alone. The literature reviewed does not separate reinforcement from self-monitoring alone when the act of self-recording could in itself be reinforcement (Sagotsky et al., 1978).

### Conclusion

Many ideas and hypothesis have come out of self-monitoring research. Mahoney et al. (1973) felt that continuous self-monitoring was superior to intermittent self-monitoring and that self-monitoring can have a dramatic effect on certain behaviors. Sieck and McFall (1977) believed that multiple reports of monitoring are more reactive than a single report of monitoring.

External monitoring is used in the literature for the sake of comparison to the self-monitor to judge accuracy (Nelson, 1977) and to improve a target behavior (Fixsen, Phillips, & Wolf, 1972). Schunk (1983) asserted that regardless of whether self-monitoring or external monitoring is used, the results would show "higher percepts of efficacy, skill, and persistence" (p. 92) in contrast with no monitoring. Rosenbaum and Drabman (1979) felt that "establishing effective self rather than externally controlled behavior modification

programs in schools would enable children to control their own academic and social behavior" (p.467).

In the last few years, self-monitoring has been widely used to collect data in clinical and research situations. With the current emphasis on self-control and behavior modification programs self-monitoring needs to be researched in the classroom for possible application in the public schools. The purpose of this research is to apply self-monitoring techniques in the classroom to find its affect on behavior, academic achievement and to observe if generalization occurs.

### Method

#### Subjects

Four students, chosen on the basis of good attendance, from a senior high school class of 11 male students. The selection of the subjects was done by an independent observer. All subjects were in a self-contained classroom for students identified as severely behaviorally disordered, which was defined as students who were on court probation and had records of truancy. Subject one (S1) was aged 18 with an I.Q. of 92 and subject two (S2) was aged 16 with an I.Q. of 88. Each of the first two subjects were tested as being hyperactive. Subject three (S3) was aged 15 with an I.Q. of 82 and subject four (S4) was aged 17 with an I.Q. of 84.

## Experimental Variables

Independent variables. The first independent variable was the act of self-monitoring demonstrated by each subjects recording of this behaviors at specified ten-minute intervals during the math class each day. No prompts of any kind were given by the teacher.

The second independent variable was the graphing of percentage correct scores of each of the subjects daily tasks. The grading of the work was done by the teacher and subject cooperatively and the data points entered on an individual graph.

Dependent variables. One dependent variable was the appropriate or inappropriate behavior exhibited by each subject, when present at specified times during the math period, i.e., 9:00, 9:10, 9:20, 9:30, and 9:40. No teacher prompts were given as to when to record.

The other dependent variable was the daily percent correct score obtained by each subject. These scores were entered as data points on individual graphs, covertly during baseline and maintenance phases, and overtly during intervention phase.

## Procedure

Behavior. At the beginning of the school year the entire class defined appropriate behavior as actions or sounds acceptable by their peers and teachers in a regular classroom.

As a class these same students collectively chose ten appropriate behaviors that they felt needed the most improvement.

The appropriate behaviors were:

1. keeping hands off others
2. being aware of good language at all times
3. actively participating in class discussion
4. staying on task during written assignments
5. staying in seat through-out lesson
6. keeping verbal behavior at conversation level
7. being attentive and sitting upright during lesson time
8. making polite requests of teacher
9. remaining passive while being teased
10. communicating with positive and productive attentions

These appropriate behaviors were then posted on a chart in the classroom. Also, verbal praise was used in this study so that the classroom atmosphere was kept as close to normal as possible.

Design. The design of the study was multiple baseline across subjects.

Baseline. The four subjects were randomly assigned to eight, 13, 18, and 23 days of baseline, respectively. Baseline data were collected by the calssroom teacher, who was the researcher, by simply noting appropriate or inappropriate



behavior on paper at specific ten minute intervals during a math class of 50 minutes. The subjects were unaware of the data collection. During this time period they were required to complete self-instructional tasks of numerical calculations. The tasks were individually designed according to each subjects's achievement level. The percentage correct score by each subject was recorded at the end of the period and the scored paper was returned to the subject the following class day.

Intervention. The intervention procedure was the self-monitoring, by each subject, of this appropriate and inappropriate behaviors as defined previously. Each subject was given a chart on which to record these data. A sample chart appears in Figure 1. The teacher and the subject began grading the math assignments together and the percentage correct was entered as a data point on a graph. All other procedures were identical to those followed during baseline.

The length of the intervention phase was 30, 25, 20, and 15 days, respectively, for the four subjects. The day S4 began intervention phase, the subjects asked and were told that the teacher was doing an accuracy check on behavior. Intervention phase ended at the same time for all subjects.

Maintenance. For all subjects the maintenance phase began at the same time and lasted eight days. Formal self-monitoring procedures were withdrawn and graphing was

Figure 1. A sample chart on which each subject recorded with a checkmark in the corresponding box which behavior was being exhibited at each of the ten minute intervals.

**Figure 1****NAME** \_\_\_\_\_**DATE** \_\_\_\_\_**DAY NUMBER** \_\_\_\_\_

<b>TIME</b>	<b>APPROPRIATE BEHAVIOR</b>	<b>INAPPROPRIATE BEHAVIOR</b>
<b>8:20</b>		
<b>8:30</b>		
<b>8:40</b>		
<b>8:50</b>		
<b>9:00</b>		

discontinued as a cooperative activity with the subjects. All procedures described under baseline were maintained without the subjects' knowledge.

### Observational Procedures

For the entire duration of the study the teacher covertly recorded the inappropriate and appropriate behaviors at the same times as the subjects. Only during the last fifteen days of intervention were the subjects aware that this act was occurring. In order to check whether or not the behaviors exhibited every ten minutes were reflective of the actual behavioral situation in the classroom, the teachers aide acted as an independent observer. He wore head phones to prevent subjects from hearing a bell sound which was recorded on tape. The bell sounds were prerecorded at variable intervals to signal when to record for momentary time sampling. At each sound of the bell, the aide recorded the appropriate or inappropriate behavior exhibited by all four subjects. These data were collected daily on charts; a sample chart can be seen in Figure 2. These procedures were followed through the completion of the intervention phase but was not used in the maintenance phase because the aide was no longer available.

Interobserver reliability. Both teacher and subjects kept independent records of appropriate and inappropriate behaviors at the specified times. When these data were compared the percentage agreement was as follows: for S1, agreement was

Figure 2. A sample chart on which the aide recorded with a checkmark in the corresponding box which behavior was being exhibited at each of the variable intervals.



98%; for S2, agreement was 96%; for S3, agreement was 97%; and for S4, agreement was 93%. These percentages were calculated by dividing the total number of appropriate behaviors recorded by the student by the total number of appropriate behaviors recorded by the teacher. All of the discrepancies occurred when the subject gave himself a check for appropriate behavior while the teacher judged his behavior as inappropriate.

### Results

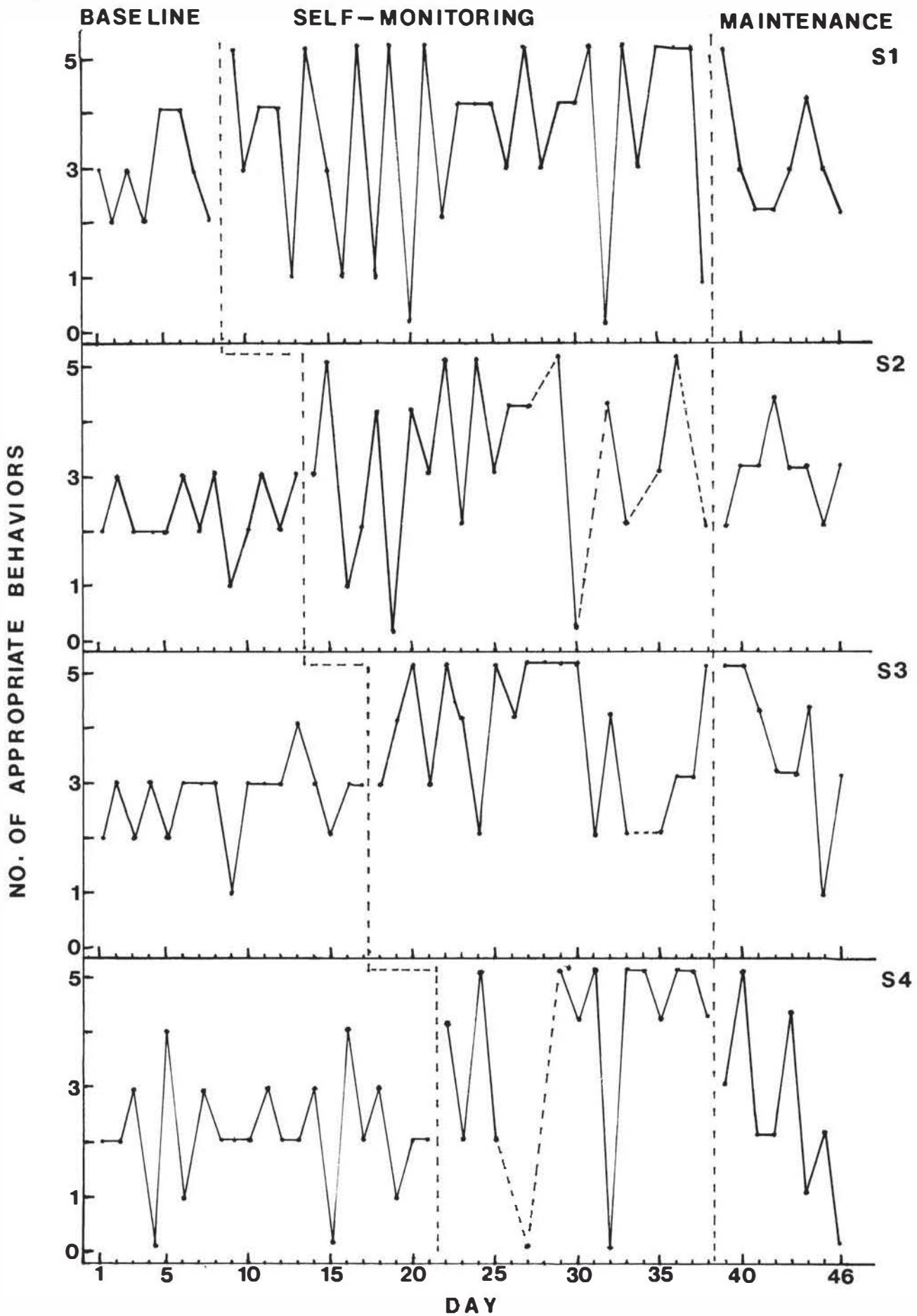
Behavior. Table 1 indicates the behavior of the subjects as they recorded them. Subject one exhibited a mean of 2.8 positive behaviors in baseline as compared with a mean of 3.6 positive behaviors in the self-monitoring phase, an increase of .8 positive behaviors. Subject two displayed a mean of 3.3 positive behaviors in the self-monitoring phase which was an expansion of 1.0 positive behaviors from baseline. Subject three obtained a mean of 2.7 positive behaviors in the baseline phase and increased by 1.3 positive behaviors during self-monitoring to a mean of 4.0 positive behaviors. Subject four arrived at a mean of 3.9 positive behaviors during self-monitoring, an increase of 1.9 positive behaviors from baseline. There is an observable difference in the range of behaviors once all subjects begin self-monitoring. The degree of fluctuation between the behaviors is greater.

Each subject's mean dropped in the maintenance phase from

Table 1. The number of appropriate behaviors recorded daily through all phases. The dependent variable was the number of appropriate behaviors exhibited by the subjects in the various phases.



**Table 1**

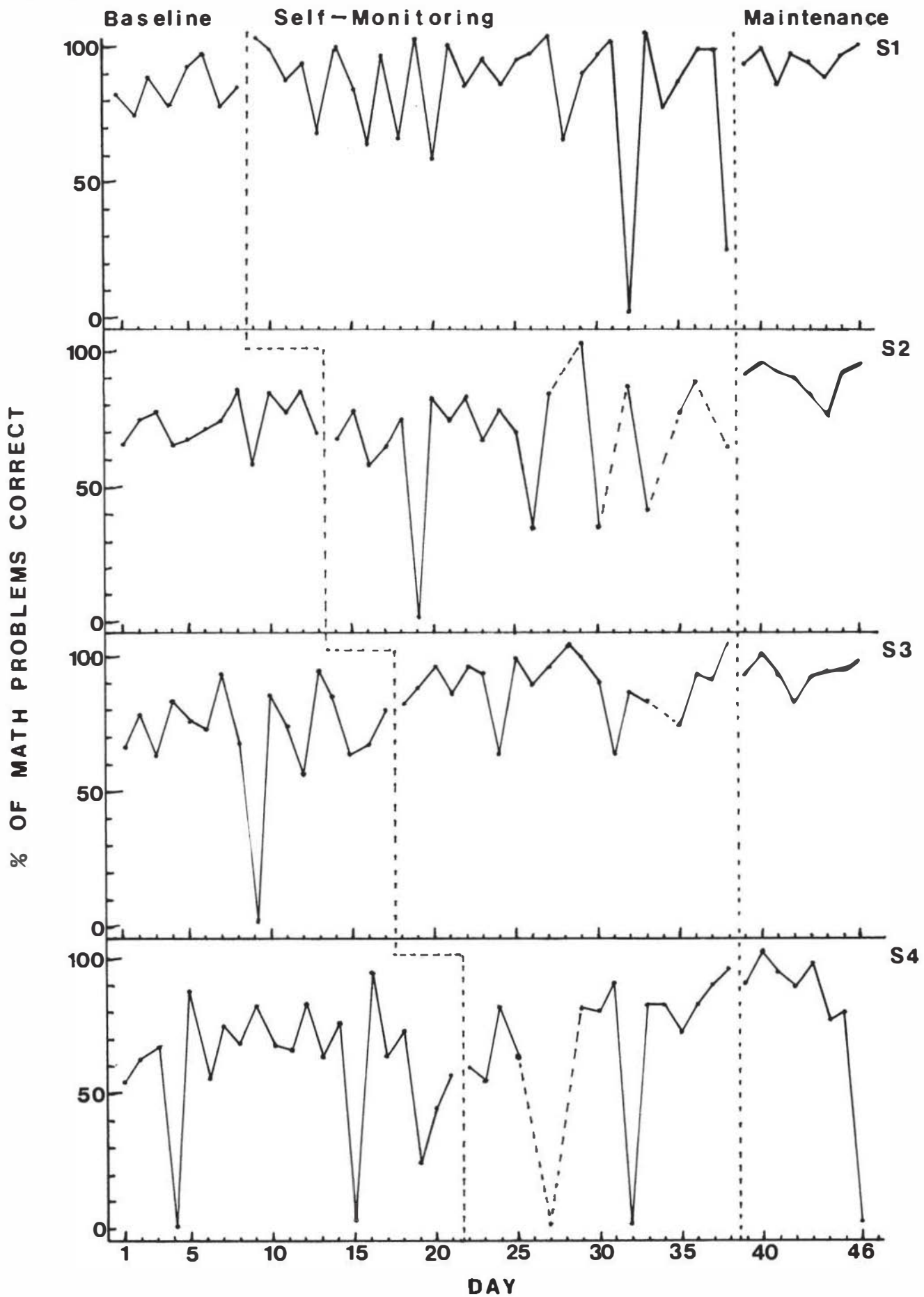


the self-monitoring phase, however, this drop in appropriate behavior was still noticeably higher than that displayed in baseline. Subject one achieved a mean of 3.0 positive behaviors through-out the maintenance phase, an overall gain from baseline of .2 in positive behaviors. With a mean of 2.9 positive behaviors during maintenance. Subject two exhibited an overall improvement of .6 positive behaviors over baseline. Subject three obtained a mean of 3.5 in maintenance which was an overall mean of .8 positive behavioral improvement. Subject four's mean during the maintenance phase was 2.4 positive behaviors, an overall increase from baseline of .4 positive behaviors.

Academic. Table 2 depicts the first two subject's percentage of math problems correct as declining in the self-monitoring phase. Subject 1 had a mean percentage of math scores as 83.4 in baseline, however, in the self-monitoring phase the mean was 82.0, a decline of 1.4 percentage points. In the maintenance phase the mean for Subject 1 was 91.6, an overall increase from baseline of 8.2 percentage of math problems correct. Similarly, Subject 2 went from a mean of 71.9 percentage of math problems correct in baseline to a mean of 68.4 during self-monitoring. Like Subject 1, Subject 2's mean percentage of math problems correct rose in the maintenance phase to 87.3, an overall growth from baseline of 15.4 percentage of math problems correct.

Table 2. The percentage of math problems correct recorded daily through all phases. The dependent variable was the percentage of math problems correct by the subjects in the various phases.

Table 2



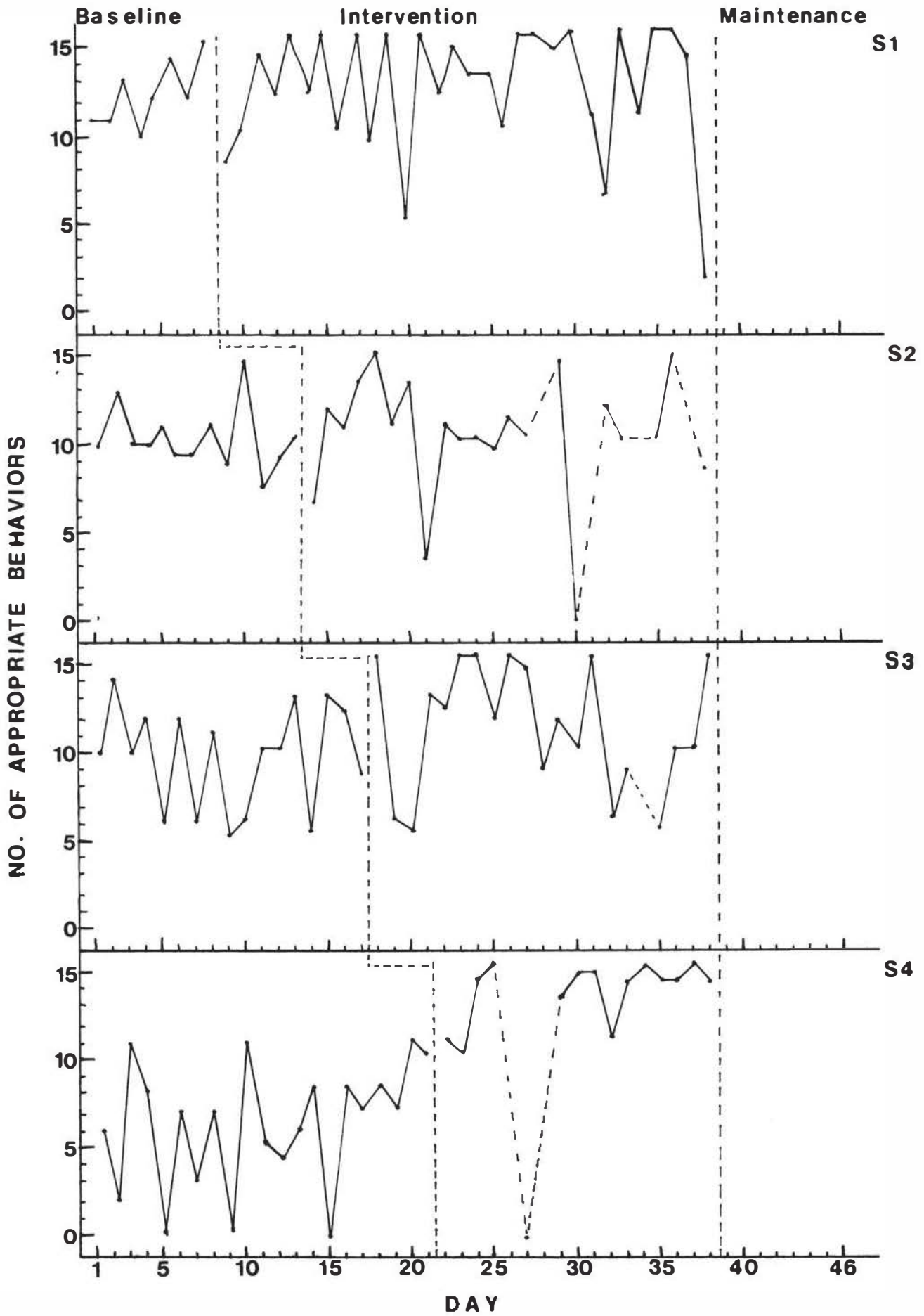
Subjects 3 and 4 differed from the first two subjects by rising from baseline through self-monitoring instead of declining. Subject 3's mean percentage of math problems correct at the end of baseline was 70.9, of self-monitoring was 87.1, an overall gain from baseline of 18.2 percentage of math problems correct. Subject 4 had a mean percentage of math problems correct as 58.8 in baseline, however, in the self-monitoring phase the mean was 70.5, an increase of 11.7 percentage points. In the maintenance phase the mean for Subject 4 was 76.3, an overall increase from baseline of 17.5 percentage of math problems correct.

There is an observable difference in the consistency of higher percentages of math problems correct between the self-monitoring phase and the maintenance phase. There was less degree of fluctuation between each point in the maintenance phase.

Momentary time sampling. The utilization of momentary time sampling with a variable interval schedule (15 intervals, 50 minute period) is shown on Table 3. No recording during the maintenance phase was done. In this procedure, the aide recorded exactly at the end of each variable interval whether or not an appropriate behavior was occurring. Subject 1 obtained a mean of 12.3 positive behaviors during both the baseline phase and the intervention phase. There was no increase or decrease in the mean between the two phases.

Table 3. Momentary time sampling with a variable interval schedule used to record the number of appropriate behaviors daily through all phases. The dependent variable is the number of appropriate behaviors each student exhibited in 15 intervals during a 50 minute period.

**Table 3**



Subject 2's performance remained the same between these two phases holding a mean of 10.2 positive behaviors. This nonincrease in appropriate behaviors is contrary from the increase between baseline and self-monitoring shown in Table 1.

Subject 3, however, had an increase of 1.4 positive behaviors with a mean of 9.6 in baseline and a 11.0 during intervention. When compared with Table 1, Subject 3 had an increase of 1.3 between the same two phases. Subject 4 had the greatest gain of all subjects of 6.5 positive behaviors with a mean of 6.1 in the baseline phase and a 12.6 positive behaviors through-out the intervention phase. Likewise, as shown on Table 1, Subject 4 had the highest gain of all subjects of appropriate behaviors with an increase of 1.9.

### Discussion

The results of this study appear to support the hypothesis that self-monitoring does improve the target behaviors. However, several facets of this study generate many questions and few answers. This discussion will attempt to clarify and explain the results so that they may be utilized in a classroom situation.

The contention by Wall (1982) that the teacher should provide clear definitions of the behaviors to be assessed appears to have been given support in this study. By the students choosing and identifying the target behaviors, the students appeared to be more aware and had a better



understanding of what was appropriate and inappropriate.

The list of appropriate behaviors did range from less severe behavior problems such as "participating in class discussion"; to severe behavior problems such as "keeping hands off others". According to informal observations of the experimenter, at the beginning of this study all behaviors on the list were demonstrated, but at the completion of this study the lesser infractions were being displayed and the more serious behaviors were fewer. The study could have been improved by identifying specifically which of the ten appropriate behaviors was being exhibited or not exhibited. This study showed only if the behavior was appropriate or inappropriate.

The theory that the characteristics of the subjects does not matter when using self-monitoring appears to be supported with students labeled severely behaviorally disordered. These subjects handled self-monitoring as well as any subjects in previous research according to this researcher. The subjects in this study came from broken homes and had records of drug and alcohol abuse and high truancy problems. This may account for the number of fluctuations in day to day behavior. Also, the peer pressure within the special education calssroom may have caused certain inappropriate behaviors to be displayed (e.g., Brulle, McIntyre & Lewellen, 1983). An extension of this study needs to be

completed using students with behavior problems within a mainstreamed class.

This study lends support to the existing literature that by self-monitoring the target behavior is influenced positively. However, the length of the self-monitoring phase did prove to be a variable in this study. The shorter self-monitoring time appeared to show more of an increase in appropriate behavior than did the longer self-monitoring phases. Subject 1 had an increased mean of .8 positive behaviors during the 30 day self-monitoring phase. Subject 4, however, self-monitored 15 days with a mean increase of 1.9 positive behaviors. This might imply that too much self-monitoring causes boredom or becomes tiring or habit forming to the student. Also, the longer self-monitoring phase could possibly lower accuracy. The student might want to predict the outcome more positive or negative than what is truly accurate.

The hypothesis that generalization occurs after self-monitoring ceases is not totally supported by this study. In the maintenance phase all subjects did descend, but not as low as baseline. One explanation for this might be that the students' awareness level of appropriate behavior was raised from what the level was at the beginning of the study. Also, this researcher observed where the check marks were placed on the subjects' self-monitoring form. The

observation showed that at the start of baseline the inappropriate behaviors occurred at the beginning of the hour. However, during maintenance the inappropriate behaviors were displayed at the end of the hour. An explanation for this might be that the students liked getting better grades so they attacked the academic task first and when completed, the inappropriate behaviors appeared.

Epstein et al., (1975), Apatos and Kanfer (1977), and Kaufman and O'Leary (1972) all felt that accuracy was not reflective on the change of the target behavior. The accuracy for this study was very high, as mentioned in the method section. However, this researcher does not feel that accuracy influenced the change of behavior. The students did not know that accuracy was being checked and yet it remained high. First, the students were young adults and not children, so the procedures were more easily carried out. Secondly, the act of self-monitoring did not seem to be a pressure on them and thirdly, the four subjects were chosen because of attendance which showed some sense of responsibility. For future studies it might be worthwhile to investigate if students with attendance problems record as accurately as those with good attendance.

Mathematics was the academic variable chosen for this study for several reasons. First of all it is the easiest subject to grade and be completely objective. The answers

were either correct or incorrect. Additionally, the math period was one of the only times that all subjects were in the room. Future studies should address different academic subjects or nonacademic periods to examine the efforts of the subject matter on behavior and self-monitoring.

As shown by Table 2, the first two subjects' mean percentage of math scores declined from baseline through self-monitoring. One possible explanation of this phenomena might be the actual conscienceness of knowing that the subject had to record every ten minutes. This anticipation of recording might cause clock watching. For example, if in the middle of doing a math calculation the subject had to look up at the cloĉk, he might lose his concentration and the problem could be incorrect. Both of these subjects, as mentioned in the methods section, were considered hyperactive which could definitely influence the math scores when added with self-monitoring. A bell or some type of audible sound might have been used in this study to make it better by eliminating clock watching.

When analyzing the self-monitoring behavior graphs and the academic graphs it is immediately noticable that when one point declines it does so on both sets of graphs. This consistency between the data indicates that when there are fewer appropriate behaviors displayed the percent of math scores drops. Also, when there is a high number of

appropriate behaviors, the percent of math problems correct is high. This shows that these two variables appear to depend on each other.

An important difference between the self-monitoring behavior graph and the academic graph is revealed in the maintenance phase. The mean percentage of math scores all increased from the first two phases whereas the mean positive behaviors decreased from the self-monitoring phase to the maintenance phase. Some explanation to this increase appeared to be that the students liked getting good grades and enjoyed being positively reinforced verbally by the teacher. There are some studies that discuss reinforcement with self-monitoring and separate from self-monitoring (Lipinski et al., 1975; Epstein et al., 1975; Layne et al., 1976; Sagotsky et al., 1978). Verbal praise as a positive reinforcement is a tool which most classroom teachers use. Future researchers should keep in mind that verbal praise would be difficult to separate from the self-monitoring in a classroom and keep the routine the same.

Momentary time sampling using a variable interval schedule was recorded by the aide. The researcher felt that the study would be more reliable by having the aide do the recording. The aide was not aware of what the study was about or what results were looked for by the researcher. The momentary time sampling graphs (Table 3) are parallel to

the self-monitoring graphs (Table 1). When one table displayed an increase or decrease in behavior it appears that the other table does the same. One limitation to the momentary time sampling component is it could not be continued through the maintenance phase. The aide was unable to finish the study. If the aide could have completed the last phase, the momentary time sampling graphs could have indicated basically what the self-monitoring graphs did.

This study began the maintenance phase on the same day for all students. Although this was not one of the purposes of this study, the researcher was given an opportunity to observe the effects that length has on self-monitoring. The reason for starting maintenance on the same day for all subjects was so that the class routine could be reestablished, as in the baseline phase, to get a typical picture of the behavior of all students.

This study was completed in the fall of the school year but the students appeared verbally to identify appropriate and inappropriate behaviors throughout the fiscal school year. The students' awareness of what was acceptable or unacceptable behavior within the classroom was a salient result of this study. For future studies a longer maintenance phase would be recommended. In this study the phase was shortened because of a school vacation.

The following are some suggestions that this researcher

has for the classroom teacher:

1. This study used ten appropriate behaviors to be self-monitored. This researcher contends that no more than ten be used and fewer might be better. Too many target behaviors could cause confusion and might lower the accuracy of self-monitoring.

2. The monitoring device would be kept simple for the sake of accuracy. A checklist, like utilized in this study, proved to be accurate and easy for the subjects.

3. Although accuracy appeared not to influence the change of the target behavior, the classroom teacher still needs to keep records of it due to different characteristics of the students.

4. Try not to extend self-monitoring too long or have the monitoring phase interrupted by a school vacation.

The tentative conclusions which can be drawn from the present study are as follows: self-monitoring does have a positive influence on the target behavior; some generalization does occur after self-monitoring ceases; students awareness level of the target behavior can be raised; accuracy does not influence the change of the target behavior; the length of the self-monitoring phase seems to influence the outcome; and self-monitoring can be used with any type of student.

While it is important that further research be conducted on target behaviors, this research indicates that self-monitoring

can be a useful tool for classroom teachers. The procedure, while certainly not an answer to all children with behavior problems, may prove to supply one more step for a teacher to utilize on modifying behaviors or improving academic goals.



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