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The effects of a self-recording procedure on student's on-task behavior

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The Effects of a Self-Recording Procedure on Student's On-Task Behavior

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Abstract

This study investigated the isolated effects of self-management on students on-task behavior through an operant analysis. Two elementary-aged students, receiving ABA services at a special education school were taught to self-record their on-task behavior using a Gymboss miniMAX timer that cued them at variable intervals. Following baseline, students were trained to self-record using Behavior Skills Training. A series of phases was then implemented to gradually increase the intervals. To isolate the effects of self-recording, feedback and reinforcement were not provided. Using a multiple baseline across participants design, a functional relation was demonstrated between self-recording and on-task behavior.

Introduction

Off-task and disruptive behaviors in the classroom often interfere with an individual's learning or the learning of others. Thus, these behaviors are often targeted by educators for reduction. Strategies for reducing these behaviors often rely on external agents to manage contingencies (e.g., teachers, administrators). Commonly, token reinforcement systems (or token economies) are used as a behavior management strategy by educators. A token reinforcement system is a behavior-change intervention that has three essential features: 1) a list of target behaviors, 2) tokens or points to be earned for emitting the target behavior, and 3) a list of preferred items or activities that can be exchanged for earned tokens (Cooper et al., 2020). The use of token economies has been shown to increase both academic and appropriate social behaviors across a variety of populations (Hackenberg, 2018). Although effective, externally managed interventions, including the token economy, require substantial effort on the part of educators to manage behavioral contingencies of students. This reliance on external management often entails observing and reinforcing the desired behavior change of a student. Alternatively, the transfer of these activities to the student may build a repertoire of behaviors that empower them to effectively contribute to the management of their own behavior.

Self-Management

One important goal in education is for students to become independent in monitoring and managing their own behavior (Cooper et al., 2020). To achieve this goal, self-management procedures can initiate desirable behavior change by teaching individuals the skills to manage their own behavior, thus reducing the need for control by others. Self-management procedures involve an individual applying behavior-change tactics that produce a desired improvement in

their own behavior (Cooper et al., 2020). These strategies contribute to developing a repertoire of skills, facilitating the evaluation, recording, and reinforcing of one's own behavior.

Skinner (1953) viewed self-management as an operant behavior in which individuals manipulate external variables to control their own behavior, similar to how the behavior of others is controlled. Skinner's conceptualization of self-management consists of two responses: the controlling response and the controlled response. The controlling response is the self-management behavior, and the controlled response is the target behavior that the individual wishes to change (Cooper et al., 2020). When an individual engages in self-management, they emit a response that controls the consequences of their behavior. Further, this allows individuals to provide input in some aspect of their behavior-change program to produce the desired behavior change.

Benefits of Self-Management

Self-management procedures have been effective across a range of populations, including typically developing children (Glynn, 1970; Olympia et al., 1994), students with learning disabilities (Amato-Zech et al., 2006; Dalton et al., 1999; Maag et al., 1993; Wolfe et al., 2000), students with emotional and behavior disorders (Rhode et al., 1983; Smith et al., 1988), and children with autism (Mithaug & Mithaug, 2003; Legge et al., 2010). Teaching students to observe, record, or reinforce their own behavior has been an effective strategy for increasing academic performance, reducing inappropriate behaviors (Ninness et al, 1991), increasing conversational skills (Koegel et al., 1993), recruiting teacher praise (Stokes et al., 1978; Connell et al., 1993), and improving work productivity (Rouse et al., 2014; Seymour & Stokes, 1976).

When self-management strategies are incorporated into behavior-change programs, the management of contingencies are transferred from the teacher to the student. This shift fosters

independence and allows teachers to devote more time to instruction (Koegel et al., 1999). In addition to these benefits, self-management procedures can foster generalized behavior change (Stokes & Osnes, 1989). When reliance of externally managed contingencies is reduced, students can acquire a repertoire of skills to be used in a variety of settings. Thus, students who emit self-management behaviors depend less on their teachers for guidance, reinforcement, and control than they did prior to intervention, cultivating generalized behavior change across behaviors, settings, people, and time (Stokes & Baer, 1977).

The literature on self-management indicates that it is an effective strategy for behavior change, including increasing the on-task behavior of students (Amato-Zech et al., 2006; Legge et al., 2010). However, self-management interventions are often paired with external reinforcement (e.g., token economies). Thus, it remains unclear as to how these strategies are functionally related to the target behavior. To contribute to and extend the research on self-management, this study sought to explore this gap in the literature and answer the following research questions.

Research Questions

The current study was conducted to answer the following questions:

1. Will the use of a self-recording procedure increase student's on-task behavior?
2. Can students be taught to manage their own behavior with minimal external support?
3. To what extent do students and teachers view this intervention as socially valid?

Literature Review

Glynn, Thomas and Shee (1973) outlined four central components of self-management which include self-assessment, self-recording, self-determination of reinforcement, and self-administration of reinforcement.

Self-Assessment

Self-assessment procedures involve an individual evaluating and comparing their performance with a predetermined goal or standard (Cooper et al., 2020). To improve classroom behavior, Drabman et al. (1973), Turkewitz et al. (1975), and Robertson et al. (1980) used matching and fading procedures to teach students self-assessment behaviors. For example, Drabman et al. (1973) used a self-assessment procedure to teach eight elementary age children with disruptive behaviors to evaluate their classroom behavior. They implemented a token system in which participants recorded the number of points they received from their teacher for appropriate social and academic behavior. Participants were then taught to rate themselves, receiving bonus points if their ratings accurately matched their teachers within a predetermined range. This matching procedure was gradually faded, with participants continuing to rate their behavior and determine their own reinforcement independent of teacher ratings. This systematic fading procedure allowed for evaluation and reinforcement duties to be transferred from the teacher to the students. Drabman et al. (1973) found that this process led to an increase in academic performance and a decrease in disruptive behaviors. Turkewitz et al. (1975) and Robertson et al. (1980) replicated Drabman et al.'s (1973) study using similar procedures, finding comparable outcomes. However, assessment of generalization and maintenance were not specifically assessed in these studies.

Rhode et al. (1983) included specific generalization procedures to extend these previous studies. Six elementary students with behavioral disorders in a resource room were taught to self-assess their performance of classroom behaviors. Students were taught how to self-assess their performance of following classroom rules and completing academic tasks using a 0- to 5-point scale at 15-minute intervals throughout the school day. Similar to earlier studies, Rhode et

al. used fading and matching procedures that resulted in the improvement of student's classroom behavior, academic completion, and ability to self-assess. When behaviors reached stable levels, the generalization and maintenance phases were introduced in which students assessed their behavior in their regular classrooms, with teacher matching gradually faded until students maintained appropriate behaviors. They found that the students appropriate classroom behavior as well as their self-recording behavior maintained and generalized from their resource room to their regular classroom.

Each of these studies examined the effects of self-assessment within the context of a token economy. Smith et al. (1998) sought to determine if self-assessment could be learned without the implementation of a token economy. They taught four junior-high students in a special education classroom to self-assess their off-task and disruptive behavior. Their initial findings suggested that self-assessment can produce change without the individual's behavior first coming under control of an external behavioral strategy, such as a token economy. However, as noted by Smith et al. (1998), evidence suggested these outcomes did not generalize to the student's regular classrooms, potentially explained by the inconsistency of teacher's ratings.

These studies demonstrated the effectiveness of self-assessment in the improvement of classroom behaviors. However, it is noted that all of these studies, with the exception of Smith et al. (1998), incorporated the use of token economies. Thus, it remains unclear the direct role self-assessment has on behavior, due to being paired with external behavioral management systems.

Self-Recording

Self-recording procedures involve an individual systematically observing their own behavior for the purpose of producing and assessing behavior change (Cooper et al., 2020). When an individual engages in self-recording, they discriminate between the occurrence or nonoccurrence of the target behavior.

Numerous studies have examined the effects of self-recording on academic performance (Knapczyk et al., 1973; Maag et al., 1993) and on-task behavior (Amato-Zech et al., 2006; Blick et al., 1987; Broden et al., 1971; Dalton et al., 1999; Legge et al., 2010; McLaughlin et al., 1985; Stewart & McLaughlin 1992; Wolfe et al., 2000). For example, to increase reading performance, Knapczyk et al. (1973) examined whether special education students could manage the recording aspect of a token system. They provided participants with individual work record books and instructed participants to enter the percentage of correct responses on their daily reading assignments. They found that self-recording of reading performance did not result in significant changes as compared to when it was not in place. Thus, students were able to self-record without diminishing their reading performance.

In a study by Dalton et al. (1999), two middle school students with learning disabilities were taught to use a self-management package to monitor their on-task behavior in various general education settings. To record their off-task behavior, participants completed a self-recording form by circling *Yes* or *No* to indicate whether they were off-task at the end of every 5 minutes. Participants also completed a checklist and a self-evaluation rating scale to further assess their behavior. If students completed the checklist accurately, they received points which they could exchange for reinforcers including candy, soda, or extra credit. Praise and feedback were also provided following a session. In their study, Dalton et al. (1999) found the self-

recording procedure to increase the student's on-task behavior as well their academic performance. In addition, teacher ratings were used to assess teacher reports of students' overall behaviors. These ratings indicated that students' off-task behavior decreased, and students' academic performance and productivity increased.

Amato-Zech et al. (2006) and Legge et al. (2010) utilized a tactile prompt to determine the effectiveness of self-recording on increasing the on-task behaviors of three fifth-grade students with learning disabilities in a special education classroom. They taught students to self-record their on-task behavior using a MotivAider, which is an electronic beeper that is programmed to vibrate either on a continuous or intermittent schedule (Amato-Zech et al., 2006). In this study, Amato-Zech et al. programmed the MotivAider to vibrate every 3 min cueing the students to record whether they were on task during writing and reasoning instruction. These forms were collected after each session by the classroom teacher. Generalization probes were conducted during math instruction, without the use of the MotivAider. Results demonstrated a functional relation between the self-recording intervention and the increase of on-task behavior. Moreover, questionnaires completed by participants and teachers indicated high ratings of acceptability for the intervention. Teachers reported that the intervention procedures were beneficial to the students and were easy to implement without extensive training. Teachers also reported they were willing to use the intervention in the classroom (Amato-Zech et al., 2006). Students indicated that they liked the intervention, felt that the intervention would help them in school, and did not think there were better ways to help their inattentive behavior.

Legge et al. (2010) extended this study to children with autism and implemented fading conditions. They taught three children in a special education classroom to self-record their on-task behaviors using a MotivAider. During math assignments, students wore the MotivAider on

their waistband. The device was set to cue students every 2 min to indicate if they were emitting each of the following behaviors: “eyes on work,” “in my seat,” and “doing work” (Legge et al., 2010). Following the end of each 20-min session, students received reinforcement (e.g., free time, listening to music) if they were on task for at least 80% of the session. Students who were on task for less than 80% of the session only received feedback and encouragement to work for reinforcement during the following session.

Following high and stable rates of on-task behavior, Legge et al. introduced a fading condition. The MotivAiders were set at variable intervals that progressively increased in time. Unlike the study by Amato-Zech et al. generalization across settings was not assessed. However, a 3-week maintenance condition was implemented to assess students’ on-task behavior without the use of the MotivAider or the self-recording data sheets. Students demonstrated 80-100% on-task behavior during the maintenance phase (Legge et al., 2010). Unlike the study by Amato-Zech et al. (2006), Legge et al. (2010) examined the accuracy of self-recording by comparing the experimenter’s data sheet and the students’ self-recording sheets. Results indicated that students had an overall high rate of accurate self-recording.

The results of Legge et al. (2010) supported the findings of Amato-Zech et al. (2006), indicating that self-recording procedures can produce an increase of on-task behaviors. Legge et al.’s (2010) study further extended the work of Amato-Zech et al. (2006) by examining the effects of cuing students to self-record using variable intervals, rather than fixed intervals.

Self-Managed versus Externally Managed Contingencies

Behavior-change programs typically entail externally managed contingencies, in which an external source evaluates an individual’s behavior and dispenses reinforcement contingent upon that evaluation (Bolstad et al., 1972). In contrast, self-managed contingencies occur when

an individual arranges specified consequences following occurrences or nonconcurrences of their behavior (Cooper et al., 2020).

Several studies have shown the effectiveness of student-arranged contingencies in fostering academic achievement (Stevenson & Fantuzzo, 1984; Humphrey et al., 1978; Flexibrod & O'Leary, 1973; Ballard & Glynn, 1975; Dickerson & Creedon, 1981; Lovitt & Curtiss, 1969; Glynn 1970; Olympia, 1994) and positive classroom behavior (Mithaug & Mithaug, 2003; Bolstad & Johnson, 1972; Glynn et al., 1973; Ninness et al., 1991; Drabman 1973; Fixsen et al., 1973). Self-managed and externally managed contingencies consist of one or a combination of the following: self-administered reinforcement and self-determined reinforcement.

Self-administered reinforcement. Self-administered reinforcement refers to a process in which an individual maintains their own behavior by dispensing their own reinforcement contingent upon their performance of the target behavior (Glynn et al., 1973). For example, Stevenson and Fantuzzo (1984) employed a self-management procedure to increase the math performance of a fifth-grade student with disruptive behavior. They taught the student to set academic goals, monitor their own performance, determine whether their performance had met their set goals, and select reinforcers based on their performance. Stevenson and Fantuzzo then assessed generalization of skills, finding that the intervention improved the student's academic performance and behavior in both the classroom and home settings.

Bolstand and Johnson (1972) compared self-management and external management procedures on the disruptive behavior of elementary students. Participants in one experimental group were taught to self-record their behavior and dispense their own reinforcers. In the other experimental group, observers evaluated participants' behavior and provided reinforcement

contingent on that evaluation. Results indicated that self-reinforcement was slightly more effective than externally administered reinforcement in reducing disruptive behavior.

Self-determined reinforcement. Self-determined reinforcement refers to the process in which an individual determines what, how much, or how often reinforcers are obtained based on their performance of the target behavior relative to their classroom performance (Ninness & Glenn, 1988). The process entails the individual using all available reinforcers to determine the nature and amount of reinforcement they should receive, contingent upon their performance of a given behavior or class of behaviors.

Lovitt and Curtiss (1969) compared the effects of a student-managed contingency and a teacher-managed contingency on the academic response rate of a student with behavioral disorders. For the teacher-managed contingency, the teacher dictated how many points the student would earn for each completed assignment. For the self-managed contingency, the student determined the number of points earned per assignment completed. Self-managed contingencies were found to be associated with a higher rate of academic responses as compared to the teacher-managed contingencies (see also Dickerson & Creedon, 1981: Flexibrod & O'Leary, 1973: Glynn, 1970).

Mithaug and Mithaug (2003) also compared teacher-managed and student-managed contingencies for promoting independent work. Participants were between the ages of 5 and 6 years and were enrolled in a school serving children with severe learning and behavioral challenges. For student-managed instructional sessions, the student set goals, selected assignments, and both recorded and evaluated their results. For teacher-managed contingencies, the teacher assigned and evaluated students' work independently of the student. As compared to

when they were teacher-managed, self-management responses were higher during student-managed contingencies.

In another study, Drabman (1973) compared the effects of a student-managed token economy with a teacher-managed token economy on reducing the disruptive behavior of 24 children residing in a psychiatric hospital. He found that participants' disruptive behaviors maintained at similar levels when the token economy was managed by peers as compared to managed by teachers.

Student-managed token systems have also been found to be effective with individuals residing in a residential group home (Fixsen et al., 1973). For instance, youths residing at Achievement Place participated in group decision-making through a self-government system. Staff at Achievement Place included teaching parents, who resided there and assisted in operating the program. Participants participated in group decision-making more often when they determined consequences for their peers than when their teaching parents determined the consequences.

The results of these studies examining self-administered and self-determined reinforcement indicate that self-managed contingencies produce positive changes in behavior just as effectively as with externally managed contingencies.

Current Study

The research on self-management indicates that it is an effective intervention for increasing challenging classroom behaviors across varying populations. However, uncertainty remains as to whether these interventions are effective without the pairing of external reinforcement. The current study aims to explore this topic by expanding the research of Amato-Zech et al. (2006) and Legge et al. (2010). This is accomplished in two ways. First, for a more

accurate analysis of the functional relation between self-recording and an individual's behavior a self-recording procedure was implemented independent from external reinforcement. Second, to reduce reactive effects and reliance on a tactile prompt, the tactile prompt was set to cue students on variable intervals (VI) rather than fixed intervals (FI) as done in the previous studies.

The purpose of this research is to examine the effectiveness of a self-recording intervention on elementary-aged students' on-task behavior. The goal of this study is to design an intervention that decreases control over an individual's behavior from an external agent. The studies from the reviewed literature suggest that self-management strategies are comprised of specific skills that can be taught to an individual, building a repertoire of behaviors that allows them to achieve the ultimate goal, becoming their own behavior change agent.

Methods

Participants and Setting

Two participants were recruited from a special education school in Virginia. Both participants had a diagnosis of autism spectrum disorder (ASD) and received applied behavior analysis (ABA) services at the school. Cory was a 5th-grade student and Nate was a 3rd-grade student. Both participants engaged in disruptive behaviors that included vocal protest, property destruction, and work refusal. Data collection was completed in the participant's classroom during independent work time. The researcher served as the primary data collector, and the participant's classroom instructor served as the secondary data collector. Prior to the start of the study, assent and consent was obtained for participants according to protocol approved by the James Madison University IRB.

Materials

Gymboss miniMAX Timer. Legge et al. (2010) used a MotivAider, which is a pager-like device that clips onto a belt or waistband and can be programmed to briefly vibrate at fixed or variable intervals. Currently, the MotivAider® is not available. As an alternative, a Gymboss miniMAX Interval Timer was used. The Gymboss miniMAX is a timer in which multiple intervals can be programmed to deliver a tactile vibration.

Self-recording form. A self-recording form was created and used by the participants. On the form, participants indicated whether they were "on-task" (see below) by writing either a plus (+) or a minus (-) (see Legge et al. 2010). During independent work times, the participants recorded their on-task behavior each time the Gymboss timer vibrated (Appendix A).

Data Collection and Analysis

Dependent variable. The dependent variable was on-task behavior. Being "on task" encompassed three behaviors: (1) "eyes on my work," (2) "in my seat," (3) "doing my work." The operational definitions are as follows:

Eyes on my work. The student's eyes are directed toward the designated assignment.

In my seat. The student's bottom is contacting their designated seat with the four legs of the chair on the ground.

Doing my work. The student is manipulating materials related to the assignment, e.g., pencil in hand, writing or erasing an item, or using a calculator; (see Legge et al. 2010).

Experimental Design

To evaluate the effectiveness of the self-recording intervention on the on-task behavior of participants, a multiple-baseline-across-participants design was used. Within the intervention, a series of changing criterions were implemented. Following baseline, the self-recording

procedure was implemented in a series of phases in which the variable interval gradually increased to evaluate incremental changes in on-task behavior. Each subphase was associated with a stepwise change in the performance criterion for the target behavior. In this study, experimental control was demonstrated when the target behavior increased as the criterion changed. In this study, subphases included the systematic change of the time interval. The initial criterion was set at a VI 1-min interval, then increased to a VI 2-min interval, a VI 4-min interval, and a VI 8-min interval. Participants moved to each subsequent phase following two consecutive sessions of on-task behavior at 80% or higher. The following is a description of the procedures for baseline, training, and changing criterions phases.

Baseline

Baseline data were collected for each participant during independent work time in which they were provided with assignments and instructed to complete the tasks. Prior to the start of baseline, the classroom teacher and instructors were trained on the procedure. The researcher was the primary data collector and used the Gymboss timer to record the participant's on-task behavior using a VI 1-min during a 10-min independent work time session. The participants on-task behavior was recorded when the device vibrated. A participant was recorded as being on-task if each of the following behaviors are emitted: (1) "eyes on my work," (2) "in my seat," (3) "doing my work."

Training

One 10-min training session was conducted with each participant using Behavior Skills Training (BST) to teach the self-recording procedure. The researcher conducted the training with each participant individually. Participants were provided with an assignment, a self-recording sheet, and a Gymboss timer. The researcher first provided an overview of the

procedures. The researcher then handed participants the self-recording data sheet and provided instructions on how to complete the sheet. There was then a demonstration of how to complete the data sheet using the following steps: (1) start the assignment (2) when the device vibrates write a (+) or (-) for each behavior for the corresponding interval on the self-recording sheet; and (3) after self-recording continue to complete the assignment until the device vibrates again. There was a discussion of the operational definitions of on-task behaviors along with nonexample behaviors. The Gymboss timer was then set at a 1-min fixed-time interval for the participants to practice the procedure. The self-recording intervention was introduced when participants demonstrated 80% accuracy or higher following the training session. Subsequent training sessions would have been implemented if participants did not reach this criterion, but this step was not required for either participant.

Self-Recording Changing Criterion Phases

The intervention consisted of four changing criterion phases. During each phase, self-recording occurred during 10-min sessions of independent work time, in which participants were instructed to complete the designated assignment. The device was programmed to vibrate at specific intervals, and participants were instructed to place the device on their desk or wear it on their waistband. For the initial phase of the intervention, the performance criterion was set to a V1 1-min schedule. A variable-interval schedule was selected because this schedule tends to produce a constant, stable rate of response (Cooper et al., 2020). Each time the device vibrated using a VI of 1-min. the participant recorded either a (+) or (-) in the corresponding interval to indicate if each of the on-task behaviors were emitted. The subsequent phases were set to VI 2-min., VI 4-min., and VI 8-min. Participants progressed across each phase following two sessions of on-task behavior at 80% or higher. The goal of evaluating participants on-task behavior with

increasing performance criterions was to have participant's self-record their behavior on an increasingly thinner schedule. During each session, the researcher's device was set to vibrate at the same time intervals as the participants devices. Throughout the session, the researcher and classroom staff did not provide feedback or reinforcement for accuracy or on-task performance.

Interobserver Agreement

Interobserver agreement (IOA) was assessed on 30% of sessions in all conditions using the interval-by-interval method. Point-by-point IOA was calculated by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100. IOA sessions consisted of the researcher and the participant's instructor independently and simultaneously observing and recording the on-task behavior of participants. The researcher and instructor both had Gymboss timers and pressed start simultaneously. IOA for each participant ranged from 90-100% during baseline and intervention conditions.

Procedural Fidelity

Procedural fidelity data were collected across 100% of sessions in all conditions. During sessions, the researcher referred to a 6-step procedural fidelity checklist to ensure that the participant's instructor implemented the intervention correctly (Appendix B). Data were recorded on whether the steps were implemented correctly and in the correct sequence. Procedural fidelity was calculated by dividing the number of steps implemented correctly by the total number of steps and multiplying by 100. The instructors implemented the intervention with 83-100% fidelity.

Social Validity

To assess the social validity of this intervention, the classroom teacher, instructors and participants were provided a questionnaire following the intervention (Appendix C). These

questionnaires were adapted from the Intervention Rating Profile-15 by Elliott and Treuting (1991). The teacher and instructors were asked to complete a 15-item questionnaire to assess their acceptability of the intervention. Participants completed a 7-item questionnaire to assess treatment acceptability (Appendix D).

Results

On-Task Behavior

Figure 1 displays the percentage of intervals of on-task behaviors for Cory and Nate across conditions. During baseline, participants demonstrated rates between 40-70% of on-task behavior. Following baseline, participants were trained to use the Gymboss miniMAX timer to self-record their on-task behavior and were introduced to subsequent performance criterion levels. The vertical dashed lines indicate the established criterion change for each phase. As the criterion level changed, the rate of on-task behavior maintained. There were some decreases in performance as these changes occurred but stayed at a level above baseline.

Cory's mean percentage of on-task behavior during baseline was 60% with a range from 40 – 70%. Upon implementation of the first phase of the self-recording intervention, there was an increasing trend, reaching to 100% of intervals of on-task behavior. As the intervals increased in subsequent phases, Cory's on task behavior averaged at 80% with some variability over time.

Nate's mean percentage of on-task behavior during baseline was 53% with a range from 30 – 70%. Upon implementation of the first phase of the self-recording intervention, there was an increasing trend, reaching 80% of intervals of on-task behavior. As the intervals increased in subsequent phases, Nate's on task behavior remained steady, stabilizing at 80% for several

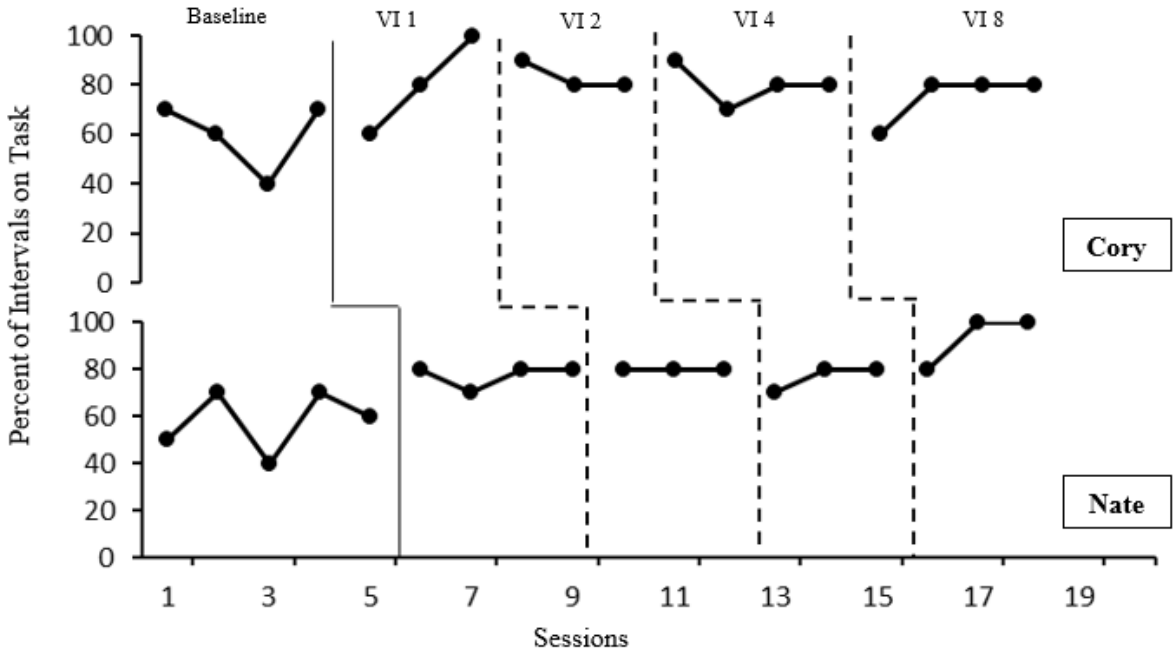
sessions until reaching 100%. These results suggest that Nate's on-task behavior maintained without external reinforcement.

Social Validity

The results from the social validity rating profiles indicate that the classroom staff had high ratings of acceptability for this self-recording intervention. Specifically, they reported that they would be willing to use this intervention in their classroom and that it was beneficial to the participants. The results from the rating profiles completed by the participants indicate that they liked the intervention and thought that it helped them in the classroom.

Figure 1.

Percent of Intervals of On-Task Behavior



Discussion

Strategies to reduce challenging classroom behaviors often rely on external agents to manage contingencies, putting an unsustainable burden on teachers, administrators and others. Fortunately, studies have shown self-management interventions to be effective across differing populations (Maag et al., 1993; Mithaug & Mithaug, 2003; Olympia et al., 1994; Smith et al., 1988; Wolfe et al., 2000). However, these studies have commonly paired self-management with external reinforcement, limiting conclusions about the utility of self-management procedures themselves (Dalton et al. 1999; Legge et al. 2010; Rhode et al. 1983). In this study, the isolated effects of a self-management procedure on students on-task behavior were investigated.

The purpose of this study was to determine the effects of a self-recording intervention on the on-task behavior of students. The results demonstrate that self-recording was effective in increasing the on-task behavior of two participants in a special education classroom. Specifically, this study extends the literature by analyzing the effects of a self-recording intervention in isolation form external reinforcement. Similar to the research by Amato-Zech et al. (2006), these findings demonstrate that students are able to manage their behavior with minimal reliance on external reinforcement. Although free time was an established part of participant's schedule it remained constant throughout the study, thus, the changes during the intervention can be attributed to self-recording. Future research is needed to expand on these findings for more thorough analyses. It also should be noted that although Cory's on-task behavior displayed an overall increase, there was some variability in his data. This may suggest that some form of external reinforcement would be necessary to maintain and further increase his behavior. Overall, this study supports and extends previous research which demonstrates the effectiveness of self-recording.

Although the results indicate that external reinforcement was not required to maintain participant's on-task behavior, it is important to investigate the potential maintaining mechanisms for these findings. To examine these variables evoking on-task behavior, an interpretation of the function-altering effects of rules is necessary. For example, self-recording can be interpreted as rule-governed behavior based on the statement of telling participants to self-record their on-task behavior following the cue of the vibration from the timer. However, in further examining the antecedent variables that evoked participant's on-task behavior, it may be the effect of a contingency-specifying stimulus rather than the function of a discriminative stimulus.

Rules are often described as discriminative stimuli in which they evoke a response due to that response having been reinforced in the presence rather than in the absence of the stimulus (Schlinger, 1993). However, a more thorough analysis indicates that these verbal stimuli, or "rules" alter the behavioral functions of other events and are considered function altering (Schlinger & Blakely, 1987; Schlinger, 1993). Thus, the verbal stimuli may evoke a response by altering the behavioral functions of the events specified by the rules. For instance, the statement, "when the timer vibrates, record your behavior" alters the function of the stimulus (e.g., the vibration from the timer). The vibration now has evocative control over the behavior of self-recording, rather than the rule. This complex process requires a more complete analysis of how rules evoke an individual's behavior.

Limitations

Despite the effectiveness of the current study, it is important to highlight the limitations presented. First, this research was done in the context of the participant's typically scheduled independent work time in which access to free time was provided following the completion of

work. Although there was no reinforcement or feedback from the teachers or staff during or after sessions, participants had access to free time following the completion of a 10-min work period. To prevent evoking challenging behavior, this pre-established schedule was not altered. Therefore, this presents a potential threat to the interval validity of this research, as this extraneous variable was not controlled for. Thus, it is undetermined if free time functioned as a reinforcer for on-task behavior. Despite this, it is important to note that free time remained a constant variable throughout this study, indicating that the effects of the intervention were attributed to self-recording.

Additionally, this study did not assess the generalization or maintenance of behavior change. For effective behavior change, the behavior needs to occur over time, across settings, and across people (Stokes & Osnes, 1989). Thus, future research should explore whether on-task behavior would generalize to different settings. For example, this study conducted sessions only during independent work time. It would be advantageous to examine the effects of this intervention during diverse instructional settings including whole group instruction. Future research should also examine if increases in on-task behavior would sustain once the timer was removed and maintain on its own with the natural consequences available in the environment.

Clinical Implications

Future research on self-recording interventions is imperative to ensure a thorough investigation of this topic. The current study indicates that self-recording can be effective with minimal reliance on external reinforcement (e.g., teacher feedback, token economies). However, future replications and similar research should focus on further isolating these effects. For instance, component analyses would be beneficial in systematically isolating the effects of self-recording and reinforcement to determine which specific element is most effective in increasing

students on-task behavior. In addition, researchers could extend this study by examining the effects of self-recording on student's academic productivity.

In conclusion, instructing students to self-record their on-task behavior with the use of a tactile prompt is both an effective and practical intervention, enabling students to become their own behavior change agent.

Appendix A

Self-Recording Sheet

Name: _____
Date: _____

Interval	**On-Task (+/-)**		
	Eyes on my Work	In my Seat	Doing my Work
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Appendix B

Self-Recording Procedural Fidelity Checklist
Date:
Instructor:

Intervention Step	Yes	No
1. The instructor presented the student with a task.		
2. The instructor provided the necessary materials (e.g., Gymboss timer, self-recording data sheet, task, etc.).		
3. The instructor set each of the Gymboss timers.		
4. The student placed the Gymboss timer on their desk or clipped it to their waistband or shirt.		
5. The students wrote “+” or “-” for the corresponding interval.		
6. The instructor did not provide feedback or reinforcement during or following the session.		

Appendix C

POST-INTERVENTION

_____ _____ _____

Student Rater completing this form Date

Adapted Version of the Intervention Rating Profile-15

The purpose of this questionnaire is to obtain information that will aid in the selection of future classroom interventions. These interventions will be used by teachers of children with identified needs. Please circle the number which best describes your agreement or disagreement with each statement.

	Strongly disagree	***Disagree***	***Slightly disagree***	***Slightly agree***	***Agree***	***Strongly agree***
1. This was an acceptable intervention for the child's needs.	1	2	3	4	5	6
2. Most teachers would find this intervention appropriate for children with similar needs.	1	2	3	4	5	6
3. This intervention proved effective in supporting the child's needs	1	2	3	4	5	6
4. I would suggest the use of this intervention to other teachers.	1	2	3	4	5	6
5. The child's needs were severe enough to warrant use of this intervention.	1	2	3	4	5	6
6. Most teachers would find this intervention suitable for the needs of this child.	1	2	3	4	5	6
7. I would be willing to use this intervention in the classroom setting.	1	2	3	4	5	6
8. This intervention did *not* result in negative side effects for the child.	1	2	3	4	5	6
9. This intervention would be appropriate for a variety of children.	1	2	3	4	5	6
10. This intervention was consistent with those I have used in classroom settings.	1	2	3	4	5	6
11. The intervention was a fair way to handle the child's needs.	1	2	3	4	5	6

12. This intervention was reasonable for the needs of the child.	1	2	3	4	5	6
13. I liked the procedures used in this intervention.	1	2	3	4	5	6
14. This intervention was a good way to handle this child's needs.	1	2	3	4	5	6
15. Overall, this intervention was beneficial for the child.	1	2	3	4	5	6

Total (sum all points circled; higher scores indicate higher acceptability; range = 15-90):

Comments: _____

Source: Adapted from Witt, J.C. & Elliott, S.N. (1985). Acceptability of classroom intervention strategies. In Kratochwill, T.R. (Ed.), *Advances in School Psychology, Vol. 4*, 251 – 288. Mahwah, NJ: Erlbaum. Reproduced under Fair Use of copyrighted materials for education, scholarship, and research. 17 U.S.C. § 107

Appendix D

POST-INTERVENTION

Student:

Date:

Adapted Version of the Children's Intervention Rating Profile

	I agree  1	2	3	4	5	I do not agree  6
1. The program we used was fair.						
2. I think my teacher was too harsh on me.						
3. Being in this program caused problems with my friends.						
4. There were better ways to teach me.						
5. This program could help other kids, too.						
6. I liked the program we used.						
7. Being in this program helped me do better in school.						

Comments:

_____

____

_____

_____ Please see Excel file, "Social Validity Adapted CIRP Scoring Tool" and PDF document, "Social Validity Adapted CIRP Scoring Guide" for scoring instructions. *Source:* Adapted from Witt, J.C. & Elliott, S.N. (1985). Acceptability of classroom intervention strategies. In Kratochwill, T.R. (Ed.), *Advances in School Psychology, Vol. 4*, 251 – 288. Mahwah, NJ: Erlbaum. Reproduced under Fair Use of copyrighted materials for education, scholarship, and research. 17 U.S.C. § 107

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