USING SELF-MONITORING TO IMPROVE ON-TASK BEHAVIOR AND
ACADEMIC PERFORMANCE OF HIGH SCHOOL STUDENTS WITH
ATTENTION DEFICIT/ HYPERACTIVITY DISORDER

THESIS

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ABSTRACT

This study used audio-taped chimes and a student checklist for on-task/ off-task behavior. The study took place in a high school study hall specifically for students with disabilities. The three participants were tenth graders and had the diagnosis of ADHD. The observers used a 10-second whole interval recording system to record on-task/ off-task behavior within an alternating treatment design. The conditions included: Baseline, Self-Monitoring, and Self-Monitoring with Reinforcement. Results indicate self-monitoring alone was effective enough to significantly increase the on-task behavior of two participants. Additional reinforcement was needed to increase the on-task behavior of the third student.
Dedicated to my parents, Chris and Larry Graham
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CHAPTER 1

INTRODUCTION

Attention Deficit Hyperactivity Disorder (ADHD) is a rapidly growing diagnosis for individuals with special needs in Special Education and one of the most controversial. The disorder represents one of the most common reasons children are referred for behavioral problems to medical and mental health practitioners in the United States and is one of the most prevalent childhood psychiatric disorders (Barkley, 2006). ADHD is the current diagnostic label for children presenting with significant problems with attention, along with impulsiveness and excessive activity as well (Barkley). The American Psychiatric Association (2000) estimates that approximately 3 to 5% of school-aged children and adolescents have the disorder, with boys outnumbering girls 2:1 to 6:1 (Biederman et. al., 2002). Girls are often older than boys by the time they are diagnosed and they are less likely to be referred for an evaluation (Parker, 2006). It has also been reported that 27% of students with disabilities are diagnosed with ADD/ADHD (Office of Special Education and Rehabilitative Services, 2003). They are often served under the
special education category of Other Health Impairments. Others may receive special education services under the specific learning disability or serious emotional disturbance labels.

One of the challenging tasks that educators face is motivating their students to focus and complete school assignments (Litner, 2003). This is particularly true for children with disabilities, including those with ADHD who have difficulty following directions and completing tasks (American Psychiatric Association, 2000). The fact is that as children matriculate in school there is an expectation that they will increase their capacity to work independently to successfully complete tasks. However, children with ADD or ADHD may continue to struggle with short attention spans and an inability to focus long enough to complete many school assignments. Adolescents who are otherwise capable of completing academic tasks may experience failure in school due to their inability to be organized and complete assignments.

One strategy that has proven successful in helping students with and without disabilities to improve their ability to stay on task is self-monitoring (Carr & Punzo, 1993; Crum, 2004; Gureasko-Moore, DuPaul, & White, 2006; Harris, Friedlander, Saddler, Frizzelle, & Graham, 2005; Hughes, Ruhl, & Masra, 1989; Kern & Dunlap, 1994; Levendoski & Cartledge, 2000; Maag, Reid, & DiGangi, 1993; Mathes & Bender, 1997; McDougal & Brady, 1995; Reid, Trout, & Schartz, 2005; Wolfe, Heron, & Goddard, 2000; Wood, Murdock, Cronin, Dawson & Kirby, 1998;). Self-monitoring has been used to improve the on-task behavior of adolescents and indirectly their academic achievement. For example, Shimabukuro, Prater, Jenkins, & Edelen-Smith examined the
effects of self-monitoring with 3 male students in the sixth and seventh grade with the diagnosis of ADHD. The students used self-monitoring procedures during independent work time to increase their on-task behavior and to assess their academic performance in math, reading, and written expression. The students recorded their completion and accuracy progress in these academic areas on charts. Gains in work completion, academic accuracy, and on-task behavior were demonstrated for all of the participants in this study.

Purpose of the Study

The purpose of this study was to examine the effects of self-monitoring on on-task behavior with high school students diagnosed with ADHD during an independent study hall. The study also investigated the effects of self-monitoring on academic performance.

Literature Review

The literature review covers three main topics: a) adolescents with ADHD, b) on-task/off-task behavior, and c) self-monitoring.

Adolescents with Attention Deficit/Hyperactivity Disorder (ADHD)

ADHD is defined as significant problems with attention, and typically with impulsiveness and excessive activity (Barkley, 2006). The terms ADHD and ADD are applied to several symptoms including: difficulty in paying attention, distractibility, having a hard time following through on tasks, and sometimes over-activity and impulsivity. The causes of this disability are varied, as is the severity and the form in which the difficulties manifest. Oversensitivity and under-sensitivity to the environment
are the main problems that these children face, and their symptoms are a reaction to the perceived stimuli, or lack thereof. The American Psychiatric Association (2000) specified four subtypes of ADHD: a) predominantly inattentive, b) predominantly hyperactive impulsive, c) a combination of the first two subtypes, and d) ADHD not otherwise specified.

Adolescents with ADHD struggle to maintain attention in almost every situation. Attention difficulty can be attributed to various factors. Brown (2000) described the brain of students with ADHD as lacking typical “executive function”. The brain’s executive functions are those that serve to organize, activate, focus, integrate and direct the brain’s activities to perform its routine and creative work (Brown). Specifically, executive functioning also includes inhibition of behavior and irrelevant information, nonverbal working memory, verbal working memory, self-regulation of affect, motivation and arousal, planning, decision making, self-monitoring of the entire solving problem process, and self-evaluation of the results of the action taken. Disorders of one or more of the executive functions may be found in children and adolescents who have ADHD, Tourette syndrome, bipolar disease, depression, obsessive-compulsive disorders, autism, or traumatic brain injury (Papazian, Alfonso, & Luzondo, 2006).

Litner (2003) stated that Attention Deficit Disorder (ADD) is a complex neurobiological disorder believed to be caused by the malfunctioning of the neurotransmitters, which are the brain’s chemical messengers. The inefficiency of the neurotransmitters causes the brain to be less active on thinking tasks and results in serious
impairment of the executive functions of the brain, which would include the ability to self-monitor.

The diagnosis of ADHD is currently a topic of contention. The measures used to determine if a child has attention problems are often very subjective and general. Currently, the criteria in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR) are used to determine if a child has ADHD. A physician must determine that a child consistently displays six or more of the symptoms of either inattention or hyperactivity-impulsivity for a period of at least 6 months (American Psychiatric Association, 2000).

The field of behavior analysis may have a lot to offer in fixing the subjective measures used to determine if a child has ADHD. Neef and Lutz (2001) conducted a study that tested the effects of four variables (rate of reinforcement, quality of reinforcement, immediacy of reinforcement, and response effort) on choice. The assessment used in the study could potentially be used as an objective, behavioral measure to diagnose impulsivity, one of the defining characteristics of children with ADHD, as well as aid professionals in the construction of interventions and ongoing assessments that focus on the strongest reinforcement dimension(s) for individual students. (Neef & Lutz).

*ADHD Interventions for On-task Behavior*

Once a child has been assessed and diagnosed as having ADHD, there is an array of intervention approaches professionals and families can consider. The interventions for
children with ADHD generally fall under three categories: psychostimulant medications, behavioral interventions, and accommodations (DuPaul & Weyandt, 2006).

*Psychostimulant medications.* Psychostimulant medications are used for their ability to balance chemicals in the brain that prohibit the child from maintaining attention and controlling impulses. Some examples of psychostimulant medication may include methylphenidate or Ritalin and some examples of non-stimulant medication may include atomoxetine (Strattera), bupropion (Wellbutrin), and clonidine (Catapres). Once again, the research that has been conducted to assess the effectiveness of medication has been based on subjective ratings such as indirect informant measures. The large differences reported on the usage of medication have not led to a consistent pattern of analysis. The usage of behavioral measures may lead to a more formal and accurate conclusion of the effectiveness of medication. Behavioral pharmacology identifies how the environmental variables that typically regulate behavior interact with or are altered as a result of drug administration. Neef, Bicard, Endo, Coury and Aman (2005) examined this approach with 58 students. Based on the definition the authors used for impulsivity, the results implied that medication alone did not affect impulsivity.

*Behavioral interventions.* Contingency management is the second most widely used protocol for treatment of ADHD for behavior interventions (DuPaul & Weyandt, 2006). This approach focuses on the antecedent behavior (what occurs before the problem behavior) and the consequence behavior (what occurs after the behavior). The usage of a functional assessment to determine the environmental factors that may cause or maintain behaviors of students with ADHD has yielded some promising results (Ervin,
DuPaul, Kern, and Friman, 1998). It has also been noted that this approach can lead to more effective interventions within the educational setting. Ervin et. al. conducted a study that utilized classroom-based functional and adjunctive assessments to determine the most effective and feasible interventions for adolescents with ADHD. The results of this study support the utility of functional assessment as a process through which classroom intervention strategies can be selected and evaluated for adolescents with ADHD.

**Accommodations.** Accommodations are necessary for most children with ADHD, in order for them to experience success in school settings (Parker, 2006). Some common accommodations may include, but are not limited to extended time for assignments and/or assessments, communication between home and school to report behavior difficulties or missing work, prompts to redirect student attention, shortened assignments, assignments that are broken down into smaller more manageable tasks, a separate setting for assessments with less distractions, and guided notes (Parker, 2006).

**Multiple interventions.** Research has shown that a multimodal approach is far more effective when working with students with this disorder, than just implementing one intervention (DuPaul & Weyandt, 2006). A multimodal approach is would be defined as the combination of medication, behavior management, and/or accommodations within the school or home setting. Communication among the adults in the students’ lives is also a key aspect to effective interventions within the schools (Litner, 2003).

**Self-monitoring**

One of the most widely studied methods to increase on-task behavior for various populations of students is self-monitoring procedures. “Self-monitoring, self-recording,
self-observation, and self-assessment all refer to an individual systematically observing his or her own behavior and responding to the occurrence or nonoccurrence of a specified target response" (Cooper, Heron & Heward, 2007, pg. 524). Self-monitoring takes many forms and utilizes various strategies. Numerous studies have utilized a checklist, auditory cues, the process of self-statements, kinesthetic cues (such as the MotivAider), frequency counts, step-by-step prompts, and much more. The effects of self-monitoring have been studied since the 1970s with various populations of students, in various settings and across various skills.

Self-monitoring is even highly valued and widely used in the medical field. A group of doctors contend that teaching patients to monitor their own blood pressure at home yields much more desirable results and more important information for the effective treatment of high blood pressure (Stergiou, Mengden, Padfield, Parati, & O’Brien, 2006). Weight Watchers is a popular weight loss program that utilizes self-monitoring as a cornerstone to their success (New York Stock Exchange, 2006).

Mathes and Bender (1997) examined the effects of self-monitoring procedures and pharmacological intervention with 3 elementary school boys within the resource room setting. The dependent variable in this study was on-task behavior and the intervention included an audiotape cue as well as a student checklist. On-task behavior improved for all participants and remained high for the duration of the study.

The majority of the studies that have been conducted relating to self-monitoring with various populations have yielded positive results and almost always increase the desirable behavior. Even though there has been a significant amount of research that
supports the usage of self-monitoring procedures to increase desired behaviors, the intervention is still not common practice within the classroom.

_Self-monitoring and students with Behavior Disorders._ One of the most common populations of students this technique has been applied to includes students with behavior disorders (Carr & Punzo, 1993; Crum, 2004; Freeman & Dexter-Mazza, 2004; Hughes, Ruhl, & Misra, 1989; Kern & Dunlap, 1994; Levendoski & Cartledge, 2000; McDougal & Brady, 1995; Mooney, Ubing, Reid, & Epstein, 2005). For example, Levendoski and Cartledge conducted a study with 4 elementary school males who were diagnosed with serious emotional disturbances. The study took place within a self-contained classroom specifically for students with behavior disorders. The intervention utilized a bell that sounded every 10 minutes and a student checklist that prompted the students to ask themselves if they were doing their math work. The dependent variables included time on task and academic productivity. The results of the study indicated that the students were able to effectively self-monitor their own behavior as well as perform the math skills. Both behaviors, on-task behavior and academic productivity, increased as a result of the self-monitoring procedures. One aspect of this study that made it unique was the implementation of a fading phase where the checklists were gradually faded and students had to covertly ask themselves if they were doing their work. There was evidence that the newly learned self-monitoring skill did continue to affect on-task behavior, even without the usage of the checklist.

_Self-monitoring and students at-risk._ Additionally, students who have been classified as “at-risk” have benefited from this intervention in an effort to remediate
academic skills and behavior (Peterson, Young, West, & Peterson, 1999; Wood, Murdock, & Cronin 2002; Wood, Murdock, Cronin, Dawson, & Kirby, 1998). For example, Wood et. al. examined the effects of self-monitoring with 4 adolescents who were considered to be at risk of failure due to low average range on achievement tests and suspensions from school due to disciplinary problems. The target behaviors in this study included on-task behavior and academic performance. The students used a checklist to monitor their on-task behavior during their classes. There was an immediate increase in the students' on-task behavior after the intervention was implemented. The results indicated a delayed and gradual increase in the students' academic performance. A few years later, Wood et. al. conducted another study that utilized self-monitoring procedures, but this time they measured academic performance, maintenance, and generalization. Once again, they found positive correlations between the self-monitoring strategy and the dependent variables.

*Self-monitoring and students with learning disabilities.* A study by Maag, Reid, and DiGangi (1993) examined the effects of self-monitoring on attention, accuracy, and productivity with 6 elementary school students classified with learning disabilities. The students were taught to use the self-monitoring procedure within the resource room setting. The intervention included a tape with audio chimes and a checklist that required the students to assess the following: on-task behavior, a count of problems completed since the last chime, and a count of correct problems that were checked with a student copy of the answer key. There was an increase in all three measures with all of the students after the implementation of the self-monitoring intervention.
**Self-monitoring and academic skills.** There has also been an increase of the usage of self-monitoring applied to increasing academic skills. Wolfe, Herron, and Goddard (2000) examined the effects of self-monitoring on written language performance with elementary school students with learning disabilities. As with the previous studies, the self-monitoring intervention included an audio taped chime as well as a checklist. The students’ on-task behavior and number of words written during the observation period were measured. There was a definite increase in on-task behavior, but the correlation between self-monitoring and written language performance was not as strong. This study also incorporated a changing criterion with public posting phase that did increase writing performance. The students were given a goal for the day based on the previous session and monitored whether or not they met their goals.

**Self-monitoring and adolescents.** Placing students with disabilities in the mainstream, or general education setting, has been quite common over the last decade. Hughes, Agran, Wehmeyer, Rodi & Presley (2002) examined the effects of using self-monitoring to improve the performance of students with mental retardation in general education high school classes. The researchers taught 4 high school students with mental retardation how to use specific cues to self-monitor the performance on their individual target behaviors. One student was taught to look at or touch a prompt card to hold her head up when interacting with peers. The second student was taught to look at money placed in his hand to prompt him to say thank you when purchasing cookies. The third student was taught to use look at pictures in a prompt book to initiate peer interactions. The last student was taught to use a checklist to prompt him to complete all steps in
modified worksheets. All 4 students increased the emission of their individual target behaviors and the results imply that self-monitoring alone without added reinforcement was effective enough to increase the desirable behavior.

Perhaps due to the rise in diagnosis or a better understanding of the disorder, more studies have started to focus on the effects of this technique with students with ADHD (Harris, Friedlander, Saddler, Frizzelle, & Graham, 2005; Mathes & Bender, 1997; Reid et al., 2005; Shimabukuro, Prater, Jenkins, and Edelen-Smith, 1999). For example, Shimabukuro et al. conducted a study with 3 male middle school students who were diagnosed with ADHD and learning disabilities. The dependent variables included academic accuracy, academic productivity, and on-task behavior across three academic subject areas. The students monitored their own academic accuracy through the usage of self-correction procedures and academic productivity through a count of items completed compared to items assigned. This study was unique in that the teachers monitored the students’ on-task behavior exclusively. The teacher and students also graphed performance as an additional visual aid. Gains were made primarily in the areas of on-task behavior and academic productivity across all three academic subjects. The lowest gains were made in the area of academic accuracy.

High school is a crucial time for students, but especially for students with ADHD. These important 4 years of a student’s life should prepare him or her for postsecondary education, employment, and basic life skills. Adolescents with attention problems by definition have difficulty utilizing self-management skills. Therefore, these students often exhibit frequent off-task behavior, but teachers may not always observe and correct this
off-task behavior. The fact is, adolescents with ADHD who have average or above average intelligence struggle with maintaining attention and their grades may not be an accurate reflection of their ability levels. Therefore, these adolescents may miss valuable information causing them to be less prepared when entering the adult world (Litner, 2003).

Some of the most frustrating years for children with ADHD, parents of children with ADHD, and professionals who work with students with ADHD are the middle and high school levels. Middle and high school students with ADHD are at higher than average risk for grade retention, failing report card grades, and dropping out of school (Barkley, Fischer, Edelbrock, & Smallish, 1990; Mannuzza, Gittleman-Klein, Bessler, Malloy, & LaPadula, 1993). Further, secondary level students experience significant difficulties with peer relations and are more likely to engage in delinquent activities than their peers without ADHD (Robin, 1998). The bulk of the research in the field of special education focuses on early intervention and elementary school development, therefore effective interventions are not as widely known or used in the secondary level. High schools are also more complex, with varying class structures and often with less predictability. That is, students see several teachers per day with a wide variety of environments and expectations. This reality poses problems with consistency when implementing interventions because of the wide range of stimuli and the overwhelming number of students each individual teacher sees per day. Therefore, it is the duty of the Intervention Specialists to teach students how to implement their own self-monitoring program, so that the students can use the strategy within the generalization setting.
As mentioned earlier, limited studies have focused on the effects of self-monitoring, or self-management, with high school students with ADHD. The studies that have been conducted within this scope have yielded very promising results. DuPaul cites two specific studies in his article “School-Based Interventions for Children and Adolescents with Attention-Deficit/ Hyperactivity Disorder: Enhancing Academic and Behavioral Outcomes”. In one of these studies, Gureasko-Moore, DuPaul, and White (2006) found that when they taught these students to use a simple checklist, the students improved their performance of the target behavior from 50% during the baseline observation to 100% by the end of the study.

While in the planning stages of constructing self-monitoring interventions, it is important to consider the delicate nature of the adolescent ego (Litner, 2003). It is constructive to include the student in the planning process so that they feel as if they have some control over their academic experiences. Students are usually much more willing to participate in an intervention if they feel like they have had adequate input and if the plan is designed to implement their interests and needs. Given that these students generally struggle socially as well, the intervention must be the least intrusive tactic. The goal at this level is for the students to gain independence and become a self-advocate, therefore the weight of the intervention should lie mostly on him or her with the least amount of support possible from professionals and other adults when the time is right. Until students can independently perform these skills, teachers, parents, and other adults in the child’s life should continue to give direct instruction on the skills, use a multimodal approach to intervention, and use positive reinforcement to help the children as mentioned above.
Again, there are extensive studies that support self-monitoring as an effective treatment for students with disabilities. Unfortunately, the majority of these studies have been conducted within elementary or middle schools. Currently, there are fewer than a dozen investigations of school-based interventions for adolescents with AD/HD (DuPaul & Weyandt, 2006). It is also quite common that the studies focus on on-task behavior primarily and do not correlate the results to academic performance. Studies have been published that link age to effectiveness of the intervention as well. The implications of these studies are that younger students can more effectively use this approach when compared to older students (DiGangi, 1993). Therefore, we need to continue to focus on improving self-monitoring skills with the adolescent population.

Secondary schools are the last "stepping stone" on the path to independent adulthood and it is essential that students with ADHD acquire the skills necessary for the adult world. This disability hinders teenagers' ability to organize themselves, follow-through on tasks, meet deadlines, study/complete work independently, and self-monitor, which are all essential characteristics needed to attend post-secondary education schools or maintain a job or career. Therefore, interventions based on helping students remediate these life skills is of utmost importance for adolescents with ADHD. Self-monitoring techniques, when implemented properly, can enhance young adults' ability to perform all of these necessary tasks and hopefully lead to a more successful, happy, and productive adult life.
Purpose

The current study is a replication and extension of previous studies related to self-monitoring. This study focuses on high school students with ADHD in an independent study hall setting. Through the usage of audio taped cues, student checklists, and reinforcement, students were encouraged to monitor their on-task and off-task behavior and the completion of academic tasks. The study examined the effects of the self-monitoring strategy relating to on-task behavior, task completion, and academic performance. The study also included a subjective measure to see if students enjoyed using self-monitoring techniques.

Research Questions

1.) Will the self-monitoring procedures with audio taped chimes and a student checklist increase the on-task behaviors of high school students with Attention Deficit Hyperactivity Disorder during independent study time?

2.) Will the self-monitoring procedures with audio taped chimes, student checklists, and added reinforcement increase the on-task behaviors of high school students with Attention Deficit Hyperactivity Disorder during independent study time?

3.) Will the self-monitoring procedures with the audio taped chimes improve the academic performance of high school students with Attention Deficit Hyperactivity Disorder?
4.) Will the high school students like using self-monitoring strategies during independent study time?

5.) Will the classroom teacher think that the self-monitoring intervention is useful and easy to implement?
CHAPTER 2

METHOD

Participants

Participants in this study were all 13 students in an Intervention study hall, which included students in grades 9 through 12 (ages 14-18). The study hall was specifically designed for students with identified disabilities. During this study, all of the students in the class were receiving special education services under IDEA, within the public school system. The students who were chosen for individual data collection were selected by meeting the criteria for the study and teacher recommendation. The criteria consisted of having a medical diagnosis of ADHD and being assigned to the Intervention study hall 5 days a week. Students scheduled for the study hall fewer than 5 days a week were not targeted for individual data collection. A letter of support was written from the chosen school district’s principal (Appendix A). A letter explaining the study and seeking parental permission was sent home with the participants (Appendix B). The students were also informed of the purpose of this study and their assent was obtained as part of the parental permission letter. An oral solicitation was also given by the researcher during the students’ Intervention study hall (Appendix H). Individual data was collected on each target participant to monitor the results of the intervention.
In addition to the ADHD diagnosis the 3 targeted participants had specific behaviors that were of concern. Student 1 was a 16-year-old male who was in the 10th grade. The student received special education services in Intervention study hall, collaborative Algebra, adjusted Biology, and collaborative adjusted American Studies. The student was chosen for data collection due to off-task behavior and lack of homework completion. The student was not on any medication for ADHD.

Student 2 was also a 16-year-old male in the 10th grade. The student received special education services in Intervention study hall, collaborative Algebra, adjusted Biology, and collaborative adjusted American Studies. This student was chosen for off-task behavior, failure to complete homework, impulsivity, and disruptive behavior. Student 2 was currently taking medication for ADHD.

Finally, student 3 was a 16-year-old female in the 10th grade. The student received special education services in Intervention study hall and collaborative adjusted American Studies. This student was chosen for off-task behavior, failure to complete homework and class work, impulsivity, depression, and disruptive behavior. More information pertaining to each student is displayed in Table 1.

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<tr>
<td>Student 1</td>
<td>10th, 16</td>
<td>4 classes</td>
<td>7</td>
<td>2.12</td>
<td>1.76</td>
<td>White</td>
<td>Male</td>
</tr>
<tr>
<td>Student 2</td>
<td>10th, 16</td>
<td>4 classes</td>
<td>7</td>
<td>1.84</td>
<td>1.72</td>
<td>White</td>
<td>Male</td>
</tr>
<tr>
<td>Student 3</td>
<td>10th, 16</td>
<td>3 classes</td>
<td>7</td>
<td>2.92</td>
<td>2.58</td>
<td>White</td>
<td>Female</td>
</tr>
</tbody>
</table>

Table 1. Background information on participants
Setting

Research was conducted in a public high school in a suburban community. The school has a history of academic excellence and the majority of the population is upper middle class. The intervention took place during the students’ Intervention study hall during 7th period. The targeted participants had to be in the same Intervention Study Hall period. This setting was a special education setting designed for a small group of students. The Intervention Specialist worked with all of the students one-on-one throughout the period and as students requested assistance. The Intervention Specialist monitored the students for academic skills, homework completion, social skills, and organization of school materials.

*Dependent Variables*

In this study data were collected on three dependent variables: on-task behavior, academic achievement, and student satisfaction.

*On-task behaviors.* On-task behavior was defined as the participant’s being seated with his/her body facing forward, both feet on the floor, eyes directed toward the academic discriminative stimulus, glancing (looking away from academic discriminative stimulus for 3 seconds or less and is still on-task) only once (during a 10 second observation period), paying attention to the teacher, responding to teacher questions, taking adequate notes pertaining to the lesson during instruction when required, only discussing the assigned task when asked to work in groups, complying to teacher requests, writing in response to academic instructional materials, asking academic questions, and ignoring distractions in the classroom.
**Off-task behaviors.** Off-task behaviors were defined as the participant’s being partially or totally out of his/her seat or sideways in seat without teacher permission, head or eyes facing a different direction from the academic discriminative stimulus or teachers for more than 3 seconds, glancing more than once, any part of head or face making contact with desktop, non-academic talking, non-compliance to teacher directions, playing with objects and/or body parts, and hand(s) or object(s) in mouth.

*Data collection.* On/off-task behavior data were collected in two ways. First, students self-monitored their own on/off task behavior when the audio-taped chime sounded. When the stimulus was presented (chime), each student evaluated his or her behavior as to whether or not he or she was on-task or off-task at the moment the chime sounded. Each student marked his or her checklist indicating that he or she was on-task or off-task when the chime sounded (Appendix C). Self-monitoring checklists of targeted participants were collected at the end of each session and their data were individually graphed. Each intervention session, the researcher randomly selected one of the targeted participants for data comparison. Specifically, the researcher used the student’s checklist and compared his or her recordings to the researcher’s. The participants did not know who the researcher was going to compare checklists with on each day until the end of the session. The targeted participants observed on a given day had their scores compared to the researcher’s recording to ensure fidelity of student self-monitoring.

The researcher also recorded the on-task/off-task behavior of all three target participants during each session. The researcher sat so she could see all target participants during the study hall. The researcher used a tape recorder and earphones. An audiotape,
different than the audiotape used for student self-monitoring, was started when the
session began. The audiotape was only heard by the observer. The tape prompted the
observer to “observe Participant 1” then 10 seconds later the tape prompted the observer
to “record data for Participant 1”. Five seconds later, the tape prompted the observer to
“observe Participant 2” then 10 seconds later tape prompted the observer to “record data
for Participant 2”. The observation time was 10 seconds per interval and the record time
was 5 seconds per interval. The tape continued to prompt the observer throughout the
session with each target participant being observed approximately 20 times each session.
The observer recorded each participant as being on task if the participant was on-task
during the entire 10-second observation trial. Observers were trained to count “1 one-
thousand, 2 one-thousand, 3 one-thousand” to determine whether or not the student’s
glancing was considered off-task. If the participant was off-task at any time during the
interval then the trial was recorded as off-task. Data were recorded on the observer
recording sheet (Appendix D).

*Academic performance.* The researcher tracked grades that students received in
general education classes as a measure of academic performance (Appendix E). The
overall grades for each class for the targeted students’ were used and were recorded 3
times during the study (once in the beginning of the study, once in the middle of the
study, and once at the end of the study). Grades were reported to the researcher by the
Intervention Specialist through the usage of the PowerSchool computer program with
parental consent (Appendix B). PowerSchool is an online grade book in which teachers
enter the students' grades and teachers, parents, and students use a login name and password to access individual information.

*Independent Variable*

*Self-monitoring strategy.*

Students were trained to self-observe and self-record their own behaviors. The researcher did a presentation during the Intervention Study Hall time to define and discuss on/off-task behaviors to each student. The researcher provided examples (on-task behavior) and non-examples (off-task behavior) to make the target behaviors more explicit. During the Intervention Study Hall, with the usage of an audiotape reminder with variable intervals and a self-monitoring checklist (Appendix C), students observed their own behaviors and recorded the occurrence or nonoccurrence of the target behaviors each time the audiotape chimed. When the students heard the chimes they recorded whether they were on or off task at the moment of hearing the chime. A prerecorded audiotape employing a variable time schedule of 2 minutes was used in the Intervention Study Hall to signal the participants to record their behaviors as being on-task or off-task at the moment the audiotape chime was heard. The tape was started at a different place every day to ensure that the pattern of chimes was different. Each student had the self-monitoring checklist on the top of his or her desk. Each student circled a “yes” if he or she determined himself/herself to be on-task or a “no” if off-task. After circling the appropriate “yes” or “no”, each student returned to his/her assigned task. This sequence of events was repeated each time the chime was heard. Each session with the audiotape chimes lasted approximately 20 minutes. At the conclusion of the session, participants
were asked to count the number of “yes’s” and “no’s” and recorded and wrote the respective number on the bottom of the form. A self-monitoring condition with reinforcers was also used and students followed the same procedures for the self-monitoring condition described above.

Materials

Materials included a letter of support from the school district principal (Appendix A), a letter to the parents and students (Appendix B), a participant consent form (Appendix B), a teacher consent form (Appendix B), student self-monitoring checklists (Appendix C), an observer recording sheet (Appendix D), a chart to track grades (Appendix E), a procedural integrity checklist (Appendix F), a social validity questionnaire for students (Appendix G), a social validity questionnaire for the teacher (Appendix G), multiple prerecorded audiotapes using variable ratio intervals of 2 minutes, interval audio tapes for observer data collection, two sets of headphones, and two audio tape players/recorders (one with a jack that allowed two sets of headphones to be plugged in at once).

Experimental Design

An Alternating Treatment design was used for this study (Kennedy, 2005). The experimental conditions included Baseline, Self-Monitoring, and Self-Monitoring with reinforcers. The treatments were selected randomly every day during data collection by drawing one of three small pieces of paper from a container with one of the three treatment conditions written on the piece of paper. The researcher wrote on the chalkboard in the front of the classroom every day before class to designate what kind of
day it was so the students knew what they needed to do for the session. If it was a Baseline day, the procedures under Baseline (see procedures section below) were followed. The same rule applied for the Self-Monitoring condition and Self-Monitoring with Reinforcers condition.

**Inter-observer Agreement**

Observers were trained prior to the beginning of the study. The study did not begin until the observers achieved 95% agreement for 2 consecutive days during an observation. During 33% of the sessions two observers simultaneously observed the target participants. Each observer wore headphones that were plugged into the same tape player. They sat so each observer could see the target participants but were unable to see the other observer’s data collection sheet form (Appendix D). Sessions were scored interval by interval for agreement or disagreement. Then, agreements were divided by agreements plus disagreements and multiplied by 100% to determine the percentage of agreement for that session.

Inter-observer agreement for academic performance was completed by using the cumulative grades that the target students had earned for a given probe. After obtaining parental consent, the researcher tracked grades by using the grade tracking chart (Appendix E) and information from the PowerSchool program. The researcher did not have access to any grade books and was only given information from the Intervention Specialist. The researcher sought agreement from another observer for all three of the assessments to ensure an accurate score. In the case of disagreements, observers came together and jointly looked at the grades for the probe of disagreement using the
information from PowerSchool to determine if they could reach a mutual agreement on the correctness of the assessment. Finally, using the same formula, agreements were divided by agreements plus disagreements and multiplied by 100%.

_Procedural Integrity_

Procedural integrity was defined as the number of steps completed per session by the student, the teacher, and the experimenter. One procedural integrity checklist for the target students for that day was completed each session excluding Baseline (See Appendix F). The checklist for the target students was used to demonstrate that the researcher had posted the conditions for the session, the researcher had placed the materials in the designated pick up place, the teacher gave normal feedback and redirection during class, target students were correctly completing each step of the self-monitoring procedures, and target students returned the items to the designated drop-off place. The researcher, who served as the primary observer, completed the procedural checklists daily during self-monitoring conditions. She marked each step with a checkmark if she observed the completion of the steps. The second observer observed independently 33% of the total sessions throughout the experiment and checked the primary observer’s checklist. Agreement for the procedural integrity checklist was the number of agreements divided by agreements plus disagreements and multiplied by 100% to obtain a percentage. Agreements were steps being checked as occurring to both observers. Disagreements were steps that one observer checked as completed while the second observer did not note its occurrence. Observers were trained to use the procedures before the study.
Procedures

Pre-assessment. The pre-assessment was a general observation of the targeted participants. The primary observer wrote a narrative description of what she observed in the classroom that included notes on target students’ academic work, focus, and whether or not the target students sought help from the teacher.

Baseline. A record of each target participant’s baseline on-task and off-task behaviors was collected using the same means of data collection described above under dependent variables (Appendix D). Classroom activities consisted of small group instruction and independent seatwork for students. During the first academic probe, the Intervention Specialist reported the classroom grades for each target student to the researcher (Appendix E). During the sessions, the teacher continued to give normal verbal praise or verbal redirection to the students when appropriate.

Training for self-monitoring strategy. Training took place in the Intervention Study Hall setting during one 20-minute session. The researchers explained the definition of target behaviors (on/off-task behaviors) to students and had discussions and demonstrations on examples and non-examples. The researchers provided examples of on-task behavior and discussed why each presented behavior was considered on-task. The researchers then demonstrated classroom behavior and asked if the behavior was an example of on-task behavior or not. The students were also asked to demonstrate examples of on-task behavior. Off-task behavior was taught using the same instructional strategies. When students could identify on/off task behavior at 100% accuracy, then the usage of the self-monitoring checklist was taught. Students were taught to mark their self-
monitoring checklists as soon as they heard the chimes. Students were taught to mark whether on-task or off-task behaviors occurred at the moment the chime sounded. When the target students’ markings matched the researcher’s marking at 95% accuracy, training was completed. There were no procedural integrity measures for the training.

**Self-monitoring condition.** There was a folder for each individual student, which included the checklists and materials. These folders were placed on a table near the entrance of the room before class started and each student got his or her folder and took it to his or her desk. If a student neglected to follow these steps, the researcher or the teacher prompted him or her to do so. The teacher gave instructions as to what the students needed to focus on for the period before the data collection session started. The researcher started the audiotape at the beginning of the session and stopped the audiotape at the end of the session. Each participant recorded whether he or she was on-task or off-task when the tape recorder chimed. Each participant circled either “yes” for on-task behaviors or “no” for off-task behaviors in the checklist at the moment the tape recorder chimed (Appendix C). During the session, the teacher continued to give verbal praise or verbal redirection to the students when appropriate. At the end of the session, students were asked to count the number of “yes’s” and “no’s” and write them on the checklist. Students also returned their folders to the same place that they picked them up. The researcher collected the folders of the target participants every day to record data.

**Self-monitoring with reinforcers condition.** This condition was the same as the self-monitoring condition but had the added feature of reinforcers. The researcher selected one of the target participants and one other participant in the class to record
behavior on the student self-monitoring checklists. When the chime sounded, the researcher used the student checklist to record whether the two students were on or off task. Behaviors recorded by self-monitoring with the audiotape were checked at the end of the session to examine the target participants' and the participants' accuracy with the researcher's self-monitoring checklist. The entire class was rewarded if the scores matched the observer's scores. A reinforcer was only given for exact matches. The reinforcers were selected according to student interest and what was appropriate for school. A survey indicated that candy was the most valued reinforcer for the class. During the session, the teacher continued to give verbal praise or verbal redirection to the students when appropriate.

*Social Validity*

At the conclusion of the study, the classroom teacher as well as the participants were asked to complete a social validity questionnaire about their reaction to self-monitoring (Appendix G). The researcher obtained consent from the teacher (Appendix B) in order to use the social validity questionnaire she filled out as part of the study. The questionnaires were confidential, easy to read, and easy to respond to.
CHAPTER 3

RESULTS

Procedural Integrity for Accuracy of Self-Monitoring

Procedural Integrity agreement verified the accuracy of student self-monitoring. All students were observed by the researchers to have accurately recorded their behavior as either on-task or off-task when the audio taped chimed using the self-monitoring checklists. No patterns of inaccurate recording were apparent during the study; therefore, no additional training was needed. The researcher agreed with students 100% of the time and the secondary observer agreed with the primary observer 100% of the time.

Interobserver Agreement for On-Task Behavior

Sessions were scored interval by interval for agreement or disagreement. Then, agreements were divided by agreements plus disagreements and multiplied by 100% to determine the percentage of agreement for that session. IOA was collected for 36% of the sessions. The range of agreement was 73% to 100% with a mean of 96%. Interobserver agreement for on-task behavior for the entire study is presented in Table 2.
<table>
<thead>
<tr>
<th>Session Number</th>
<th>9</th>
<th>10</th>
<th>13</th>
<th>16</th>
<th>19</th>
<th>20</th>
<th>21</th>
<th>22</th>
<th>23</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage Agreement</td>
<td>73</td>
<td>100</td>
<td>97</td>
<td>97</td>
<td>100</td>
<td>98</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 2. Interobserver Agreement Percentages for On-Task Behavior

Interobserver for Academic Performance

The Intervention Specialist printed out a cumulative record of the 3 target participants from PowerSchool three times during the study. PowerSchool is a computer program that allows teachers to enter students’ grades into an electronic grade book and then teachers, parents, and students can access the information online through the usage of a username and password for each individual student. Grades were recorded onto the grade tracking sheet by the primary observer and checked by a second observer. The observers agreed on the cumulative grades 100% of the time.

On-Task Behavior

The data from the 3 students is shown in Figures 1-3. Data presented are from the primary observer.

**Student 1.** The range of on-task behavior for student 1 during baseline sessions was 13%-79% with a mean of 51%. The range of on-task behavior during the self-monitoring condition was 75%-100% with a mean of 92%. The range of on-task behavior during the self-monitoring with reinforcement condition was 80%-100% with a mean of 93% (See Figure 1). On-task behavior for student 1 immediately increased after the self-
monitoring intervention was implemented. There was also a clear separation between baseline data and self-monitoring data, indicating a functional relation between self-monitoring and on-task behavior.

![Graph](image)

**Figure 1.** Percentage of On-Task Behavior for Student 1

**Student 2.** The range of on-task behavior for student 2 during baseline was 20%-70% with a mean of 46%. The range of on-task behavior during the self-monitoring condition was 35%-83% with a mean of 75%. The range of on-task behavior during the self-monitoring with reinforcement condition was 55%-100% with a mean of 97% (See Figure 2). Again, on-task behavior for student 2 increased after the intervention was implemented. There was minimal overlap of data points across the experimental
conditions. The largest separation was between baseline and self-monitoring with reinforcement. There was a functional relation between self-monitoring with reinforcement and on-task behavior.

![Graph](image)

**Figure 2.** Percentage of On-Task Behavior for Student 2

**Student 3.** The range of on-task behavior for student 3 during baseline was 0%-68% with a mean of 47%. The range of on-task behavior during the self-monitoring condition was 0%-100% with a mean of 64%. The range of on-task behavior during the self-monitoring with reinforcement condition was 90%-100% with a mean of 96%. The increase of on-task behavior for student 3 gradually increased after the intervention was
implemented. There was, for the majority of the study, a vertical distance between the conditions. There was a great deal of variability across baseline and self-monitoring conditions. Self-monitoring with reinforcers was consistently the strongest condition. There was a functional relation between self-monitoring with reinforcement and on-task behavior.

![Graph showing percentage of on-task behavior for Student 3]

**Figure 3.** Percentage of On-Task behavior for Student 3

*Academic Performance*

Three probes were taken to measure academic performance, one at the beginning, the middle, and the end of the study. Students’ grades are displayed in Tables 3-5.
Student 1. Grades did not improve during the study. In fact, three grades went
down (Algebra, PE, and Public Speaking) only one improved (Biology), and one stayed
the same (American Studies).

<table>
<thead>
<tr>
<th></th>
<th>Probe 1</th>
<th>Probe 2</th>
<th>Probe 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Algebra</td>
<td>85%- B</td>
<td>83%- B</td>
<td>77%- C+</td>
</tr>
<tr>
<td>PE</td>
<td>92%- A-</td>
<td>77%- C+</td>
<td>70%- C-</td>
</tr>
<tr>
<td>Biology</td>
<td>61%- D-</td>
<td>75%- C</td>
<td>76%- C</td>
</tr>
<tr>
<td>American Studies</td>
<td>69%- D+</td>
<td>66%- D</td>
<td>69%- D+</td>
</tr>
<tr>
<td>Public Speaking</td>
<td>76%- C</td>
<td>49%- E</td>
<td>48%- E</td>
</tr>
</tbody>
</table>

Table 3. Student 1 course grades as indicated on PowerSchool

Student 2. Similarly, student 2’s grades did not improve during the study. Three
grades went down (PE, Biology, and American Studies), one grade improved (Algebra),
and one stayed the same (Choir).
Table 4. Student 2 course grades as indicated on PowerSchool

<table>
<thead>
<tr>
<th></th>
<th>Probe 1</th>
<th>Probe 2</th>
<th>Probe 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Algebra</td>
<td>49%- E</td>
<td>47%- E</td>
<td>56%- E</td>
</tr>
<tr>
<td>PE</td>
<td>98%- A+</td>
<td>96%- A</td>
<td>95%- A</td>
</tr>
<tr>
<td>Biology</td>
<td>66%- D</td>
<td>70%- C-</td>
<td>62%- D-</td>
</tr>
<tr>
<td>American Studies</td>
<td>53%- E</td>
<td>54%- E</td>
<td>33%- E</td>
</tr>
<tr>
<td>Choir</td>
<td>100%- A+</td>
<td>100%- A+</td>
<td>100%- A+</td>
</tr>
</tbody>
</table>

Student 3. Overall, the grades for student 3 did not improve during the study. One grade did increase (Biology), two grades virtually stayed the same (Algebra and Choir), and two grades went down (Photography and American Studies).

Table 5. Student 3 course grades as indicated on PowerSchool

<table>
<thead>
<tr>
<th></th>
<th>Probe 1</th>
<th>Probe 2</th>
<th>Probe 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biology</td>
<td>42%- E</td>
<td>60%- D-</td>
<td>76%- C</td>
</tr>
<tr>
<td>Algebra</td>
<td>52%- E</td>
<td>45%- E</td>
<td>54%- E</td>
</tr>
<tr>
<td>Photography</td>
<td>83%- B</td>
<td>49%- E</td>
<td>72%- C-</td>
</tr>
<tr>
<td>American Studies</td>
<td>63%- D-</td>
<td>57%- E</td>
<td>51%- E</td>
</tr>
<tr>
<td>Choir</td>
<td>100%- A+</td>
<td>100%- A+</td>
<td>100%- A+</td>
</tr>
</tbody>
</table>
Social Validity

All of the students who were present in the class on the day of the survey participated. There were a total of 7 students in class who filled out the social validity questionnaires. The survey utilized a 7-point Likert Scale described in Table 6.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strongly Agree</strong></td>
<td></td>
<td></td>
<td></td>
<td>Neutral</td>
<td></td>
<td></td>
<td><strong>Strongly Disagree</strong></td>
</tr>
</tbody>
</table>

Table 6. Ratings for the 7-point Likert Scale used on the social validity questionnaires

Results from the student social validity questionnaire are displayed in Table 7.

<table>
<thead>
<tr>
<th><strong>Question</strong></th>
<th><strong>Mean</strong></th>
<th><strong>Range</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>I found the checklist easy to use.</td>
<td>1.5</td>
<td>1-2</td>
</tr>
<tr>
<td>The audio tape chimes helped me focus and reminded me to stay on task.</td>
<td>2</td>
<td>1-4</td>
</tr>
<tr>
<td>I had success with the self-monitoring strategy in my academic learning. I was more focused on my work and I accomplished a lot more because of the self-monitoring technique.</td>
<td>2.7</td>
<td>1-5</td>
</tr>
<tr>
<td>The self-monitoring technique distracted me in class and I could not get my work done because of it.</td>
<td>4.7</td>
<td>3-7</td>
</tr>
<tr>
<td>The self-monitoring technique was appropriate for my age. It did not make me feel like I was being belittled.</td>
<td>2.5</td>
<td>1-7</td>
</tr>
<tr>
<td>I wish other teachers would use the self-monitoring strategy in other classes.</td>
<td>4.3</td>
<td>1-7</td>
</tr>
<tr>
<td>I do not want the teacher to continue using the self-monitoring technique in this class.</td>
<td>3.7</td>
<td>1-7</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------------------------------------------------------------------------------------------------------</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>I believe that the self-monitoring strategy would be useful to other students.</td>
<td>2</td>
<td>1-4</td>
</tr>
<tr>
<td>I do not feel comfortable using the self-monitoring technique without the OSU researcher.</td>
<td>6.1</td>
<td>3-7</td>
</tr>
<tr>
<td>I am going to tell other students about how useful the self-monitoring technique was for me.</td>
<td>4.9</td>
<td>2-9</td>
</tr>
</tbody>
</table>

Table 7. Ratings from the student social validity questionnaires

Students had the opportunity to make additional comments. These comments included narratives from 2 students: “Personally I thought the self-monitoring technique was distracting and it made it harder for me to concentrate. But it did help remind me when there were times I was off-task.” “I think the strategy is very successful and should be used in math and English classes where concentration is difficult.”

The teacher also filled out a social validity questionnaire. It incorporated a 7-point Likert Scale exactly like the one noted above for the student questionnaire.

1.) The self-monitoring strategy was easy to implement in class. It did not take an unreasonable amount of effort from me and it did not disrupt my teaching.
   Rating- 3

2.) The students in my class had success learning the material they studied during Intervention Study Hall because of the self-monitoring strategy. Students accomplished more during the intervention and retained more information.
   Rating- 3

3.) The audio taped chimes were distracting and disruptive to the classroom and I would prefer using another cue for the completion of student checklists. I do not like the chimes.
   Rating- 4
4.) The checklists were useful for the students and they gained a lot more control over their behavior because of this aspect of the self-monitoring intervention. Rating- 2

5.) If I were to continue to use the self-monitoring technique, I would change some aspects of the intervention. Rating- 1

6.) I will continue using the self-monitoring intervention with the class that was part of this study. Rating- 3

7.) I plan on using the self-monitoring strategy with other students in the future because I feel that it is worthwhile and effective. I think that other students would benefit from this intervention. Rating- 2

8.) I would consider using the self-monitoring strategy with other students that I teach, but I do not have enough time to implement the intervention. Rating- 5

9.) I do not feel comfortable implementing the steps of the intervention without the OSU researcher. I feel like I need additional training with this intervention. Rating- 4

10.) I will definitely recommend the self-monitoring strategy to other teachers. Rating- 2

The teacher also made additional comments: “The biggest hindrance to the success of the self-monitoring appeared to be the students’ frustration with the interruptions caused by the insistence of the chime, its unpredictable timing and the students’ inability to be flexible in their thinking. “Typical” students with LD have difficulty with concentration, retrieval and holding things in short-term memory. The chime, marking the sheet coupled with the frustration of stopping their flow of thinking truly appeared to bother some of the students. By the end of the study, a time I thought
they may have become accustomed to the chime and self-monitoring process, they were audibly moaning and groaning when they had to interrupt their work to self-monitor.”
CHAPTER IV

DISCUSSION

This chapter will discuss the results of the study in relation to the research questions, the limitations of the current study, classroom implications relating to the results of this study, and possible future research to extend this study.

*Question 1: Will the self-monitoring procedures with audio taped chimes and a student checklist increase the on-task behavior of high school students with Attention Deficit Hyperactivity Disorder during independent study time?* The self-monitoring procedure with audio taped chimes and student checklists did increase the on-task behavior of all 3 participants. The clearest functional relation was shown through student 1's data. Student 1 immediately increased his on-task behavior after the self-monitoring intervention was introduced and there was no overlap between the baseline and self-monitoring conditions. The effects of self-monitoring were less defined for students 2 and 3 but both demonstrated substantial improvement in on-task behavior during the self-monitoring condition. The improved on-task behavior with self-monitoring is consistent with other research findings. (Carr & Punzo, 1993; Crum, 2004; Harris, Friedlander, Saddler, Frizzelle, & Graham, 2005; Hughes, Ruhl, & Masra, 1989; Kern & Dunlap, 1994; Levendoski & Cartledge, 2000; Maag, Reid, & DiGangi, 1993; Mathes & Bender,
During session 10, student 2 was on-task and completed an entire math assignment during the observation period. Unfortunately, the observers had to mark him as off-task 65% of the time because he had his pen in his mouth while he was working. Even though he was working on school tasks, the definition for off-task behavior may have been too narrow because it included having objects or hands in mouth. After the observation period, the observers reviewed the definition with student 2 again and explained that we had to mark him off-task. During the same session, student 3 was not filling out her checklist and she was listening to music through her headphones. We met with her after the observation period and talked about why she was not participating. She said she was “having a bad day.” Student 3 had had a recent history of conflict with teachers and peers that had escalated across this academic school year.

During session 16, student 3 was on-task the entire period, but again had to be marked as off-task 100% of the time because of the stringent definition for the study. The student was organizing her backpack and binders, throwing away trash that was in her backpack, and sorting through papers. While she was doing this, she used her desk and chair to set materials on, and therefore was out of her seat the entire period. According to the definition, she was off-task because she was out of her seat.

During session 19, student 3 and the teacher got into an argument. The teacher thought the student was using profanity and the student said she wasn’t. After the altercation, student 3 refused to fill out the checklist for the rest of the observation period.
and eventually left the room to cool down. Because the student was displaying non-compliance to teacher directions, the student was marked off-task for 38% of the observation period.

During session 24, student 3 was very upset about an event that occurred in a class earlier that day. She had her head down on her desk and was crying for most of the observation period. She still attempted to complete the student checklist, but her head was down, so she was marked off-task for 75% of the observation period.

Overall, there was a functional relation for all 3 students. Self-monitoring increased the on-task behavior of all 3 students during independent study time.

Question 2: Will the self-monitoring procedures with audio taped chimes, student checklists, and added reinforcement increase the on-task behaviors of high school students with Attention Deficit Hyperactivity Disorder during independent study time? All of the students displayed high rates of on-task behavior during the self-monitoring with reinforcement condition. The reinforcers included candy that each individual in the class requested and the students were allowed to have two pieces because they were small pieces. Student 1 and student 2’s data indicated that reinforcement was valuable, but self-monitoring alone was enough to increase on-task behavior significantly. Student 3 performed much better when the reinforcement condition was used suggesting that the student needed a more tangible reinforcer. Self-monitoring alone did not affect student 3 as much as student 1 and 2, but with reinforcement her on-task behavior was markedly higher and more stable.
It should also be noted that student 2 and 3 were currently on medication for ADHD and the students were honest about the inconsistency of taking their medication. There was still a functional relation between self-monitoring with reinforcement and on-task behavior.

Question 3: Will self-monitoring procedures with the audio taped chimes improve the academic performance of high school students with Attention Deficit Hyperactivity Disorder? The grades for all 3 of the participants were, for the most part, actually lower at the end of the study than at the beginning of the study. There are many factors that could have contributed to this trend. This study was not directly tied to a specific academic content area, which may have been easier to track and prove a functional relation. The measures that were used to determine academic performance were very broad measures and the measures incorporated all of the students’ classes. The researcher had no direct contact with the teachers, therefore no explanations were given as to why the grades were lower. It could have been due to homework completion or more difficult content. It should also be noted that the grades were reported through the PowerSchool program where teachers enter grades into an electronic grade book. The teachers were inconsistent with entering grades within a certain time frame and the grades were not shared or monitored with the students as part of the study. Students do have access to their own grades, but it is unclear how often students monitor their academic performance. Overall, the measure for academic performance was very broad and unreliable.
Question 4: Will the high school students like using self-monitoring strategies during independent study time? Overall, the students seemed to like the self-monitoring technique. The questionnaires indicated the following: the checklists were easy to use, the audio taped cues were helpful, students felt like they had some success with completing academic tasks, the chimes were a little distracting, and the strategy was age appropriate. The students were neutral when asked if they would like to use self-monitoring in other classes or in the same class, they felt that the strategy would be useful for other students, they felt comfortable continuing without the assistance of the OSU researchers, and the students were neutral about telling other students about self-monitoring. The biggest complaint from the students was that the chime interrupted their thinking and made them stop working on what they were doing. This was apparent through the comment made by one student that stated, “Personally I thought the self-monitoring technique was distracting and it made it harder for me to concentrate. But it did help remind me when there were times I was off-task.” Even though it might have been distracting for some students, they still reported that it was a valuable reminder to help them stay on-task.

Question 5: Will the classroom teacher think that the self-monitoring intervention is useful and easy to implement? The teacher reported: that self-monitoring was somewhat easy to implement, students had some academic success, she was neutral about how distracting the chimes were, the checklists were useful, she would definitely change some aspects of the intervention if she continued using it, she might continue using a self-monitoring strategy, other students would benefit from the intervention, she would have some time to do it in the future, she was neutral on implementing it without the OSU
researchers, and she probably will recommend the intervention to other teachers. The teacher’s biggest concern was that some of the students were frustrated with the chimes because it may have been distracting. Specifically she stated, “The biggest hindrance to the success of the self-monitoring appeared to be the students’ frustration with the interruptions caused by the insistence of the chime, its unpredictable timing and the students’ inability to be flexible in their thinking.”

Limitations

There were several limitations to this study. The stringent definition prevented several students from receiving higher percentages of on-task behavior even though the students were on-task. As mentioned earlier there were at least two observation periods where the students genuinely were on-task, but the data did not reflect this because according to the operational definition they were considered off-task.

Another major limitation to this study was the inconsistency of medication administration. There were several sessions in which two students made comments about how they were off-task because they thought they forgot to take their medication that day. It is hard to control for these types of factors but it is still worth mentioning because missing medication can cause a drastic change in behavior.

The final limitation was the broad measures used for academic performance. It would have been a lot easier and precise to have a direct relation between the self-monitoring and performance in a specific academic content area instead of trying to incorporate all academic areas. There also needs to be a more specific way to measure performance. Instead of using cumulative grades, it would make more sense to have
direct contact with one teacher for one academic content area and find out the exact number of points possible for a shorter amount of time, perhaps a week, and measure how many points the student earned. The PowerSchool program is useful, but it is not always up to date with the most recent assignments. Talking directly to the teachers would yield more valuable information pertaining to student performance. The study was also conducted over a relatively short period of time, which may have limited the amount that on-task behavior and academic performance were affected.

Classroom Implications

The results of the current study support past findings in that self-monitoring is a useful intervention to increase desirable classroom behaviors. This study also supports previous literature that this intervention is not extremely time consuming or difficult to implement within classrooms. Every intervention takes some teacher time and effort, but decreasing the off-task behavior of students allots more time for instruction and less effort from the teacher for classroom management. Self-monitoring has proven to be an effective intervention for several decades in the educational setting and the majority of studies that examine the effects of self-monitoring have indicated significant success for students. Simply making students accountable for themselves and aware of their behavior also teaches a very important life skill. The primary goal of the education system to is prepare children to become responsible, educated adults which can more easily be achieved if students learn to manage their behavior before they are expected be independent. This study also supports the use of positive reinforcement in the classroom
to increase desirable behavior. During the self-monitoring with reinforcement conditions, all 3 students responded immediately and with a steady, high pattern of on-task behavior.

Future Research

Future studies that incorporate self-monitoring may want to consider some of the following aspects. The current study did not use a fading procedure to show that the skills had been maintained or generalized without the usage of the audio taped cue. A future study may include a fading procedure that would incorporate the usage of less obtrusive cues, such as a MotivAider, and eventually no cues to self-monitor behaviors. The usage of a MotivAider, a small device that vibrates according to the interval it is set at, would also eliminate the distraction factor that some of the students expressed concern about during the study. It would also be beneficial to measure student behavior in a generalization setting, such as another classroom.

Redefining on-task and off-task behavior might also be useful and would allow for more deviation from a stringent definition that may not accurately capture the students’ behavior. For example, changing the definition to reflect that there are such instances where being out of one’s seat is not necessarily off-task. A student can be out of his or her seat to throw away garbage, organize their materials, or recruiting teacher assistance. Having a pen in your mouth doesn’t necessarily mean that you are off-task either. On-task and off-task behavior is very hard to define and is different for everyone. Pre-assessment is very important for this reason. A thorough examination of student behavior patterns would allow for a more functional definition that will more accurately capture on-task and off-task behavior in the classroom.
Finally, a more sound measure of academic performance should be constructed for future studies. Trying to focus on too many academic areas at once would decrease the probability of being able to show a functional relation between self-monitoring and academic performance. Focusing on one class at a time, perhaps the subject that the student is struggling the most in, would yield much more positive results. Academic performance should also be measured on a more frequent basis, instead of only three times during the study. Assessing this variable at least once every few days would give much more direct information. The nature of the setting for this study did not allow a direct measure of classroom work because it was an independent study hall period therefore every student had a different schedule with different assignment requirements.

Conclusion

Being able to manage one’s own behavior is an essential component to experiencing success in life. Students with ADHD lack this skill in many cases, but can acquire this skill when it is taught directly. Most of the time, students are not even aware of their own behavior until they are given clear boundaries as to what is expected of them. Once they know what the expectations are in the classroom, they are able to evaluate whether or not they are displaying the appropriate behavior. Teaching the skill directly and prompting students to be aware of their behavior is essential in the initial stages of instruction and will hopefully lead to maintenance and generalization as the student matures and comes into contact with natural contingencies of reinforcement. Adolescents who may have more challenging behavior can still benefit from interventions but may need some extra positive reinforcement until behaviors are
reinforced within the natural environment. The implementation of an easy intervention, such as self-monitoring, may impact a student’s life significantly in various settings and across various skills. Advocating that students with attention problems are not capable of being on-task in the classroom is not a valid excuse with the extent of literature that has been published proving that desirable behaviors can almost always be increased when students are made aware of and held accountable for their own behavior. Not teaching a student how to manage themselves would be a great disservice to the intent of education.
REFERENCES


APPENDIX A

LETTER OF SUPPORT FROM HIGH SCHOOL PRINCIPAL

November 20th, 2006

To Whom It May Concern,

Ms. Kristall Graham has shared with me the rationale and methods sections of her research project "Using self-monitoring to improve the on-task behavior and academic performance of high school students with Attention Deficit Hyperactivity Disorder". The high school fully supports this research and we are excited to be part of the project. We look forward to working with Ms. Graham, Dr. Ralph Gardner III, and the Ohio State University in the exploration of instructional methods for students with disabilities. Please feel free to contact me with any further questions.

Sincerely,

High School Principal

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APPENDIX B

LETTER OF EXPLANATION, PARENTAL CONSENT AND TEACHER CONSENT

January 2, 2007

Dear Parent or Guardian,

My name is Kristall Graham and I am currently a graduate student in Special Education at The Ohio State University. An important requirement for completing my course of study is to conduct research as part of a Master’s Thesis. I am in the process of preparing research that I will be carrying out in your child’s Intervention Study Hall. I will be conducting the research under the supervision of Dr. Ralph Gardner, a professor in the College of Education. I am writing to explain my research and ask your permission for your child to participate. The following is a description of the study I am planning to conduct.

This study will investigate how well students can use self-monitoring to improve their on-task behavior and academic performance. Your child will learn to monitor his or her own on-task behavior. The study will use audio taped chimes and a self-monitoring checklist. The on-task behavior will be listed on the checklist, and I will give your child the exact definition of every behavior before conducting the study. At variable intervals, the audiotape will chime serving as a reminder to your child to self-record his or her own behavior on the self-monitoring checklist. The children’s correct recording of behaviors and accomplishment of personal goals will be reinforced by earning a reinforcer from a prize box. I will also ask your child questions relating to the material he or she is studying to see if the self-monitoring procedure has helped them retain the information that was studied. Your child will benefit by having opportunities to gain more positive control over his/her own behavior. Your child will participate in a daily 20- minute session in the Intervention Study Hall.
Sessions will not be video- or audio-taped. Your child’s name will not be revealed in any kind of publication, document, or any other form of report or presentation developed from this study. I am excited about this project, and I hope you will grant permission for your child to participate in this study. I will ask your child’s teacher for the following information: your child’s age, gender, grade level, and whether or not your child attends school regularly (i.e., is rarely absent from school). We will not need to see your child’s school records in order to conduct this study. However, we will ask your child’s teachers for information about your child’s grades in their classes. Your child’s grades will allow us to see if there is a meaningful correlation between improved self-monitoring and academic performance.

Attached are two copies of the consent form for Participation in Educational Research. By signing this consent form you agree to allow your child to participate in this study as described in this letter. Please sign and return one signed copy of the consent form using the attached stamped envelope to me, and keep the second copy for your records. If you have any questions about details of this study, feel free to call me at (614) 599-8901 or you may also contact Dr. Gardner at (614) 292-3308, or by e-mailing me at graham.421@osu.edu.

Sincerely,

Kristall J. Graham
M.A. Student

Ralph Gardner
Associate Professor
Advisor

Enclosures: 2 copies of Consent Form for Participation in Educational Research
Participant Consent Form For Participation in Educational Research

I consent for my child's participation in a research study evaluating the effects of self-monitoring strategies. Ms. Kristall Graham will conduct this study under the direction of Dr. Ralph Gardner. Ms. Kristall Graham has explained to me the purpose and procedures for the study. She has also explained to me the self-management skill that my child will be taught. I understand that my child's identity will not be revealed to anyone other than people directly involved in the study, or by means of publication, documentation or any other form of report and presentation developed from this research. Additionally I understand that I have the right to withdraw my consent for my child's participation at any time during the study.

I acknowledge that I have had the opportunity to obtain additional information regarding the study and that any questions I have raised have been answered to my full satisfaction.

I acknowledge that I have read and fully understand this participant consent form. I sign it freely and voluntarily. An additional copy has been given to me.

_________________________________________ Date
Signature of Parent or Guardian
(Person authorized to consent for participant)

_________________________________________ Date
Signature of Participant

I understand that as a part of this study Ms. Kristall Graham will be in contact with my child's teachers to gather information about my child's grades in their classes. I grant permission to the teachers to share with Ms. Graham my child's grades in their classes.

_________________________________________ Date
Signature of Parent or Guardian
(Person authorized to consent for participant)

_________________________________________ Date
Signature of Participant

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Teacher Consent Form For Participation in Educational Research

I consent to participate in a research study evaluating the effects of self-monitoring strategies. Ms. Kristall Graham will conduct this study under the direction of Dr. Ralph Gardner. Ms. Kristall Graham has explained to me the purpose and procedures for the study. I understand that I will be observed to ensure that the intervention is completed in a consistent manner (see Appendix F: Procedural Integrity Checklist). That is, does the teacher provide directions to students and does the teacher provide verbal feedback to students for their behavior (i.e. social praise and redirection). She has also explained to me the self-management skill that the students will be taught. I understand that my identity will not be revealed to anyone other than people directly involved in the study, or by means of publication, documentation or any other form of report and presentation developed from this research. Additionally I understand that I have the right to withdraw my consent to participate at any time during the study.

I acknowledge that I have had the opportunity to obtain additional information regarding the study and that any questions I have raised have been answered to my full satisfaction.

I acknowledge that I have read and fully understand this participant consent form. I sign it freely and voluntarily. An additional copy has been given to me.

Signature of Participant ___________________________ Date ______________

I understand that as a part of this study Ms. Kristall Graham will be conducting a social validity assessment and I will be asked to answer questions pertaining to my opinion on the intervention. I grant permission to Ms. Graham to use this information as part of the study.

Signature of Participant ___________________________ Date ______________
APPENDIX C

SELF-MONITORING CHECKLIST

<table>
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<th>GOAL FOR TODAY:</th>
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<th>NO</th>
<th>TODAY'S DATE:</th>
<th>YES</th>
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Examples of On-Task Behavior:
- sitting in seat, facing forward
- head up or leaning only on arm/hand
- eyes directed toward the academic
  discriminative stimulus
- glancing only once
  ("glancing is looking away from the
  academic stimulus for 2 seconds or less
  and still on-task")

Non-examples of On-Task Behavior
- partially or totally out of seat or
  sideways in seat
- head or eyes facing in a different
direction from the academic stimulus
  or designated speaker for more than
  2 seconds
- glancing more than once
  ("glancing is looking away from the
  academic stimulus for 2 seconds or less
  and still on-task")

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• responding to teacher questions
• taking notes pertaining to lesson during instruction when required
• only discussing the assigned task when working in groups
• reading materials when requested by the teacher
• writing in response to academic instructional materials
• asking academic questions
• ignoring classroom distractions

academic stimulus for 2 seconds or less and still on-task
-any part of head or face making contact with desk
-non-academic talking
-non-compliance to teacher directions
-playing with objects and/or -hand(s) or object(s) in mouth
# APPENDIX D

## OBSERVER RECORDING SHEET

<table>
<thead>
<tr>
<th>Observer</th>
<th>IOA Y N</th>
<th>%</th>
<th>2nd Observer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>Session #</td>
<td>Condition</td>
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Circle student number if absent 1 2 3

<table>
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<tr>
<th></th>
<th>Student 1</th>
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<th>Student 3</th>
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</tr>
</tbody>
</table>

**TOTALS:**

A student must exhibit on-task behavior (+) at the moment the audiotape cues the interval and for the entire duration of the interval to be recorded as on-task (+). If the student engages in any off-task behavior (−) during the observation interval, the behavior is recorded as off-task (−). See attached sheet for examples and non-examples of behavioral definition.

**Examples of On-Task Behavior:**
- sitting in seat, facing forward
- head up or leaning only on arm/hand
- eyes directed toward the academic discriminative stimulus
- glancing only once ("glancing is looking away from the academic stimulus for 2 seconds or less and still on-task")
- responding to teacher questions
- taking notes pertaining to lesson during instruction when required
- only discussing the assigned task when working in groups
- reading materials when requested by the teacher
- writing in response to academic instructional materials
- asking academic questions
- ignoring classroom distractions

**Non-examples of On-Task Behavior**
- partially or totally out of seat or sideways in seat
- head or eyes facing in a different direction from the academic stimulus or designated speaker for more than 2 seconds
- glancing more than once ("glancing is looking away from the academic stimulus for 2 seconds or less and still on-task")
- any part of head or face making contact with desk
- non-academic talking
- non-compliance to teacher directions
- playing with objects and/or body
- hand(s) or object(s) in mouth
APPENDIX E

FORM FOR TRACKING CLASSROOM GRADES

Circle Student #  1  2  3

Date of Data Collection __________________

<table>
<thead>
<tr>
<th>Subject</th>
<th>Overall Grade to Date</th>
<th>Additional Comments</th>
</tr>
</thead>
<tbody>
<tr>
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APPENDIX F

PROCEDURAL INTEGRITY CHECKLIST

Date: ___________________  Name of Observer: ___________________

IOA: Y N  Time session starts: ___________________

Condition ___________________  Time session ends: ___________________

Place a checkmark in the box as the following steps are completed by the teacher. If more than one activity is described within a box, all activities must occur for a checkmark to be placed in the box.

<table>
<thead>
<tr>
<th>Folders including self-monitoring checklists are on the front table as students enter the classroom.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Each student takes his/her folder when they come into the classroom.</td>
</tr>
<tr>
<td>The checklist is placed on each student's desk in class.</td>
</tr>
<tr>
<td>Teacher directions to students</td>
</tr>
<tr>
<td>Researcher start observation tape</td>
</tr>
<tr>
<td>Teacher starts audio tape during self-monitoring conditions</td>
</tr>
<tr>
<td>When the audiotape chimes the 1st time, student self-records his/her own behavior.</td>
</tr>
<tr>
<td>When the audiotape chimes the 2nd time, student self-records his/her own behavior.</td>
</tr>
<tr>
<td>When the audiotape chimes the 3rd time, student self-records his/her own behavior.</td>
</tr>
<tr>
<td>When the audiotape chimes the 4th time, student self-records his/her own behavior.</td>
</tr>
<tr>
<td>Time</td>
</tr>
<tr>
<td>--------</td>
</tr>
<tr>
<td>5th</td>
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<td>6th</td>
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**Additional Comments:**
APPENDIX G

SOCIAL VALIDITY QUESTIONNAIRES

Social Validity Questionnaire for Teachers

Please give your honest opinion regarding the self-monitoring strategy by circling 1 if you strongly agree with the statement through 7 if you strongly disagree with the statement. A ranking of 4 would indicate a neutral position. Please base your answers on only the last 5 days of the intervention.

Thank you for your time and opinion.

1.) The self-monitoring strategy was easy to implement in class. It did not take an unreasonable amount of effort from me and it did not disrupt my teaching.

2.) The students in my class had success learning the material they studied during Intervention Study Hall because of the self-monitoring strategy. Students accomplished more during the intervention and retained more information.

3.) The audio taped chimes were distracting and disruptive to the classroom and I would prefer using another cue for the completion of student checklists. I do not like the chimes.

4.) The checklists were useful for the students and they gained a lot more control over their behavior because of this aspect of the self-monitoring intervention.
5.) If I were to continue to use the self-monitoring technique, I would change some aspects of the intervention.

6.) I will continue using the self-monitoring intervention with the class that was part of this study.

7.) I plan on using the self-monitoring strategy with other students in the future because I feel that it is worthwhile and effective. I think that other students would benefit from this intervention.

8.) I would consider using the self-monitoring strategy with other students that I teach, but I do not have enough time to implement the intervention.

9.) I do not feel comfortable implementing the steps of the intervention without the OSU researcher. I feel like I need additional training with this intervention.

10.) I will definitely recommend the self-monitoring strategy to other teachers.

Please write any other comments, criticisms, questions, or suggestions:
Social Validity Questionnaire for Students

Please give your honest opinion regarding the self-monitoring strategy by circling 1 if you strongly agree with the statement through 7 if you strongly disagree with the statement. A ranking of 4 would indicate a neutral position. Please base your answers on only the last 5 days of the intervention.

Thank you for your time and opinion.

1.) I found the self-monitoring checklist easy to use.

1 2 3 4 5 6 7

2.) The audio tape chimes helped me focus and reminded me to stay on-task.

1 2 3 4 5 6 7

3.) I had success with the self-monitoring strategy in my academic learning. I was more focused on my work and I accomplished a lot more because of the self-monitoring technique.

1 2 3 4 5 6 7

4.) The self-monitoring technique distracted me in class and I could not get my work done because of it.

1 2 3 4 5 6 7

5.) The self-monitoring technique was appropriate for my age. It did not make me feel like I was being belittled.

1 2 3 4 5 6 7

6.) I wish other teachers would use the self-monitoring strategy in other classes.

1 2 3 4 5 6 7
7.) I do not want the teacher to continue using the self-monitoring technique in this class.

8.) I believe that the self-monitoring strategy would be useful to other students.

9.) I do not feel comfortable using the self-monitoring technique without the OSU researcher.

10.) I am going to tell other students about how useful the self-monitoring technique was for me.

Please write any additional comments, criticisms, questions, or suggestions:

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APPENDIX H

ORAL SOLICITATION

Classroom Script

My name is Kristan Graham and I am currently a graduate student in Special Education at The Ohio State University. I will be conducting a study in your school during the next three months.

This study will investigate how well students can use self-monitoring to improve their on-task behavior and academic performance. You will learn to how to monitor your on-task or off-task behavior. This study will use audio taped chimes and a self-monitoring checklist (see attached). The on-task behavior will be listed on the checklist, and I will give you the exact definition of every behavior before conducting the study. At variable intervals, the audiotape will chime serving as a reminder to you to self-record your behavior on the self-monitoring checklist. If you correctly record your behaviors you will earn a reward. You will benefit by having opportunities to gain more positive control over your own behavior. You will participate in a daily 20-minute session in the Intervention Study Hall. If you or your parents decide at any time you do not want to participate you can drop out of the study without any negative consequences.

Do you have any questions?