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# Self-monitoring : an efficient and effective intervention for academic and behavioral targets in the school

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# Self-monitoring : an efficient and effective intervention for academic and behavioral targets in the school

## **Abstract**

This research paper will review current research concerning the use of self-monitoring as an intervention technique for academic and behavioral targets in the school. The history and theory will be described, as well as the elements and implementation of self-monitoring as an intervention technique. Classroom applications with academic and behavioral targets are reviewed, as well as caveats on the use of self-monitoring as a classroom intervention technique. Recommendations concerning the need for additional research on the applicability of self-monitoring as an intervention technique are also described.

SELF-MONITORING: AN EFFICIENT AND EFFECTIVE INTERVENTION FOR  
ACADEMIC AND BEHAVIORAL TARGETS IN THE SCHOOL.

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Submitted to the

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## Abstract

This research paper will review current research concerning the use of self-monitoring as an intervention technique for academic and behavioral targets in the school. The history and theory of self-monitoring will be described, as well as the elements and implementation of self-monitoring as an intervention technique. Classroom applications of self-monitoring with academic and behavioral targets are reviewed, as well as caveats on the use of self-monitoring as a classroom intervention technique. Recommendations concerning the need for additional research on the applicability of self-monitoring as an intervention technique are also described.

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has been approved as meeting the  
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Self-Monitoring: An efficient and effective intervention for academic and behavioral targets in the school.

With the enactment of Public Law 94-142 (1975), educators must develop individualized educational plans for all students in need. Accordingly, the costs of educational services have increased, forcing schools to find effective means of intervention that are inexpensive. The search for effective and inexpensive academic and behavioral interventions is ongoing and laborious. Cognitive-behavioral theory and research has yielded an intervention that is both effective and inexpensive. Self-monitoring is supported throughout the school-based intervention literature as an effective means of helping students with academic or behavioral problems succeed in the classroom. In the following paper, the history and development of self-monitoring as an intervention technique is reviewed, as are the effects of self-monitoring on numerous academic and behavioral problems of children.

Students are in control of their own learning, even though many of them do not realize it. Although teachers choose the methods of instruction, control the schedule for learning, and direct the activities in the classroom, the student is ultimately in charge of whether he or she learns (Ridley, McCombs, & Taylor, 1994). It is more complicated for students who display atypical behavior or encounter difficulty in the learning process. These students need assistance in discovering the strategies that will enable them to take control of their actions and learning behavior. Traditional intervention methods have been successful in assisting a number of student and teacher needs but have several limitations when used with children lacking self-control (Shapiro & Cole, 1994).

Therefore, new strategies have been formed to help students take control of their behaviors and learning. Self-monitoring has been supported throughout the current research as one of the most effective strategies.

Many traditional academic or behavioral interventions focused on the external manipulation of antecedents and consequences and were successful in remediating many different types of discipline and instructional problems (Shapiro & Cole, 1994).

However, the traditional procedures have several limitations. Traditional methods fail to instill the self-management techniques that students need most. Students who display atypical behavior are held under control by external manipulation methods and fail to learn how to control their own behavior. Limiting students' participation in the intervention denies them the opportunity to develop self-reliance (Cole & Bambara, 1992).

There are additional limitations that accompany the traditional management strategies. Because of high demands placed on teachers, they are likely to miss the atypical students' display of specific target behaviors. In doing so, behavior change may progress slowly, due to inconsistent responses (Shapiro & Cole, 1994). Students may proceed to view teachers as cues and only display appropriate behavior in the presence of teachers. This deters generalization.

Traditional intervention strategies also focused on using punishment. Shapiro & Cole (1994) noted that, "Although potentially valuable in the short-term management of disruptive actions, external punishment procedures, when used as the major mode of intervention, do not actively teach students the skills necessary for long-term behavior change" (pg.4). Traditional methods are effective in the short-term but rarely produce

long lasting effects. Teacher perceptions of these strategies are becoming more negative also. Research has shown that teachers waver in using traditional methods due to their reputation as requiring a lot of time and being particularly difficult to execute (Martens, Witt, Elliott, & Darveaux, 1985; Witt, Moe, Gutkin, & Andrews, 1984).

Due to discontent with traditional classroom interventions for academic and behavioral problems, self-monitoring interventions were proposed. Self-monitoring is particularly easy for the teacher to implement for both academic and behavioral concerns.

### Self-Management

Over the last two decades, self-management has become more prevalent in the classroom intervention literature. Self-management is defined by Shapiro & Cole (1994) as “the actions designed to change or maintain one’s own behavior” (pg. 6). Self-monitoring is a behavioral intervention based on self-management principles.

Behavioral theory has a long history. Beginning with John B. Watson in 1913, American psychology was transformed. Concepts such as image, mind and consciousness were rejected, while a more objective psychology focused on observable behavior that could be described in objective terms. The birth of behavioral theory marked the beginning of the positivist era in psychology, with a focus on knowledge, facts, and truth. In contrast, today’s post-positivist era would not agree that there is such a thing as an objective view of behavior. Post-positivism uses qualitative methods to gain insight into each person’s reality. Post-positivism believes that each person has a reality, but we are not able to know each individual’s reality with certainty.

Behaviorism had a tremendous influence upon psychology in western civilization. As the field progressed, many behaviorists expressed discontent with the absolute rejection of concepts that dealt with cognitive/mental processes. Due to the discontent, between 1960 and 1970, a new movement was formed by behaviorists to reflect the study of behaviorism with an emphasis on cognitive processes. The movement was known as the social learning or sociobehaviorist approach to psychology. From this movement, cognitive-behavioral theory emerged, which integrated the focus on overt behavior with a focus on dysfunctional thoughts and cognitions.

Social learning theory encompasses a variety of different theoretical perspectives. Of the theorists, Albert Bandura is one of the most prominent. He referred to his theory as sociobehavioristic and later as social cognitive learning theory. Bandura's theory emphasized the observation of a subject's behavior and the use of reinforcement to attain and modify behavior. His view of reinforcement included the concept of vicarious reinforcement. Vicarious reinforcement involved a subject observing the behavior and consequences of others, then modifying one's own behavior based on those examples. His theory emphasized the subject's capacity to visualize behavior and consequences before they occur and regulate behavior accordingly.

Social cognitive learning theory also emphasized the concepts of self-efficacy and behavior modification. Bandura believed that people who were high in self-esteem or self-worth were able to cope with life events and seek challenges to overcome. Those who were low in self-esteem or self-worth expected failure and felt hopeless in influencing the surrounding conditions. This affected many aspects of a person's functioning in daily life. Bandura's social cognitive learning theory also included

behavior modification. He focused on the external aspects of atypical behavior and believed that treating those behaviors would result in treating the subject's disorder. To do so, modeling was used to alleviate many different atypical behaviors.

Through an analysis of the history of behaviorism and social cognitive learning theory, the development of self-management intervention techniques becomes apparent. Self-management theory is based in both behaviorism and social cognition. Students use interventions that focus on the observation and evaluation of their own behavior to create behavior change.

Self-management interventions are used in the classroom to assist a student in participating in certain behaviors in order to change a target behavior. The target behavior may be academic or behavioral and is defined as detrimental to the student's learning environment. Self-management interventions require students to implement strategies, on their own, to change their academic or behavioral performance.

Self-management techniques include contingency-based and cognitively-based approaches (Shapiro & Cole, 1994). Contingency-based techniques include self-monitoring, self-evaluation, and self-reinforcement. The techniques focus on the consequences for appropriate versus inappropriate behavior. Cognitive-based techniques include self-instruction, stress-inoculation, and social problem-solving and focus on the antecedents for appropriate behavior. Many of the contingency and cognitively based techniques are combined in an intervention program. Combinations vary, depending upon the student and the type of target behavior.

Of the contingency-based self-management techniques, self-monitoring has been found to be a successful intervention strategy. Self-monitoring was initially used as an

assessment technique. Clinicians who were seeking data pertaining to their clients' behavior during the times that the clients were not in treatment, or data on client behaviors that were not directly observable (e.g., thoughts or feelings), found that clients could be taught to observe and record data on their own behavior. The clinicians soon found that, in requiring their clients to observe and record their own behavior, reactive effects occurred. Simply having the person observe a behavior caused changes in that behavior. Many researchers and practitioners have taken advantage of the ease of implementation and reactive effects of self-monitoring in order to change students' behavior in the classroom.

When trying to obtain information on self-monitoring as an intervention, a common obstacle evolves: the use of inconsistent terms throughout the self-monitoring/self-management literature base. Browder and Shapiro (1985) indicated that the most prominent problem that has plagued the research and practical application of self-management techniques is the issue of definition. Self-management, as a theoretical approach, has also been referred to as self-control by a number of researchers (Barkley, Copeland, & Sivage, 1980; Glynn & Thomas, 1974; McLaughlin, 1976; Sagotsky, Patterson, & Lepper, 1978). In addition, the components of self-management have been named differently by a variety of researchers. What may be known as self-monitoring by one researcher is often known as self-recording or self-observation by others.

This inconsistency of definition makes it difficult for individuals with background knowledge in self-management to understand what each particular researcher is actually referring to in a study. A person with little or no previous knowledge of self-management would find it particularly difficult. Self-monitoring and other self-management

techniques are not user friendly to teachers who rely on the professional literature with its confusing definition of terms.

In this paper, self-management is defined as: interventions that involve strategies related to changing or maintaining one's own behavior (Shapiro & Cole, 1994). Self-monitoring is defined by Shapiro & Cole as "a self-management procedure that requires the student to observe specific aspects of their own behavior and provide an objective recording of those observations" (pg. 7).

## Self-Monitoring

### Elements of Self-Monitoring

Self-monitoring requires the individual to act as the observer for his or her own behavior or skills. The self-monitoring task has two basic components: (a) observation of the behavior or skills and (b) recording of the observational data. Students learn to execute a routine that requires them to stop what they are doing, assess their own behavior, and record whether a specific target behavior/skill has occurred or is occurring. The student can observe and record the target behavior/skill in many different ways.

There are four complementary parts of the self-monitoring intervention which determine how the technique will vary for each individual student: (a) the presence or absence of cueing, (b) the observational procedure employed, (c) the method of recording, and (d) the self-monitoring training that is given to the student (Lloyd, Landrum, & Hallahan, 1991).

## Cueing

Most self-monitoring intervention programs include some form of cueing system. The presence of cueing implies that some type of indicator is used to cue the student to begin the self-monitoring routine (Lloyd et al., 1991). Research has shown that cues are important to the effectiveness of self-monitoring (Heins, Lloyd, & Hallahan, 1986) and may eventually be removed after the target behavior has improved (Hallahan, Lloyd, Kosiewicz, Kauffman, & Graves, 1979). A common method used to cue students involves using a taped recording that plays tones at relatively frequent, irregular intervals. The tones serve as a cue for students to assess and record their target behavior/skill. Many teachers have questioned the intrusiveness of the tape recorded tones, in that they may distract other students, and have suggested the use of earphones so that the tones would not be audible to other students. Research has shown that when other students, who are not the targets of the self-monitoring intervention, hear the cues, their behavior improves as well (Kosiewicz, 1981).

Some self-monitoring intervention plans do not require a separate cue to occur, because the occurrence of the target behavior itself, or the end of a given task, is used as a signal for the student to monitor the behavior. For example, a self monitoring program could require teachers to mark certain problems on students' worksheets. The marked problems serve as cues for students to stop and assess the accuracy of their work (Rooney, Polloway, & Hallahan, 1985). A similar procedure might require students to record their hand raising behavior in asking questions or requesting permission from the teacher.

## Observation Procedures

Different observation systems can be used in self-monitoring. A frequency count procedure requires the student to observe and record every occurrence of her own target behavior/skill. Momentary time-sampling may also be employed. It requires the student to observe and record the target behavior/skill at a single point in time. For example, a student with a learning disability hears a cue on a taped recording. If she is engaged in the target behavior at the cue, she records the behavior (Hallahan et al., 1979). Another method involves a summary rating procedure. The student learns to make overall judgments of her behavior/skill after a set period of time elapses.

Observation procedures may also focus on the duration of the target behavior/skill or combine the frequency with duration. For example, Schwartz (1977) required tutors to have their tutees collect duration data on the time spent on their reading practice. Lloyd, Bateman, Landrum, and Hallahan (1989) used a combination of frequency counts and momentary time sampling to instruct students to count the number of arithmetic problems completed during brief time periods.

## Method of Recording

Self-monitoring has been found to be more effective when students are required to record their observations in an obvious manner. The different methods for recording observations have been separated into two main categories: pencil and paper systems and counting devices (Lloyd et al., 1991). Pencil and paper systems require students to make tally marks every time the target behavior/skill occurs. Teachers may find that preparing a recording sheet makes it easier for students to monitor and record the occurrence of

their behavior/skill because of the structured and uniform format of the recording procedure. In developing prepared recording sheets, it is critical that teachers keep the age and interests of students in mind to ensure that sheets are developmentally appropriate.

Counting devices may also be used for recording. For example, a teacher may have students monitor the number of arithmetic problems completed by having them move a bead on a leather strap. The students can wear the leather strap on their wrists and move a bead after completing each problem (Holman & Baer, 1979). A mechanical counter may also be worn on the wrist to record the occurrence of a specific behavior/skill (Hallahan, Marshall, & Lloyd, 1981).

### Training

Self-monitoring may be taught to a student by a teacher or school psychologist in 15 to 20 minutes (Lloyd et al., 1991). For training to be successful, the self-monitoring program must be explained in a very clear manner. Lloyd et al. stress that it is important for the trainer to: (a) define the behavior that the student will be recording; (b) model the defined behavior; (c) check for the student's understanding of the defined behavior; and (d) observe the student while she practices the procedure.

Depending upon students' target behaviors and the various needs in teachers' classes, teachers or school psychologists choose an appropriate training program. Training programs may include a variety of elements. Students may be trained individually or in groups. Self-monitoring may be paired with another intervention (i.e., token economy). Videotapes may also be used so the student may practice observing and

recording their target behavior. Students may be required to match recordings with a teacher, or rewards may be given for accurate recording (Sprick, Sprick, & Garrison, 1993). For the self-monitoring intervention to be effective it is recommended that teachers, rather than school psychologists, conduct training with students due to the availability of teachers (Lloyd et al., 1991). This allows the student to have an easily accessible resource for further assistance with the intervention.

Typically, contingent rewards are not necessary for a self-monitoring intervention to work effectively. For many students, using self-monitoring as the sole intervention proves to have a reactive effect on the target of change, but the effects of self-monitoring are unique for each individual student. While many students experience reactive change when subjected to self-monitoring, others may not. In this instance, the use of self-monitoring may be paired with additional self-management strategies (i.e., contingent rewards).

Through an analysis of the self-monitoring literature, Nelson (1977), Shapiro (1984), and Mace and Kratochwill (in press) have identified certain variables that may assist the reactive effects of self-monitoring: (a) motivation, (b) valence, (c) target behaviors, (d) goals, reinforcement and feedback, (e) timing, (f) concurrent monitoring of multiple behaviors, (g) schedule of self-monitoring, and (h) nature of self-monitoring device. In addressing motivation, the more motivated a student is to change their target behavior, the more likely reactive effects of self-monitoring will occur. Self-monitoring also has a tendency to strengthen desirable behaviors and decrease the capacity of undesirable behaviors. Reactive effects may be more evident for more obvious, nonverbal behaviors and for those common antecedents that follow undesirable target

behaviors. If a self-monitoring program is accompanied by performance goals, feedback, and reinforcement, reactive effects are also more likely to occur. Requiring the student to self-monitor before the target behavior occurs, and to self-monitor only one or few behaviors also increases the possibility of reactive effects. Lastly, by implementing the use of continuous self-monitoring (versus intermittent self-monitoring) and obtrusive recording devices (beep tapes), the occurrence of reactive effects may also be increased.

### Implementing the Self-Monitoring Program

There are several factors that teachers and school psychologists should consider when developing and implementing self-monitoring programs for students. Three factors are listed by Lloyd et al. (1991): (a) planning a system for evaluating treatment, (b) planning for the withdrawal of treatment, and (c) programming for maintenance and generalization.

### Evaluating Treatment

Because the student is observing and recording her own target behavior, a lot of data is produced on the target behavior. The data that is produced cannot be used to analyze the outcome of the self-monitoring intervention because students are typically inaccurate during some part of the assessment of their own behavior. Lloyd et al. (1991) note that “data generated by the pupils generally reveal an overestimation of the occurrence of the appropriate behavior...completely accurate self-monitoring may not be essential to obtaining acceptable intervention effects... even when students’ assessments of their own behavior are found to be exaggerated in comparison with independent

observational data, positive changes in the target behaviors have still been observed” (pg. 206). It is important that teachers or school psychologists who are responsible for implementing the self-monitoring program also collect data. This results in independent evaluations of the effects of self-monitoring interventions. Teachers or school psychologists may collect data by obtaining it themselves or by training someone as an independent observer. The observer then conducts periodic observations in the classroom where the student is involved in the self-monitoring intervention. In conducting an independent evaluation of the self-monitoring program, the teacher or school psychologist can be assured of the appropriateness of the self-monitoring intervention for the particular student.

### Withdrawing Treatment

Research suggests that using overt cues (e.g., tape recorded tones, kitchen timer) and recording devices are important in teaching students to use a self-monitoring routine (Heins et al., 1986; Lloyd et al., 1991). The overt cues and recording devices are not necessary after the student has become skilled in self-monitoring. Studies have shown that after systematically removing either the overt cues or the recording device first, the students continued to sustain the treatment effects (Hallahan et al., 1979, 1981; Hallahan, Lloyd, Kneedler, & Marshall, 1982). It is important that teachers and school psychologists use professional judgment in deciding whether treatment effects reached the desired levels and were maintained over an appropriate amount of time before removing elements of the self-monitoring intervention. When it is determined that the treatment effects have reached the desired levels and have been maintained appropriately,

the elements may be removed one at a time, in a gradual manner. Each component (e.g., overt cue, recording device) may be removed individually, in a gradual and tapered off manner, over a designated period of time. An example of this would include the student receiving fewer overt cues (to record the occurrence or absence of a behavior) over time until they are completely absent. It is important that the teacher or school psychologist monitor treatment effects and slow down the withdrawal process accordingly, if treatment effects begin to weaken.

### Maintenance and Transfer

If a self-monitoring intervention is removed abruptly after the student displays the desired behavior/skill change, the student will not maintain treatment effects. After the student has used self-monitoring for some time and the target behavior has improved, the overt cues and recording devices may be removed systematically, and the behavior change can be maintained. Heins et al. (1986) reported that follow up observations, made for as long as two and a half months after the appropriate removal of the self-monitoring intervention, showed continued treatment effects.

The amount of time needed for students to participate in a structured self-monitoring intervention program in order to maintain treatment effects varies from student to student. It is recommended that teachers and school psychologists evaluate the data that they collect independently, in order to determine if the student has displayed improvement of the target behavior for a stable amount of time. After the student has displayed improvement over a stable amount of time, the treatment should be systematically removed; and teachers and school psychologists should continue to

independently gather data to determine the maintenance of the desired levels and/or frequencies of the behavior/skill (Lloyd et al., 1991). The continued data collection should occur at least once a week after the self-monitoring intervention has been removed. If observations indicate that the self-monitoring treatment effects have become weak or unstable, provide the student with short retraining sessions to assist in treatment maintenance.

Investigations of the generalization potential of self-monitoring include: (a) transfer to untreated but related behaviors and (b) transfer to other settings (Lloyd et al., 1991). Hallahan et al. (1979) found that self-monitoring treatment effects on a student's attending behavior also generalized to the student's academic productivity level. The self-monitoring intervention focused solely on attending behavior and academic productivity increased. Warrenfeltz, Kelly, Salzberg, Beegle, Levy, Adams, and Crouse (1981) found that self-monitoring treatment effects transferred to another setting. Students learned social skills and then used a self-monitoring program to generalize the acquired social skills to a vocational classroom. Individual cases demonstrated that generalization occurred. Typically, generalization of self-monitoring treatment effects is as difficult to obtain as generalization of the effects of other interventions used in the schools (Lloyd et al.).

### Classroom Applications of Self-Monitoring

Many studies have established the reactive effects of the self-monitoring procedure. The reactive effects of self-monitoring have been found to occur during the

remediation of both academic skills, behaviorally-based target behaviors, and assisting students in becoming self-regulated learners.

Research on the efficacy of self-monitoring will be described first for academic targets: on-task behavior, work completion, study skills, written expression, math, spelling, and reading. Research on behavioral targets are described next and include: transitions, inappropriate verbalizations, and aggression/emotional control.

### Academic Targets

Self-monitoring has been used to improve academic skills in various content areas. Self-monitoring may be used with a variety of general skills (e.g., staying on task, studying, and completing assignments), and specific academic skills (e.g., increasing the amount of descriptive words used in writing assignments, improving subtraction skills, and improving sight word acquisition). Although many intervention programs combined self-monitoring with other self-management techniques, self-monitoring was as effective when used as the sole intervention.

### On-Task Behavior

One of the most commonly researched behaviors is students' on-task behavior (i.e., focusing attention on a specific task) (Armstrong & Frith, 1984). Typically, self-monitoring programs target improvement of on-task behavior and a subsequent improvement in assignment completion.

Broden, Hall, and Mitts (1971) used self-monitoring to increase on-task behavior of a student. An eighth grade female student was observed at the end of 10 second

intervals before and during self-monitoring for 30 minutes in her history class. Data were recorded for six days on a piece of paper with three columns of ten squares, a place for the date, and instructions that reminded the student to record her on-task behavior “when she thought of it” by marking a plus if she was on-task and a minus if she was not.

Results indicated a dramatic increase in her on-task behavior (from a baseline average of 30% of recorded intervals to an intervention phase average of 78% of recorded intervals). All intervention components were removed and a second baseline was implemented for 5 days, which resulted in her on-task behavior decreasing to an average of 27% of the recorded intervals. Self-monitoring was reinstated for 10 days, which resulted in her displaying on-task behavior for an average of 80% of the recorded intervals. Self-monitoring was then paired with teacher praise for 9 days, leading to another small increase in on-task behavior, with an average of 88% of the recorded intervals. When self-monitoring and praise were withdrawn in a systematic manner, on-task behavior continued to show improved effects for 4 days at a stable 80 percent of recorded intervals, compared to her 30 percent baseline period.

Glynn et al. (1974) used self-monitoring and reinforcement to increase the study skills of nine 3rd grade children rated by the principal as hard to manage (not paying attention). Eight boys and one girl were observed throughout the experiment. Eight raters were trained to observe students’ on-task behavior using whole interval observation assessment. The raters observed the on-task behavior for 10 second intervals during an oral and written language lesson that lasted 50 minutes and included group and individual work sessions. The raters were trained to rate the child’s behavior as A (on-task) or O (off-task). For behavior to be rated as A, the student had to be observed in on-task

behavior for the majority of the 10 second interval. On-task behavior was defined as: during teacher instruction must remain in seat, be silent, look at the teacher, and during work periods write a story, draw a picture, or perform any other activity assigned by teacher.

During the first baseline, rates of on-task behavior were recorded for a 10 day period. A self-control period followed in which students were required to self-monitor, record, evaluate, and reinforce their behavior. Beeps were intermittently (i.e., one, two, three, four, or five minute intervals) played by a tape recorder to cue students. Students recorded their behavior on a self-monitoring card taped to their desk. Students who were on-task at the beep were instructed to place a check on their card. Students were allowed to exchange their checks for free time in an adjacent room filled with toys and activities.

A 2-week return to baseline involved no tape recorded signals, self-monitoring, recording, evaluating, or reinforcement. After baseline two, students entered a behavioral self-control plus cueing phase. During this phase, all of the self-monitoring, recording, evaluating, and reinforcement procedures were reinstated but with some changes. The tape recorded signals included only 1, 2, or 3 minute intervals. Also, a behavior specification chart was used to assist students in monitoring their behavior when a tone sounded. On one side of the chart, the following definition was listed: “(Red) Look at the teacher, stay in your seat, be quiet.” On the other side, the following definition was listed: “(Green) Work at your place, write in your books, read instructions on the blackboard.” The teacher was in charge of displaying the red side during group instruction and the green side during individual work time.

Results of the study indicated that during the first intervention phase, only one student had an increase of greater than 30% in on-task behavior over baseline. During the self-control plus cueing phase, all 9 students increased their on-task behavior to over 30% when compared to baseline one. In addition, variability of performance was present during the first self-monitoring, recording, evaluating, and reinforcement phase, but decreased during the self-control plus cueing phase. Results indicated that the use of an additional cueing system (chart defining on-task behavior) with self-monitoring, recording, evaluating, and reinforcement assisted in the increase of attention to the task. Due to a lack of regular observers, maintenance data was not obtained.

In a study conducted by Sagotsky et al. (1978) self-monitoring was used with 67 fifth and sixth grade students to improve on-task behavior and assignment completion. The students rated their on-task behavior by determining if they were: (a) at seat working; (b) at teacher's desk; (c) at seat not working; (d) out of seat not working; and (e) out of room. The self-monitoring program required that students use a sheet of paper to mark where their math workbook progress stopped each day. Students had a piece of paper with 12 empty boxes and were told to periodically note whether they were actually working on math units. Students put a plus in a box if they were on-task and a minus in the box if they were not. Students were also asked to use a minus as a reminder to resume studying. Results showed an increase in the average number of math problems completed accurately with a mean change in number of problems correctly solved per day rising +8.78, when compared to baseline totals. In addition, a mean change in percentage of on-task classroom study behavior was noted as +9.14%, when compared to baseline percentages. The maintenance effects of the intervention were not investigated.

Hallahan et al. (1981) used self-monitoring to improve the attention levels of three 10-year-old students diagnosed with learning disabilities. The students had low levels of on-task behavior during a 45-minute reading comprehension lesson. At baseline, students were on-task for 20-30% of the observed intervals. At intervention, the students wore wrist counters and a tape recorder played audible tones between 10 and 90 seconds apart. When the tone played, the students were to ask themselves, "Was I paying attention?" If students believed they were paying attention, they advanced their wrist counter once. Students were trained for 3 days to ensure that they were able to make an accurate distinction between the presence or absence of their own on-task behavior.

Results indicated a significant increase in the levels of on-task behavior for all 3 students. On-task behavior increased to 50-80% of the observed intervals. After the intervention was in place for 20 days, the use of the wrist counter and tape recorder were phased out and on-task behavior was maintained. The tape recorder was then removed and all 3 students continued to maintain the increased levels of on-task behavior over the remaining 3 month observation period.

In a study conducted by Hallahan et al. (1982), self-monitoring was used to improve the on-task behavior of an 8-year-old student identified with learning disabilities. The student was trained to self-monitor his on-task behavior when an audible tone was emitted from a tape player. When the tone sounded, the student asked himself "Was I paying attention?" He then recorded his answer on a recording sheet at his desk. The student used the self-monitoring technique in 20 minute sessions. Teacher-assessment of the student's on-task behavior was also completed in the same manner. Baseline consisted of 8 days of initial data collection by a trained observer, self-

monitoring was introduced on the ninth day of the study and remained for 8 days, and teacher-assessment began on the eleventh day of the study and was present for 9 days. A reversal of treatment was in effect for 9 days, before the study returned to self-monitoring for 6 more days.

After treatment effects were established and maintained, parts of the self-monitoring intervention were systematically removed by eliminating the tape recorded cues on the 41<sup>st</sup> day of the study, and the recording sheet removed on the 46<sup>th</sup> day of the study. After implementing self-monitoring, the student's on-task behavior improved from baseline levels of 40% on-task to over 90% on-task. Maintenance effects were observed for an additional 4 days, which had shown the percentage of time samples on-task and the number of problems completed correctly as remaining at their increased levels.

Hallahan and Sapona (1983) used a self-monitoring intervention program to increase the on-task (paying attention) behavior of an 11-year-old male with learning disabilities. A tape recorder was placed near his desk which would play audible tones to cue the student to monitor and record his attention during assigned seatwork (handwriting and math). When the tone was played, the student was instructed to ask himself "Was I paying attention?" After asking himself the question, he recorded his answer on a recording sheet that was placed on his desk by checking "yes" or "no." The study consisted of six conditions which included: baseline, self-monitoring with tape, self-monitoring without tape, and self-praise. The last two conditions were used to observe maintenance of intervention effects. Hallahan and Sapona report that the student's attention and academic productivity increased dramatically with self-monitoring during

handwriting and math, although specific data on the amount of increase was not disclosed. In addition, it is reported that the on-task behavior was maintained at a high level during the last two phases when intervention was withdrawn. A 1 month follow-up of maintenance effects resulted in high level of attention maintained during math seatwork. The maintenance effects during handwriting were not investigated.

Hughes and Hendrickson (1987) used self-monitoring to improve the on-task behavior of fourth, fifth, and sixth grade students in a regular classroom who were identified as at risk for academic failure. A recording device sounded intermittent tones to cue the students to self-monitor. Students were taught to ask themselves “Was I paying attention when the tone went off?” After asking themselves the question, students then recorded their answers by checking “yes” or “no” on a recording sheet. Self-monitoring was shown to increase on-task behavior. Student attentiveness improved from the initial 50-60% of the observed intervals to over 80% for most students.

Lloyd et al. (1989) also investigated on-task behavior and academic task productivity/completion when using self-monitoring as an intervention. Five students, identified as seriously emotionally disturbed or learning disabled, were trained in either self-monitoring of on-task behavior or completion. On-task behavior and correct academic performance were observed for all students. On-task behavior was observed by using a 3 second momentary-time sampling procedure. Self-monitoring produced higher rates of on-task behavior and completion for all students over what was produced at baseline. Self-monitoring resulted in higher levels of completion for all students. When compared to baseline levels, student 1 experienced higher levels of completion on 38% of the intervention phase days and displayed an increase in attention to task on 57% of the

intervention phase days. Student 2 increased completion on 95% of the days and displayed an increase in attention to task on 77% of the days. Student 3 experienced an increase in completion on 21% of the days while attention to task increased on 77% of the days. Student 4 displayed increased completion on 100% of the days and improved attention to task on 71% of the days. Lastly, student 5 increased completion on 92% of the intervention phase days and increased attention to task on 55% of the days. These increased levels of completion and attention were maintained over the 3 days that intervention was phased out, in addition to the levels being maintained for 5 weeks after all intervention was eliminated.

In a study conducted by Prater, Joy, Chilman, Temple, and Miller (1991), adolescents with learning disabilities used self-monitoring to increase their on-task behavior. The students ranged in age from 12 to 17 years. The self-monitoring intervention was implemented in a resource room for math, a self-contained special education classroom, a study hall for social studies, and a resource room for government and English. A visual cue, in the form of a sign, was used to help students remember to self-monitor when an audible beep sounded. At the beep, students recorded their on-task behavior on a sheet placed on their desks. In addition, trained observers monitored the students' on-task behavior by using a momentary time sampling procedure with intervals ranging from 15 seconds to 1 minute, lasting for a total of 15 to 30 minutes. At the end of each interval, the observer noted if the subject was on- or off-task on a tally sheet. Self-monitoring yielded significant increases in on-task behavior for all of the students. Students' baseline on-task behavior averaged 40% of the observed intervals. On-task behavior during the intervention phase increased to an average of 80% of the observed

intervals for all students. Increases occurred without the use of contingent rewards for most students. Maintenance effects were monitored for an additional 3 to 5 sessions, which resulted in all students maintaining increased levels of on-task behavior.

Hughes and Boyle (1991) examined the effects of self-monitoring on the on-task behavior and task completion of three students with moderate retardation. The rates of accurate task completion over seven different tasks were recorded. Task completion for 2 of the 3 students improved considerably after implementing self-monitoring. The third student improved in on-task behavior but not in task completion, which may have been an indication that the student was not able to comprehend how to complete the required task.

In summary, self-monitoring alone or paired with other self-management techniques increased the on-task behavior of diverse students in a variety of settings. Students at risk of academic failure, identified as learning disabled, or residing in the regular education mainstream improved their on-task behavior. The use of contingent rewards with self-monitoring can be effective, as shown by various studies, but is often not critical or necessary when implementing an effective self-monitoring intervention program. Although several of the studies did not investigate the maintenance and long-term effects of the self-monitoring intervention technique, those studies that did investigate found that the maintenance and long-term effects of self-monitoring were supported with diverse students that possess a variety of academic and behavioral targets.

### Work Completion

Piersel and Kratochwill (1979) used self-monitoring of assignment completion with two different students. The first student was a 7-year-old female who did not

complete phonics assignments. Self-monitoring was used by taping a card inside the student's desk and asking her to record her scores on the phonics assignments. The researchers also monitored the percentage of correct items on daily phonics assignments. The student increased her work completion from 30% of assignments correct during a seven day baseline, to 65% during self-monitoring over the remaining 58 days of school. Interrater reliability was 1.00.

The second student was a 15-year-old male student who did not complete assignments in reading and mathematics. At baseline, the number of SRA units completed in reading and the number of assignments completed in math were recorded. SRA units required students to read a story independently and then answer vocabulary and comprehension questions that relate to the story. In reading, the student was required to complete one SRA unit per week. In math, one completed assignment was required daily with 75% accuracy. At the beginning of intervention, the student recorded on a sheet of paper the number of correct SRA assignments that he completed on a sheet of paper. Recording the number of math assignments was introduced after intervention in reading had occurred for 2 weeks. An increase was found in his work completion behavior, with zero SRA assignments completed during baseline to 17 completed during the intervention phase. Completed math assignments also increased, with an average of zero math assignments completed with 75% accuracy during baseline to one or more assignments completed with at least 75% accuracy nearly every day. The length of the intervention was not specified.

Piersel (1985) used self-monitoring with an 8-year-old, third grade, male student who experienced severe problems with work completion. The self-monitoring procedure

required the student to record completed assignments on a chart as he turned them in to his teacher. This chart was then checked weekly by the student and a school psychologist. The student monitored the completion of reading, spelling, penmanship, language, mathematics, science, and health on a daily basis. Phase I included baseline levels of completed assignments ranged from 0 to 30 % of assignments over a 10 day period. During phase II, the intervention of self-monitoring and weekly meetings began and the student completed 75 to 100% of assignments over a 20 day period. Phase III consisted of a return to baseline for 5 days, which resulted in the student completing 0 to 25% of assignments. During phase IV, the student participated in self-monitoring without weekly meetings, and high rates of 60 to 100% work completion were obtained. Phase V required the student to participate in weekly meetings only, which resulted in a drop of 15 to 35% assignments completed. The last phase required the student to return to self-monitoring with weekly meetings, which resulted in 60 to 100% of assignments completed.

Shapiro et al. (1994) noted that numerous studies questioned whether students should monitor on-task behavior or academic responses. Results indicated that monitoring on-task behavior is easier than monitoring academic responses. Both typically produced equal change in the target behavior. For many students, monitoring on-task behavior produced increased academic work completion. In addition, more students were willing to self-monitor their on-task behavior than their academic responses.

### Study Skills

Hefferman and Richards (1981) examined the study behavior of undergraduate students. One group experienced serious study problems and was interested in improving study behavior/skills. The second group of students was identified as having successful study skills: self-monitoring of some form (83% of the students); arranging rewards following studying (75% of the students); and stimulus control techniques (i.e., 100 % typically used isolation to study). The study skills of the successful group were taught to the group that experienced difficulty with study behavior and resulted in an increased overall grade for each student that ranged from 1/4 to 2/3 of a letter grade at a 7 week follow-up report.

Although the subjects were in college, the same strategies could be used with elementary, middle, and/or high school aged children. Although, homework is required more often after the elementary grades when parental guidance is decreasing (Armstrong et al., 1984). Three techniques are suggested to increase study behavior: establish time periods and locations that are isolated for studying; implement some type of self-monitoring (e.g., number of correct homework problems, total number of pages read); and associate the self-monitored behavior with a favorite activity or reinforcer (Armstrong et. al.).

### Written Expression

In a study conducted by Ballard and Glynn (1975), 37 subjects, ranging from 8 to 11 years of age, received written expression instruction from the same teacher. Instruction focused on using good writing skills: writing in sentences, using describing

words, and using action words. The students were assigned to a control or an experimental group. Target behaviors included: total number of sentences written, different action words, different describing words, and number of intervals on task. A sentence, action word, and different describing words were all operationally defined for the students. Three wall charts were posted with the first labeled as “good writing chart.” This chart included suggestions for writing sentences. The second chart was labeled as the “writing time chart” and listed suggestions on appropriate behavior during instructional time. The third chart was labeled as the “ideas” summary and provided topics to write about.

Students were required to self-monitor (observe and record) their number of sentences, different describing words, and different action words produced in their daily stories. They recorded the numbers on a sheet attached to their stories and transferred the numbers to a tally sheet attached to their writing folders.

During the 12 day baseline, mean number of sentences and action words ranged from 5 to 8, and describing words ranged from 7 to 14. The students then participated in 8 days of self-monitoring plus self-recording which did not have an impact on the mean number of sentences, action words, or describing words. Contingent reinforcement was then paired with self-monitoring. Students received points for the number of sentences written, different action words used, and different describing words. Reinforcement was contingent on the number of sentences written for 8 days, the number of action words for 8 days, and then the number of different describing words for the remaining 8 days. After reinforcement, increases in target behaviors occurred, in addition to an increase in on-task behavior. Mean number of sentences written increased and ranged from 15 to 21,

action words ranged from 14 to 24, and describing words ranged from 24 to 32.

Maintenance effects were not investigated.

Glomb and West (1990) investigated the use of self-monitoring and self-instruction to improve the completeness, accuracy, and neatness of creative writing assignments of 2 high school students with behavior disorders. The students learned to plan assignments and monitor their work for: completeness, how accurately they followed all of the directions or performance standards, and neatness. An acronym, WATCH, was used to indicate the steps that students followed: **W**rite down an assignment when it is given and write the due date, **A**sk for clarification or help on the assignment if needed, **T**ask-analyze the assignment and schedule the tasks over the days available to complete the assignment, and **C**heck all work for completeness, accuracy, and neatness.

Students were given envelopes containing five color pictures on each Monday and were told to write a story about each picture. Students handed in the stories on the following Friday. The first week consisted of baseline and students wrote stories without any training in the self-monitoring or self-instruction. The second week consisted of training the students. On the first day, students were taught how to identify the antecedents and consequences of their behavior in relation to completing independent seat work/homework. On the second day, students learned to perform the first three steps in the WATCH acronym, and then learned the last two on the following day. Students were instructed to evaluate their performance and award themselves points (ranging from 0-4) for each part of the acronym on each assignment. A trained rater evaluated student performance, compared it to the student's rating, and awarded bonus points for correct monitoring, recording, and evaluation.

Results indicated that using the WATCH procedure increased the completeness, accuracy, and neatness of the students' creative writing assignments. Completeness of homework increased from 22 to 87% and 62 to 89%. Levels of accuracy and neatness for assignments increased and varied between 83 and 100% and 60 to 100%, respectively. Maintenance effects were not investigated.

### Mathematics

In a study conducted by Szykula, Saudargas, and Wahler (1981), 2 fifth grade students were instructed to self-monitor the number of math problems assigned, number completed, and the number correct during a math class. Goal setting and contingent rewards were added later. Results indicated differing effects upon the 2 subjects. For one subject, limited change was evident before contingent rewards were added to the program. The other subject showed improvement when goal-setting elements were introduced.

Dunlap and Dunlap (1989) used a two-phase multiple baseline to investigate students' use of self-monitoring to improve their subtraction skills. Students with learning disabilities who had received verbal instructions on how to complete subtraction problems and points for successful completion were introduced to self-monitoring. Individualized checklists were developed and included a list of items that students were trained to self-monitor. This enabled them to avoid the types of errors that they had typically made during the baseline period. Students were required to place a plus or minus next to the items on their checklist for each problem. If a minus sign was recorded by the student, they were instructed to redo the problem without erasing their original

attempt. Points were awarded for correct answers. Additional points were awarded when students completed all steps of their self-monitoring checklist for each problem. The self-monitoring program resulted in the students completing more of the items correctly. At baseline, the students averaged 35%, 42%, and 48%. These averages rose during intervention to 82%, 97%, and 83% respectively. After students exhibited high levels of self-monitoring behavior, a maintenance phase began. Student 1 maintained intervention effects for 16 days, student 2 maintained effects for 4 days, and student 3 maintained effects for 12 days.

### Spelling

Kapadia and Fantuzzo (1988) compared the effects of teacher-management and self-management procedures on the spelling performance of 4 students with learning disabilities. The 4 students were randomly assigned to two groups of 2 each. After a baseline of 11 days, one group was assessed by their teacher during their daily spelling drill activity and the other group was trained to self-monitor, evaluate, and reinforce themselves. After 10 days of intervention, the self-monitoring and self-reinforcement group returned to baseline for 5 days, returned to the same intervention for 5 days, and returned to baseline for 15 days. The teacher-administered assessment group returned to a second baseline for 15 days after the 15 days of intervention. The groups then received the opposite assessment method (teacher vs. self-monitoring and reinforcement) for an additional 20 days before returning to baseline.

Results indicated that the students experienced a greater increase in spelling performance when self-monitoring and self-reinforcement were used. This was true for

all conditions: self-monitoring, self-evaluation and self-reinforcement occurring before and after teacher assessment. For students in the teacher-first group, during the teacher-monitoring phase, the students increased their baseline mean of 35 to 68 correct spelling problems. This increased to 86 during the self-administered phase. For students in the self-first group, during the self-monitoring and self-reinforcement phase, the students increased their baseline mean of 34 to a mean of 131 correct spelling problems. This decreased during the teacher-monitoring phase to 113. Both groups decreased during the return to baseline, which indicates that maintenance of the interventions was not successful and long-term effects of the intervention were minimal or absent.

### Reading

In a study by Lalli and Shapiro (1990), self-monitoring was used to improve the acquisition of “sight” words for students with learning disabilities. Eight students in first through sixth grades of a self-contained private school for students with learning disabilities were involved. The students’ mean age was 10.6 years with a range of 8.4 to 14.1 years. Students averaged a 2.1 year delay in reading. Five word lists that included 15 unknown vocabulary words each were formed for each student.

To self-monitor, students read a word orally and then listened to a taped recording of the word for correct pronunciation. If the student read the word correctly (before the tape recorded version was played), they recorded a plus on a recording sheet. Likewise, they recorded a minus if they read it incorrectly. After students mastered a list, they moved on to another one. Results showed that the use of self-monitoring was successful for students with learning disabilities acquiring “sight” word vocabulary. The use of self-

monitoring alone resulted in similar attainment of words when compared to the use of self-monitoring with a contingent reward.

The use of self-monitoring, as a sole intervention or in association with other self-management interventions, was effective in improving the academic skills of a variety of students in the schools. Self-monitoring was found to be effective without the use of contingent rewards for most students. For some students, contingent rewards were used when the common reactive effects of self-monitoring were not evident. It is supported as an effective intervention technique for students who experience problems with on-task behavior, work completion, study skills, writing, mathematics, spelling, and reading skills.

### Behavior Problems

Many students exhibit behavior that is viewed as disruptive to the classroom environment. Students are often unaware that the behaviors they exhibit are a problem. Rather, students view their inability to function in the classroom as a reflection of who they are, rather than as a function of their behaviors. Students, in turn, label themselves as irresponsible, distractible, obnoxious, sloppy, or bad (Sprick et al., 1993). Students begin to feel hopeless about themselves and their situations. Self-monitoring has helped many of these students. Self-monitoring, used alone or with accompanying self-management techniques, can help students decrease disruptive and increase appropriate behaviors.

## Transitions

Minner (1990) used a self-monitoring intervention to improve the time it took 3 students with behavior disorders to walk from their regular education classroom to their resource room and vice versa. The program required each student to press a switch that activated a stopwatch when they left one classroom. They pressed another switch that stopped the stopwatch when they arrived at the second classroom. The students then recorded a plus on a recording sheet if they made the transition in a specific amount of time. The teachers also monitored the transition times to ensure that the students were accurately recording their data, but the students were not told when the teachers would be monitoring. Students received teacher praise and were also able to choose a reinforcer every Friday. Reinforcers were assigned different values and used accordingly to reward students for being on time for 1 day, 2 days, 3 days, and 4 days. Rewards gained in value with the number of days that students were on time.

Results supported the use of self-monitoring. All students increased the number of appropriate transition times from under 20% of transitions in the baseline period to over 80% after the self-monitoring strategy was implemented. Treatment effects were monitored for each student for 1 to 4 weeks after the intervention was removed. For all students, the treatment effects were fully maintained at 100% of the total transitions. Shapiro & Cole (1994) noted that this procedure could be used with any classroom to decrease time lost during transitions.

Shapiro & Cole (1994) implemented self-monitoring with a 12-year-old student with a behavior disorder in a self-contained classroom. The student was referred for disruptive behavior during classroom transitions. Disruptive behavior was defined as not

(a) gathering appropriate materials, (b) sitting in his seat, and (c) beginning assignments. At baseline the student engaged in appropriate transitions 64% of the time over a 5 day span. The student designed the recording sheet with three transition rules listed: gather all materials; sit in appropriate area; do these quickly and quietly. Below the transition rules list, the student was instructed to place a plus or a minus in a monitoring grid for each of the seven periods of the school day. The teacher monitored the process to ensure intervention integrity. The student chose tokens from a reinforcement menu at the beginning of the day, contingent on completing 100% of the transitions in an appropriate manner.

Over the 10 days of intervention, the student improved his level of appropriate transitions to an average of 95% of the time. Interrater reliability comparisons resulted in the student being accurate 93% of the time. After 10 days of intervention, the recording procedure was phased out gradually (i.e., twice a week and then to once a week). During the phase out, the student maintained appropriate transition behavior 100% of the time. Self-monitoring the occurrence of specific behaviors, paired with reinforcement, was successful. Reinforcement was controlled by the student since he: (a) formed his own reward list; (b) selected one when appropriate; and (c) communicated the reward choice to his teacher. The reward was given at the end of the day. The pairing of contingent rewards with self-monitoring is not typically necessary. Although the intervention included the pairing of contingent rewards with self-monitoring, it is not known whether the use of rewards played an instrumental role in the intervention process.

### Inappropriate Verbalizations

Broden et al. (1971) used a self-monitoring intervention to decrease the disruptive blurting-out behavior of an eighth grade male during math class. The student was instructed to record every occurrence of audible and inaudible blurting-out behavior on a slip of paper attached to his desk. At the top of the slip of paper an instruction was listed: "Put a mark down every time you talk-out." A blurt-out was defined as any verbalization that occurred during class that was not recognized by the teacher. Blurts-outs were recorded if one occurred at any time in each 10 second interval. During the baseline phase, data was recorded for 9 days, during the first half of the class period that consisted of 25 minutes. After the first half of class, students attended lunch and then returned for the second half of class which consisted of 20 minutes. Data was obtained on days 1, 4, 5, 6, and 8 during the second half of the period.

The intervention resulted in a substantial decrease in blurting-out behavior. During the baseline phase, blurt-outs averaged 1.1 times per minute for the first half of the period and 1.6 times a minute during the second half of the period. During 7 days of intervention, blurt-outs decreased to a mean of 0.3 times a minute during the first half of the class and remained at 1.6 times a minute for the second half of class. Self-monitoring was then required for only the second half of class, and resulted in 1.2 blurt-outs a minute during the first half of class and a decrease during the second half to 0.5 times a minute over 7 days. Self-monitoring was then required for both sessions for an additional 7 days, which resulted in mean blurt-out rates of 0.3 times per minute during the first half of class to 1.0 times per minute during the second half of class. The self-monitoring intervention was then removed from both class periods and the frequency of blurt-outs returned to

baseline levels. Broden et al. (1971) noted that using a matching element (requiring the students' evaluations to match an observer's), may have strengthened intervention effects.

Shapiro, Albright, and Ager (1986) used a self-monitoring intervention to reduce the inappropriate verbalizations of a 14-year-old female student. The student had engaged in "high-frequency, negative actions, such as using sarcasm, calling out obscenities, or using a loud or rude tone of voice." The intervention required the student to self-monitor her positive and appropriate verbalizations. The target behavior was defined as responses to directions, consequences, or conversation in which positive words, tone of voice, and appropriate facial expressions were used.

After the student understood the definition of the target behaviors, she was trained in self-monitoring. She was instructed to make a tally mark on a recording sheet each time she engaged in an appropriate verbalization. The teacher or another observer also monitored the number of appropriate verbalizations. If the student equaled the observer's tally by 95% agreement or better, she was allowed to leave school 5 minutes earlier than she normally did. By requiring the student to match the observer's tally, she was required to acknowledge that she engaged in inappropriate behaviors. After this condition lasted for 10 days, the student and the entire class were allowed to leave school early, if the student matched the observer's tally. This condition lasted for an additional 9 days. The results of the study indicated that the student's rate of appropriate verbalizations significantly increased after the intervention procedure was implemented. Over the 11 day baseline, her percent of appropriate verbalizations averaged 56%, while her mean percentage of appropriate verbalizations during individual contingency equaled 96.8%,

and her mean percentage during group contingency equaled 92.1%. Maintenance effects were not investigated.

### Aggression / Emotional Control

Bolstad and Johnson (1972) used self-monitoring, evaluation, and reinforcement with 17 first and second grade students identified by their teachers as routinely displaying disruptive behavior in the classroom. Students participated in one of three experimental conditions. Phase one (six sessions) involved baseline collection of data on disruptive behavior: talking out or making inappropriate noise, hitting or physically annoying others, and leaving desk to do unassigned or inappropriate activities. A single observer in each classroom recorded occurrences of disruptive behaviors in 5 minute time periods. Each student was observed for 22 minutes daily.

In phase two (six sessions), subjects were instructed that if they exhibited fewer than five disruptive behaviors they would receive 8 points. If fewer than 10 disruptive behaviors, they would receive 4 points, and if more than 10 disruptive behaviors were tallied, they would receive no points. Points could be traded for reinforcers.

During phase three (seven sessions), two of the three experimental groups were trained in self-monitoring and self-evaluation. They intermittently observed and recorded their behavior on self-monitoring cards taped to their desks, evaluated their behavior, and then self-reinforced by following the previous reinforcer guidelines. In addition, the students' self-monitoring ratings were compared to those of the observer. Students received additional points for accuracy and lost points for inaccuracy.

In phase four (seven sessions), the two groups trained in self-monitoring, evaluation, and reinforcement, monitored their behavior independent of the experimental observer. During phase five (seven sessions), reinforcement was removed. All subjects were told that reinforcers were no longer available, but they were instructed to continue to observe and record their disruptive behavior.

Results of the study indicated that all subjects displayed fewer disruptive behaviors than the control group during the experimental phases, with an average of 40% fewer disruptive behaviors. In addition, the self-monitoring and evaluation phase of the experiment produced fewer disruptive behaviors than the externally managed phase of the experiment, with the two self-monitoring and evaluation groups averaging around 40% fewer disruptive behaviors than the externally managed group throughout all phases. Although subjects experienced a slight increase in disruptive behaviors during the extinction phase, disruptive behavior remained lower when compared to initial baseline levels. Of the externally managed group, 56% of the students maintained their reduced rates of disruptive behaviors at less than half of their baseline rate, while 69% of the students from the two self-monitoring and evaluation groups maintained their reduced rates of disruptive behaviors at or below half of their baseline rates.

Turkewitz, O'Leary, and Ironsmith (1975) paired self-monitoring with self-evaluation to decrease the disruptive behavior of eight students who ranged in age from 7 to 11 years. The students' target behaviors included: inappropriate verbalizations, aggression, inattention, and being out of seat. The students were taught to self-monitor their social and academic behaviors and self-evaluate periodically.

Students rated their behaviors using a “1” (poor) to “5” (excellent) scale. They recorded their evaluations on cards placed on their desk. Their teacher also monitored, evaluated, and recorded their behaviors. A token system was used and was dependent upon the teacher’s evaluations of the students’ behaviors. Gradually, tokens became dependent upon the accuracy of the students’ recorded data. When student evaluations matched teacher evaluations, students earned the number of points that they had assigned to their behavior. A baseline period lasted 4 days, then the students participated in a goal phase that required them to focus on a goal that was written on a card taped to their desk for six days. A self-monitoring/evaluation phase then began and lasted 5 days. The self-monitoring/evaluation was then paired with self-reinforcement for an additional 12 days that enabled students to exchange points that they had earned for edibles. Students matched their ratings with the teachers for the next 17 days, beginning with 100% of the students matching their ratings with the teacher’s for eight days, 50% of the students chosen randomly to match for five days, and 33% of the students chosen randomly to match for four days. Following this, matching ratings was totally absent for 5 days. Reinforcers were phased out in the same manner, over a 23 day time span.

Results indicated that matching student to teacher ratings was more effective in decreasing disruptive behavior than teacher ratings alone. Students performed better when they self-monitored. At baseline, students averaged 1.33 disruptive behaviors in every 20 second interval for 4 days. When self-monitoring/evaluation was introduced, a slight increase in disruptive behavior occurred. After the token economy was installed, the disruptive behavior dropped from 1.38 to .5 disruptive behaviors in every 20 second interval. Student-teacher matching produced further decreases, ranging from .28 to .30.

After the student-teacher matching intervention produced stable effects, it was phased out. A small increase of .40 disruptive behaviors occurred. Reinforcers were then phased out over 23 days and this also caused a slight increase in disruptive behaviors for all students, ranging from .38 to .60 disruptive behaviors in every 20 second interval. However, the overall rate of disruptive behavior remained at 1/3 to 1/2 of the baseline data levels.

Barkley et al. (1980) used self-instruction, self-monitoring, and self-reinforcement techniques to manage the disruptive behaviors during large group and individual work time of 6 male students with hyperactivity. The students ranged in age from 7 to 10 years old and were referred by their teachers or parents for hyperactive and impulsive behaviors. After baseline data was obtained on the frequency of students' inappropriate behaviors, students were trained to self-instruct, self-monitor, and self-reinforce.

Students observed a teacher present a problem during large group instruction and model the solution. Students then solved additional problems on their own. They were instructed to follow four steps of self-instruction: listen to the directions; repeat the problem/question out loud; describe the problem in your own words and talk yourself through the solution out loud; and check your answer to see if it solves the problem or question. The self-instruction steps were printed on a large poster.

During independent seat work, students worked on assignments at their desks and used a self-monitoring and self-reinforcement program. Students observed their own work behavior and recorded it when an audible tone signaled them. A poster was placed in front of the students that listed the rules for individual seat time: stay in your seat, work quietly, don't bug others, don't space out, and raise your hand if you need help.

Two independent observers behind a two-way mirror monitored and recorded student behaviors. After each 30 minute work session, observers compared their recordings with the students'. If a student's recordings matched the observers, the student received tokens and points for accuracy. The tokens could be exchanged for activities or access to the playground later.

Results indicated that misbehavior during large group instruction did not decrease, with inappropriate behaviors for all students averaging .33 per minute at baseline which remained the same during intervention. Misbehavior during individual instruction did decrease, with inappropriate behaviors for all students averaging .75 at baseline and decreasing to .22 during intervention. Large group instruction involved the self-instruction treatment, which did not appear to cause a change in students' misbehavior. The use of self-monitoring and self-reinforcement decreased student misbehavior in the individual work time setting when compared to baseline levels. Maintenance effects were not investigated.

Research supports the use of self-monitoring alone and in conjunction with other self-management procedures to reduce the occurrence of problem behaviors of students in classroom settings. It has been found to be a useful and efficient intervention technique for reducing: transition time, inappropriate verbalizations, and disruptive classroom behaviors.

### Caveats on the Use of Self-Monitoring as an Intervention Technique

Although self-monitoring is supported as a useful intervention technique for a wide range of academic and behavior problems, there are also a number of caveats.

Cautions include: the absence of research pertaining to the use of self-monitoring/management with students that experience severe disabilities, absence of generalization and maintenance research, and the lack of attention to reporting in the research the amount of time and cost involved in self-monitoring interventions.

Applicability of self-monitoring to students with severe cognitive impairments has been a very important issue that has not been addressed in the self-monitoring/self-management research literature. Much of the current research focused on students in the regular classroom or receiving special education services on the basis of mild disabilities. Although numerous studies focused on the needs of students with behavioral or learning disabilities, the use of self-monitoring with students with severe disabilities is almost non-existent in the literature. The use of self-monitoring with students who have severe physical or sensory impairments and those who have mental retardation has not been addressed. Self-monitoring may be an effective intervention technique for this population and should be investigated.

In relation to this, much of the research was completed in remedial, special education, or simulated classrooms. Only vague descriptions of the samples and environmental conditions were provided. Professionals may mistake the findings as those that have been a result of using self-monitoring procedures in a regular classroom setting.

Very little research focused on the issue of generalization and maintenance of self-monitoring effects. Many studies suggested the possibilities of generalization to other settings or the long-term maintenance of self-monitoring/management treatment effects. However, few studies investigated and reported generalization and maintenance effects. In many of the studies maintenance was not addressed at all. There was no follow up of the students and their academic or behavioral performance after a substantial amount of time elapsed. Therefore, the potential generalization and maintenance of the positive treatment effects has not been addressed and supported in the research literature. This is a very critical issue in relation to the effectiveness of self-monitoring/management as an intervention technique.

Another caveat in the use of self-monitoring techniques as classroom interventions is the absence of actual evidence of the time and cost efficient nature of the techniques that many researchers claim. Many researchers have not provided detailed information of the time and cost involved in using self-monitoring or self-management techniques. This could deter their use.

In addition, there is little information which is readily available to undergraduates who are studying to be teachers or to those teachers who are already practicing professionals. In a review of ten randomly selected classroom management texts (Jones and Jones, 1995; Zabel and Zabel, 1996; Levin and Nolan, 1996; Grossman, 1995; Canter and Canter, 1992; Emmer, Evertson, Clements, and Worsham, 1994; Evertson, Emmer, Clements, and Worsham, 1994; Charles, 1996; Cangelosi, 1997; and Wolfgang, 1995), four included self-monitoring/management as a classroom intervention technique.

Although self-monitoring/management was included in four texts (Jones et al., 1995; Zabel et al., 1996; Levin et al., 1996; and Grossman, 1995), only a brief and vague description was provided. This would not be sufficient for future or practicing teachers who want to design and implement self monitoring/management intervention programs. Jones et al. provided the most detailed description of general guidelines and case examples for using either the self-monitoring or self-instruction intervention technique with elementary and junior high students. The case examples made it easier to understand, but there were no details or cautions provided for design, implementation, generalization, or maintenance in the use of self-monitoring/management. Self-monitoring of academic problems was not addressed.

Grossman (1995) also included a more detailed description of self-management techniques for classroom behavior problems. He included disadvantages, generalization and maintenance. Grossman indicated the potential use of self-management with attention, behavior, emotional, and temperament problems of students. The reader was not supplied with detailed information on specific self-management strategies and there was no distinction between contingency based and cognitively based self-management approaches. Therefore, he provided a more detailed description when compared to the other classroom management texts cited, but it was not thorough enough to assist a teacher or professional in forming an intervention program.

Both Zabel et al. (1996) and Levin et al. (1996) provided brief and general descriptions of self-monitoring as an intervention for behavioral problems. Zabel et al. included definitions of self-monitoring, evaluation, and reinforcement in two paragraphs under the topic of self-management. Other self-management strategies were described as

contingency contracting and mediation essays. Contingency contracting was briefly described as a contracting agreement that a teacher may use with a student. Mediation essays were briefly described as cognitively based writing strategies to promote self-awareness.

Levin et al. (1996) only described self-monitoring. They supplied a general description of advantages of the technique when addressing behavior problems in the classroom. Some cautions were provided to assist the teacher or professional with the design and implementation process, but the technique was addressed in two pages of text. It was described succinctly and was done so in very general terms.

For teachers to acquire the knowledge and skills necessary for designing and implementing an self-monitoring/management intervention, there needs to be more detailed information readily available for teachers and other professionals responsible for interventions. Teaching the self-monitoring/management intervention during teacher training periods, would be very beneficial, but the lack of information available in classroom management texts indicates that the probabilities of this currently occurring are very slim. Educating future teachers and currently practicing teachers about the self-monitoring/management approach to intervention must occur before the intervention will surface as a commonly used, efficient intervention strategy in the school system.

All of the cautions that have been cited above would be detrimental to a teacher or professional seeking the knowledge needed to implement a self-monitoring or self-management intervention program. These may be addressed in future research, but currently remain as cautions when using self-monitoring/management techniques.

### Future Considerations

Self-monitoring has been referred to as one of the easiest, most time efficient, and most successful intervention strategies in helping students regain control over their learning environment. Although it is sometimes more effective when paired with self-reinforcement, the reactive effects of self-monitoring alone have resulted in targeted behavior change. It has been shown to increase exam performance and amount of homework completed correctly. Self-monitoring has also been used to increase the number of spontaneous answers given in class, amount of time spent on homework, and the amount of interest that a student displays in content areas. In addition, it has been used to decrease atypical behaviors that inhibit students learning.

Self-monitoring enables teachers to move away from the controlling behavior/thinking model of teaching. Students are able to choose to participate in the self-monitoring intervention, and in doing so, the student makes the initial choice to change their own behavior and/or academic performance. It helps students analyze their own thinking and behavior processes. By teaching students these self-monitoring skills, teachers give control to students, resulting in positive changes in academics and behaviors. This process enables students to become more self-regulated and efficient learners, one of the primary goals of our education system.

In addition, self-monitoring is a “teacher friendly” intervention. It is easy to implement for a number of target behaviors and can be beneficial for all students, not only the target student(s). A teacher may implement the intervention with a few students and observe reactive effects on the rest of the class. There are many different approaches to implementing a self-monitoring program. Most approaches are cost efficient and may

be personalized for each student by including them in the planning process. Regardless of the approach taken by the teacher, the majority of the control is handed over to the student during the treatment phase, which practically eliminates the time that is typically required of teachers to monitor the effects of an intervention on a student. It is also easily accepted by school personnel because of the “positive effects” focus. In other words, it does not operate from a punishment paradigm.

There are some cautions to note in the use of self-monitoring. By focusing on a uniform approach to defining self-monitoring/management, clearer understandings throughout the education field may be reached. Also, by conducting research in the use of self-monitoring/management interventions with the more severely handicapped school population, the use of self-monitoring/management may be extended to include all of the children in our school systems. In addition, research can further investigate the possible generalization and maintenance effects of self-monitoring, to further support its use as an intervention. By producing actual data on the cost and time efficiency of self-monitoring/management techniques, the appeal of the intervention will be further reinforced to teachers, professionals, students, parents, and communities.

Little research has been conducted on the extent of teacher knowledge and use of self-monitoring in the classroom. Teachers may not possess the procedural skills needed to develop successful self-monitoring interventions. It is critical that students are willing to participate in a self-monitoring program for the intervention to be effective. In addition, teachers must be able to accurately define the important target behaviors. By selecting an unimportant or useless target behavior as the focus of change, the intervention will not be truly effective and will not assist the student. To avoid the

inaccurate implementation of a self-monitoring intervention program, research must focus on the amount of training that teachers need to accurately and effectively implement a self-monitoring program. If teachers are informed of the cost effectiveness, user friendliness, and positive effects of self-monitoring interventions, it could become a preferred method of intervention throughout classrooms and schools.

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