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Increasing on-task behavior and academic engagement with students with attention hyperactivity disorder using self-management approaches in a secondary general education classroom

Kelsi Anne Kinnunen (Burfeindt)

INCREASING ON-TASK BEHAVIOR AND ACADEMIC ENGAGEMENT WITH STUDENTS WITH ATTENTION HYPERACTIVITY DISORDER USING SELF-MANAGEMENT APPROACHES IN A SECONDARY GENERAL EDUCATION CLASSROOM

By

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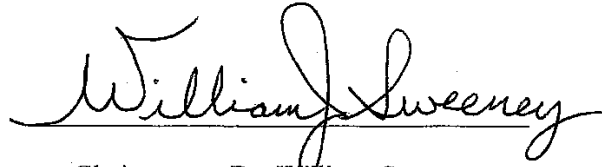Division of Curriculum and Instruction

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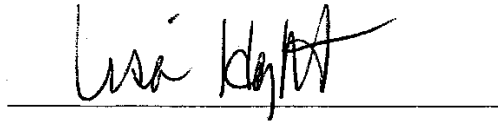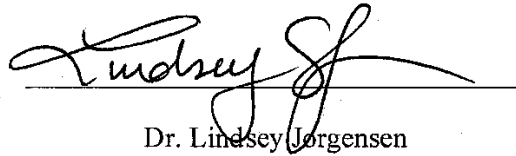DOCTORAL COMMITTEE

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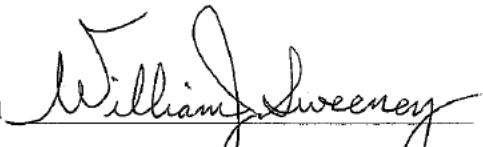
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ABSTRACT

With the increased prevalence of ADHD and concerns about students' academic performance, intervention is necessary to increase students' success in secondary school (Fried et al., 2016; U.S. Department of Health and Human Services, DHHS, n.d.). Otero and Haut (2015) discuss the correlation between on-task behavior and academic achievement. Academic achievement is a predictor of high school completion; therefore, on-task behavior positively contributes to a student's ability to finish high school. This study evaluated the effectiveness of a self-management strategy to increase on-task behavior in students diagnosed with attention deficit hyperactivity disorder (ADHD) in a general education classroom at the secondary education level. The interventions, including self-monitoring and self-evaluation, were expected to increase student on-task behavior in a language arts classroom with three students diagnosed with ADHD. The experimental design used for this study was ABAB reversal design. The implications were also discussed and indicated that the intervention was successful in increasing on-task behavior and academic engagement. Results of the study indicated the use of a self-management intervention is effective for improving on-task behavior with individuals enrolled in special education with co-morbid ADHD in secondary general education classrooms.

Signed _William J. Sweeney_

William Sweeney, Ph.D., Director of Dissertation

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CHAPTER 1

Introduction

In the United States, about 1.2 million students do not graduate from secondary school with their peers each year (Fried et al., 2016). Because of this number of students not completing their secondary education, a high school diploma is more imperative than in previous years. In an age of advancing technology, the need for skilled labor increases; therefore, the need for uneducated individuals also decreases. In 2004, Davis and Dupper cite that only 15% of jobs call for unskilled labor, and even most of those jobs prefer an individual with a high school diploma (p. 180). Students attaining a high school diploma is crucial for their success in the adult world. Many at-risk students struggle to see the importance of their retention and completion of a secondary education. One group of at-risk students are those individuals with attention deficit hyperactivity disorder (ADHD). Students with ADHD exhibit higher rates of school failure, poor grades, and grade retention causing them to possess more difficulties experiencing success in high school and attaining a diploma (Fried et al., 2016, p. 383).

The National Institute of Mental Health cites that the prevalence of ADHD diagnoses among students increased 42% since 2003 (U.S. Department of Health and Human Services, DHHS, n.d.). Students with ADHD exhibit behaviors such as inattention, hyperactivity, and impulsivity. They may forget to finish or turn in completed assignments or can make careless mistakes on assignments. Students also present difficulties in time management, planning of long-term assignments, and studying for tests (Langberg et al., 2008). They often misplace or lose materials, forget materials, and forget to record assignments and due dates. These difficulties are exhibited because of their lack of executive functioning skills (Langberg et al., 2008). They present difficulties in inhibition control, delay tolerance, working memory, and time

perception (Abikoff et al., 2013). They present disruptive behaviors and exhibit poor social skills, resulting in low self-esteem, disrupted relationships, and academic failure (Parker et al., 2013). Students with ADHD can miss large portions of class, not follow directions correctly, or not complete tasks in a timely manner, causing conflicts with teachers. According to Evans et al. (2014), they exhibit higher rates of sub-standard grades, office referrals, suspension, expulsion, and dropping out of school. They display deficiencies in executive functions, described as planning, data processing, and working memory (Mohammadi et al., 2014). According to DePaul et al. (2011), students suffering from ADHD may display aggression and noncompliance. Off-task behavior and lack of executive functioning skills inhibit performance in the classroom.

Additionally, teachers find various struggles when dealing with classroom management. Many inappropriate behaviors and disruptions affect classroom management, particularly off-task behavior (Riley et al., 2011). Moore et al. (2013) describes off-task behavior as "inattention, distractibility, and failure to complete work" (p. 303). Another source describes off-task behavior as engaging in "non-work-related activities, playing with objects, and daydreaming" (Williamson et al., 2009, p. 1074). This behavior not only affects teachers but also fellow classmates. Students with off-task behavior often disrupt the entire classroom environment and can hinder learning (Riley et al., 2011). Students with consistent off-task behavior during instructional time may present skills deficits in academic areas. In other words, classroom behavior problems and academic achievement are closely related.

Specifically, on-task behavior is the ability to work independently and attend to the teacher with eye contact or active participation in discussion. Clare et al. (2000) believe that increasing the above-described behavior assists in the improved academic functioning and decreases disruptive classroom behavior. Academic engagement is a predictor of improved

performance in all areas of academics (Hattie, 2009). Otero and Haut (2015) describe off task behavior as "lower reading achievement, lack of scholastic achievement, school dropout, and greater likelihood of negative behavioral outcomes" (p. 1). There is also evidence linking on-task homework behavior to positive grades and test scores (Godwin et al., 2021). Hawkins and Axelrod (2008) discussed that homework provides extra practice and assists students in strengthening skills that are learned in the classroom. Appropriate on-task homework behavior also improves students' attitudes toward school at the middle school and high school levels (Hawkins & Axelrod, 2008). Improved grades and student attitudes justify a need for appropriate intervention to improve on-task behavior with students in secondary education.

Interventionists utilized many different strategies to adjust and manage off-task behavior, such as "behavioral strategies, psycho-stimulant medications, academic accommodations, and a combination of these strategies" (Graham-Day et al., 2010, p. 206). One of these strategies is self-management. According to Zirpoli (2012), "Self-management is a cognitive-behavioral intervention" (p. 293). Simply put, self-management teaches students to manage their own behavior. Early studies of self-management strategies resulted in positive outcomes decreasing inattention (Moore et al., 2013). Self-management requires the student to understand their behavior, monitor and record it, evaluate it, and reinforce it. There are many benefits to training a student to manage their own behavior. The primary reason is self-management "allows teachers to teach students techniques that will make them less dependent on the teacher's environmental manipulations" (Zirpoli, 2012, p. 293). Another benefit is involving students in their intervention and making them active participants in behavior management, which makes them more invested. Fading teacher involvement and active student participation are especially appealing to high

school resource teachers because the goal is to assist students in gaining independence (Cooper et al., 2020).

Statement of the Problem

This study intends to evaluate the effectiveness of a self-management strategy to increase on-task behavior in students diagnosed with attention deficit hyperactivity disorder in a general education classroom at the secondary education level.

Research Questions

The following research questions guided this study:

1. What is the effect of self-management procedures on the daily on-task behavior of high school students with attention deficit hyperactivity disorder?

2. Are the definitions of the behavior and measurement system for daily on-task a reliable measurement procedure?

3. Will the procedural integrity measures of the self-management procedures ensure fidelity of the intervention implementation?

4. What effect will the self-management procedures exhibit on the perceptions of students, special education personnel, and general education personnel?

Significance of the Study

With the increased prevalence of ADHD and concerns of students' academic performance, intervention is necessary to increase their success in secondary school (Fried et al., 2016; U.S. Department of Health and Human Services, DHHS, n.d.). As stated above, attaining a high school diploma or equivalent is crucial for student's success in their adult life. Otero and Haut (2015) discuss the correlation between on-task behavior and academic achievement.

Academic achievement is a predictor of high school completion; therefore, on-task behavior positively contributes to a student's ability to finish high school.

Some research exists to indicate that self-management strategies increase on-task behavior (Moore et al., 2013). Cooper et al. (2020) cite success with self-management strategies on students with disabilities' on-task behavior but not specifically students with ADHD. Limited research is available to show the success of self-management strategies among secondary students with ADHD. Cooper et al. (2020) also discuss people with diverse abilities learning self-management strategies. That said, there is an implication that clinicians can see success with self-management strategies with students with ADHD.

Lastly, students gaining independence as they near the end of their secondary careers is imperative for long-term success. As Cooper et al. (2020) cite, self-management is the goal of education. Students need to develop independence and evaluate their own performance to experiencing on-going success (Cooper et al., 2020). This study addresses the void in research related to the use of self-management strategies to increase on-task behavior among secondary students with ADHD.

Definition of Terms

The following are terms and definitions to ensure consistency and understanding throughout the study. The researcher defined some of these terms while others are accompanied by a citation.

Attention deficit hyperactivity disorder (ADHD): The American Psychiatric Association defines ADHD as a persistent pattern of inattention and/or hyperactivity–impulsivity that interferes with functioning or development (2013). Inattention symptoms may include trouble holding attention to tasks or activities, does not seem to listen when spoken to directly, or does

not follow through on instructions or fails to finish homework. Hyperactivity symptoms may include fidgeting with or tapping hands or feet, leaving one's seat in situations where remaining seated is expected, and talking excessively.

Experimental control: Cooper et al. (2020) cites that "experimental control is achieved when a predictable change in behavior (the dependent variable) can be reliably produced by the systematic manipulation of some aspect of the environment (the independent variable)" (p. 182).

Individuals with Disabilities Educational Improvement Act (IDEIA): IDEIA ensure that all individuals with disabilities receive a free, appropriate, public education within the least restrictive environment that meets their education needs. By the age of 16, each individual's plan requires post-secondary goals, course of study, and transition services or activities for assistance in transition planning (IDEIA, 2004).

Individual Education Program (IEP): The South Dakota Department of Education defines the purpose of an IEP and the IEP meeting as where a team makes decisions about eligibility and programming for the student (South Dakota IEP Technical Assistance Guide, 2020). Additionally, the IEP document acts as a record of the educational decisions by the instructional team determined at the meeting (South Dakota IEP Technical Assistance Guide, 2020). An Individual Education Plan is a written statement for children with a disability that is developed, reviewed, and revised in a meeting (Heward et al., 2017). The plan must include present levels of academic achievement and functional performance, measurable annual goals, statement of special education and related services, explanation of the extent that the child will not participate in the regular class, appropriate accommodations and modifications, date for beginning of services, and transition services for students of age 16 (IDEIA, 2004).

Inter-observer agreement: Johnson and Pennypacker (2009) defines inter-observer agreement or reliability as "a procedure for enhancing the believability of data that involves comparing simultaneous but independent observations" (p. 148).

On-task behavior: On-task behavior is the ability to work independently and to attend to teacher-directed activities. Clare et al. (2000) defines on-task behaviors as "eye contact with the teacher, working quietly, and appropriately orienting to a task" (p. 517).

Procedural fidelity: Procedural fidelity "refers to the extent to which the procedures in all conditions of an experiment, including baseline, are correctly implemented (Cooper et al., 2020, p. 257).

Self-management: Self-management is a "cognitive-behavioral intervention" (Zirpoli, 2022, p. 293). Common self-management interventions are self-monitoring, self-evaluation, self-instruction, goal setting, and self-reinforcement (Mooney et al, 2007).

Single-subject design: Single-subject design or single-case design focuses on investigating the effect of an intervention on an individual subject or small group of subjects (Kazdin, 2011).

Social validity: Social validity is used to ensure that interventions and research methods "take into account the concerns of society and the consumers" (students, teachers, parents, etc.) of those interventions and methods (Kazdin, 2011, p. 53).

Steady state responding: Johnston and Pennypacker (2009) defines steady state of responding as a "pattern of responding that shows relatively little variation in its measured dimensional quantities over some period of time" (p. 196).

Systematic replication research: Systematic replication repeats an entire phase or condition in an experiment to evaluate the reliability of the effect observed when changing from one phase or condition to another (Johnston & Pennypacker, 2009).

Limitations of the Study

The following items appeared as potential limitations/delimitations of the study:

1. Each participant received other intervention services (i.e., social skills training, speech therapy, educational services) which potentially affected his performance from day to day.

2. The study was conducted in a small group, with a low teacher-to-child ratio, which may have affected the generalization of the skills to other settings with higher child-to-teacher ratios.

3. Each participant was diagnosed with attention deficit hyperactivity disorder. The presentation of this diagnosis varied greatly between individuals which may have affected the generalizability of the results.

4. The study was conducted in rural remote school district in a relatively small state which may limit the generalizability of the results beyond the current setting. Additionally, the setting was altered as a result of the emergence of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) global pandemic, which resulted in schools making changes to every day practices including increased cleaning, quarantine requirements, and altered required attendance procedures.

CHAPTER 2

Review of Selected/Related Literature and Research

This chapter discusses the literature available to explain the definitions and procedures used in this research. The chapter is divided into the following sections: (a) attention deficit hyperactivity disorder, (b) self-management strategies, (c) self-management strategies used for on-task behavior, and (d) a summary.

Attention Deficit Hyperactivity Disorder

Attention deficit hyperactivity disorder (ADHD) is one of the most common childhood disorders (US Department of Health and Human Services, DHHS, n.d.). ADHD symptoms occur in children from preschool to adulthood. Mphahlele et al. (2020) cite that ADHD affects 5% of children and 2.5% of adults worldwide (p. 1). Individuals with ADHD typically display deficits in executive functioning, impulsivity, inattention, and hyperactivity (Fredicksen et al., 2014; Graham-Day et al., 2010). These deficits result in individuals' difficulty thinking through actions and consequences, poor interpersonal relationships, poor academic achievement, and poor work performance compared to their peers without ADHD (Barkley, 2006; Fischer et al., 2006; Hechtman et al., 1984; Sonuga-Bourke et al., 2002). Students and adults with ADHD display difficulties with assignment and work completion, goal-oriented behavior, and scheduling and keeping appointments or meetings resulting in poor academic and employment performance (Fredricksen et al., 2014; Lyhne et al., 2021).

Individuals also display long-term concerns, such as work problems, poor socio-economic outcomes, mental health issues, and drug and alcohol abuse (Biederman et al., 2006; Sedgwick-Müller et al., 2022). Specifically, regarding mental health and substance abuse,

Biederman et al. (2006) discuss that those individuals with ADHD often display "elevated rates of antisocial, addictive, mood and anxiety disorders" in adulthood (p. 167).

The American Psychiatric Association (2013) defines the diagnostic criteria for attention deficit hyperactivity disorder (ADHD) as follows:

Symptoms and/or behaviors that have persisted for more than six months in more than two settings (e.g., school, home, church). Symptoms have negatively impacted academic, social, and/or occupational functioning. In patients aged 16 years or less, more than six symptoms are necessary; in those aged 17 years or more, more than five symptoms are necessary. For the inattention type of ADHD, the symptoms cited are as follows.

1. Often fails to give close attention to details or makes careless mistakes in schoolwork, at work, or with other activities.

2. Often has trouble holding attention on tasks or play activities.

3. Often does not seem to listen when spoken to directly.

4. Often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace.

5. Often has trouble organizing tasks and activities.

6. Often avoids, dislikes, or is reluctant to do tasks that require mental effort over a long period of time.

7. Often loses things necessary for tasks and activities.

8. Is often easily distracted.

9. Is often forgetful in daily activities.

For the hyperactivity and impulsivity type of ADHD, the symptoms cited are as follows.

1. Often fidgets with or taps hands or feet, or squirms in seat.

2. Often leaves seat in situations when remaining seated is expected.

3. Often runs about or climbs in situations where it is not appropriate.

4. Often unable to play or take part in leisure activities quietly.

5. Is often "on the go" acting as if "driven by a motor."

6. Often talks excessively.

7. Often blurts out an answer before a question has been completed.

8. Often has trouble waiting their turn.

9. Often interrupts or intrudes on others. (American Psychiatric Association, 2013, pp. 59-60).

Due to these symptoms, individuals with ADHD may display deficiencies in academic functioning and peer relations, making school difficult for them to succeed (Fried et al., 2013; Xing Tan & Teng, 2020). The American Psychiatric Association (2013) cites that students with ADHD obtain less schooling and exhibit poorer vocational achievement than their peers (p. 63). Students with ADHD are a population that requires intervention before the consequences affect their adult lives (Biederman et al., 2006; Lyhne et al., 2021; Sedgwick-Müller et al., 2022). Breslau et al. (2011) cite that 33.2% of students with ADHD do not graduate high school on time (p. 295). This statistic is significantly higher than those without a psychiatric condition, cited at 15.2% (Breslau et al., 2011, p. 295).

According to DuPaul et al. (2011), students with ADHD experience significantly higher rates of grade retention, placement in special education, and school dropout. Fried et al. (2016) also concluded that students with ADHD are "significantly more likely" to drop out of high school, indicating the critical importance of early intervention to lessen adverse educational

outcomes (p. 383). Breslau et al. (2011) suggest that for students with ADHD dropping out of school "is due at least in part to the negative impact of attention problems on the acquisition of academic skills" (p. 295). Other research concludes similar outcomes for students with attention issues (Bryant et al., 2003; Lindhardt et al., 2022; Tichenor et al., 2021; von Simson et al., 2022). Hoff and Ervin (2013) also found a correlation between disruptive behaviors and an "increased risk for academic deficits, absenteeism, school dropout, and delinquency" (p. 151). One study states that students with ADHD often display a risk for school failure due to impulsivity and inattention (McGoey et al., 2002). Biederman et al. (2004) claim that children with ADHD are 2.7 times more likely to repeat a grade (p. 761). An additional study found a correlation between ADHD and long-term school outcomes, including retention and high school dropout due to poor academic achievement (Barbaresi et al., 2007; Breslau et al., 2009; Fischer & Barkley, 2006). Reed et al. (2017) also cited poor school-based behavioral outcomes for students with ADHD, such as truancy, disciplinary issues, and in-school fights. In summary, students with ADHD lack on-task behavior, and on-task behavior is an essential element of their secondary school success.

If students continue to display these types of behavior problems, they can exhibit socialization problems including difficulty maintaining peer and adult relationships (Frankel & Feinberg, 2002), social rejection (DuPaul et al., 2011), and social isolation (de Boo & Prins, 2007). Social issues are not the only concern; students may also demonstrate academic problems. Students with consistent off-task behavior during instructional time may present skill deficits in academic areas (DuPaul & Weyandt, 2006; Gaddy, 1988; Williamson et al., 2009). In other words, classroom behavior and academic achievement are closely related in students with ADHD (Hyland & Keaton, 1994). Students with ADHD display difficulty with on-task behavior due to a deficit in neurological executive functioning, which is the ability to control one's actions

(Barkley, 2006; Sonuga-Bourke et al., 2002). Students with ADHD struggle with the capacity to think before they act, hold information in their working memory, manage their emotions, develop plans to deal with demanding situations, sustain attention for extended periods, organize their materials, and plan for long-term goals due to their lack of executive functioning (Barkley, 1997). These deficits connect to self-regulation and metacognition. According to Bruning et al. (2011), students require metacognition and self-regulation to understand their own thinking and use this awareness to regulate their own cognitive processes (p. 7).

Students with ADHD require explicit instruction in executive functioning and self-regulation to experience success in both educational and vocational settings (Graham-Day et al., 2010). Explicit instruction uses "clear statements about the purpose and rationale for learning the new skill, clear explanations and demonstrations of the instructional target, and supported practice with feedback" until the student reaches proficiency (Archer & Hughes, 2011, p. 1). Another source states that diverse learners require targeted strategies, multiple examples, and explicit instruction to ensure positive outcomes (Coyne et al., 2007, p. 32). Hattie and Clarke (2019) also cite the importance of self-regulation, clear explanations, and feedback on student learning. These authors claim that students at the self-regulation level display confidence in their ability to complete the task and to self-evaluate, which results in their willingness to continue the task with effort. The authors' findings result from an ongoing synthesis related to a meta-analyses about effect sizes on the influence of student learning (Hattie & Clarke, 2019).

Bruhn et al. (2016) cite students with disabilities, specifically those with behavioral difficulties, often lack self-regulation skills and require explicit instruction in self-regulation strategies. One study showed positive results in direct instruction compared to a control group involving students with ADHD that intended to improve inattention and academic efficiency

(Kerns et al., 1999). The authors suggest that students with ADHD benefit from a direct or explicit instruction of interventions compared to traditional methods. "These results suggest that direct interventions aimed at improving attention may be a valuable treatment option for improving cognitive efficiency in children with ADHD and warrant further investigation" (Kerns et al., 1999, p. 273). Evans et al. (2014) found students with ADHD at the middle school and high school levels benefit from training programs because their environment is less structured and inconsistent.

In summary, students with ADHD often lack the awareness and ability to regulate their own thinking. Explicit instruction and self-regulated learning improves this ability (Archer & Hughes, 2011; Coyne et al., 2007; Hattie & Clarke, 2019). Shapiro and Cole (1994) cite teaching self-management strategies to students with ADHD to accomplish this goal.

Self-management strategies

Skinner (1953) appears as the first to conceptualize the idea of self-control to change behavior. In past studies, teaching self-management strategies resulted in positive results for students of all ages and disability categories (Carr et al., 2014; Carter et al., 2011; McDougal et al., 2017; Reynolds et al., 2014; Southall & Gast, 2011). Previous self-management research also displays favorable outcomes with different behaviors such as classwork completion (Falkenberg & Barbetta, 2013; Trevino-Maack et al., 2015;), organization skills (Guresko-Moore et al., 2006), classroom survival skills (Snyder & Bambara, 1997), math achievement (Tindall-Ford et al., 2015), handwriting and written expression achievement (Stotz et al., 2008; Sweeney et al., 1993), reading comprehension (Crabtree et al., 2010) and on-task behavior (Axelrod et al., 2009; Clare et al., 2000; Clemons et al., 2016; Gulchak, 2008; Moore et al., 2013; Rosenbloom et al., 2019; Wills & Mason, 2014).

Studies cite positive results for students in elementary school (Newstrom et al., 1999; Stotz et al., 2008), middle school (Mooney et al., 2005; Tindall-Ford et al., 2015), and high school (Arguedas et al., 2016; Wills & Mason, 2014). Research also includes benefits to students with ADHD (Gureasko-Moore et al., 2006; Harris et al., 2005), emotional or behavioral disorders (EBD) (Gulchak, 2008; Willis et al., 1995), specific learning disabilities (SLD), (Crabtree et al., 2010; Snyder & Bambara, 1997) developmental disorders or cognitive disorders (Kuntz & Carter, 2019; Sweeney et al., 1993), traumatic brain injury (Selznick & Savage, 2000), and autism spectrum disorders (ASD) (Rock & Thead, 2007; Soares et al., 2009)

Cooper et al. (2020) provide a basic definition of self-management as "behavior a person emits to influence another behavior" (p. 735). By this definition, self-management uses behaviors to change a different behavior. Kazdin (2013) furthers that definition by describing a deliberate undertaking to achieve a self-selected goal by "manipulating antecedent and consequence events" (p. 627). Combining these definitions, self-management is a cooperative self-application of a behavior change program between a student and teacher or other caregivers to increase the probability of desired behavior or decrease the likelihood of undesired behavior. For this study's purpose, self-management is a set of self-directed strategies that produce the desired improvement of a specific, self-selected collaborative behavior by the teacher and student to improve educational outcomes in the classroom.

Individuals apply self-management strategies to their everyday life. Cooper et al. (2020) describe some of these strategies such as writing notes to oneself as reminders, setting an object in a convenient location to remember to take it somewhere, keeping appointments in a calendar, and creating shopping or to-do lists. In the digital age, individuals use portable devices to set reminders, keep shared calendars, and utilize applications to manage their daily lives. Many of

these strategies lead to a more effective and efficient life, focusing on "overcoming forgetfulness or lack of organization" (Cooper et al., 2020, p. 738). Self-management strategies also assist individuals in breaking bad habits, accomplishing complex tasks, and achieving personal goals.

Self-management benefits individuals as well as society. Individuals with practical self-management skills display a greater likelihood of fulfilling their potential and considering long-term outcomes such as buying fuel-efficient vehicles and recycling (Epstein, 1997). Dewey (1939), one of the most influential philosophers in psychology and education, suggests that self-management is the ideal aim of education. Self-management allows students to feel free and in control. Hattie and Clark (2019) and Cooper et al. (2020) state that individuals with self-management skills display more self-confidence and can evaluate and provide feedback for reward or correction.

Self-management incorporates different interventions, which one source categorizes as contingency-based and cognitive-based (Shapiro & Cole, 1994). Contingency-based approaches focus on "consequences for appropriate or inappropriate behavior" (Shapiro & Cole, 1994). Robertson et al. (1979), in a seminal study in contingency-based approaches, increased students with cognitive disabilities' self-evaluation skills to decrease disruptive behavior. Researchers taught the students to observe and evaluate their behavior and collected interval recording data during multiple sessions. The study displayed reduced rates of disruptive behavior during treatment, fading, and generalization phases (Robertson et al., 1979).

Contingency-based approaches encompass self-monitoring, self-evaluation, and self-reinforcement. "Self-management represents a broad array of skills and strategies individuals use to assess and regulate their behavior" (Wills & Mason, 2014). Self-management behaviors are a

heterogenous group that offers a different approach to typical, teacher-directed behavior modification programs.

Self-monitoring. Cooper et al. (2020) define self-monitoring as "a procedure whereby a person systematically observes his behavior and records the occurrence or nonoccurrence of a target behavior" (p. 745). Previous research cites improvements in the variety of desired behaviors of secondary students using self-monitoring (Blick & Test, 1987; Mitchem et al., 2001; Trevino-Maack et al., 2016). The first step in training the self-monitoring technique is to increase students' awareness of the behavior they are recording (Zirpoli, 2012). Professionals must teach students the operational definition of the behavior to ensure they can identify the presence or absence of the behavior correctly. Shapiro and Cole (1994) claim that students with an awareness of the defined behavior increase the accuracy of monitoring and recording.

Patton et al. (2006) developed a method for making students aware of their behavior and teaching them how to define and identify appropriate and inappropriate behavior. According to this method, the teacher displays a visual sample or models each behavior. The student identifies appropriate and inappropriate behavior to begin recording their behavior. Patton et al. (2006) also discuss the importance of making contracts for the student to sign, giving them more incentive to display the appropriate behavior (p. 19). Once the student is aware and the behavior is operationally defined, the student can begin counting or recording. When applied to on-task behavior, the most effective way a student can record their behavior is by using a prompt to remind them to record (Patton et al., 2006). Students use momentary time sampling to record their behavior using tactile, visual, or audio signals.

One study investigated contingency contracting to improve a student with a behavioral disorder's written language (Newstrom et al., 1999). "Contingency contracting is a document

that specifies a contingent relationship between the completion of a target behavior and access to, or delivery of, a specified reward" (Cooper et al., 2020, p. 724). The researchers used a multiple baseline design across the academic skills, by evaluating the percent of capitalization and punctuation marks made correctly during written language assignments, to assess the effects of contingency contracting. Using a contract assisted the student and practitioner in the clearly defined behavior for recording.

Another study used contingency contracting to reduce a first-grade student's off-task behavior and refusals to comply with directives (Wilkinson, 2003). The study implemented an AB design to evaluate the effectiveness of contingency contracting on the student's behavior. The study conducted direct observations in a classroom environment. The results displayed effectiveness for improving in positive behavior and problem-solving skills, even after a 4-week follow-up (Wilkinson, 2003).

Many interventions use a signal or cue system only felt, seen, or heard by the student to avoid social stigma (Cooper et al., 2020). Moore et al. (2013) conducted a study involving a tactile prompt called the MotivAider®, an electronic beeper that vibrates to signal the student to record their behavior. One study cites the use of the WatchMinder®, a vibrating prompt watch, to improve students' on-task behavior of students with autism spectrum disorder (ASD) (Finn et al., 2015).

Another study by Crabtree et al. (2010) used a predetermined point in a text as a cue. Crabtree et al. (2010) conducted a study with high school seniors using self-monitoring to improve reading comprehension. The researchers used predetermined places in the text to cue the student to record story elements using a recording form. The study showed a positive, functional

relationship between the self-monitoring strategy and improved reading comprehension performance.

After a researcher choosing a cueing device, selecting a recording device is the next step. Many practitioners choose a basic table, some including the visuals used in the behavior definition stage. Piersel (1985) investigated the effect of the presence and absence of a physical recording device on a student's completion of schoolwork. The study displayed positive results with a third-grade student when in the presence of the physical recording device. The teacher needed to ensure that the recording process is quick and easy for the student and not distracting instruction or engagement. Training students at the secondary level to self-record or self-monitor requires sufficient time and training.

Self-evaluation. Shapiro and Cole (1994) define self-evaluation as the following: "involves the comparison of one's own behavior against a self-determined or externally determined standard" (p. 7). Self-evaluation often accompanies self-monitoring. Miller et al. (1993) studied the effectiveness of a self-evaluation procedure to increase on-task behavior in preschool students considered disruptive. The study matched teacher and child ratings during direct observations in two classrooms. The study displayed positive results in the students' on-task behavior during observations (Miller et al., 1993).

In another study, a student with learning disabilities evaluated their handwriting using a self-evaluation form addressing size, slant, shape, and general appearance (Sweeney et al., 1993). This study cited improvements in a secondary-level student's difficult-to-read handwriting. Self-monitoring or recording is essential for self-evaluation to occur. Students and teachers must set goals or preset standards for behavior for self-evaluation effectiveness.

Another critical component of self-evaluation is immediate feedback from the practitioner at the beginning stages of the intervention. Immediate feedback or reinforcement ensures the correct behavior receives the reinforcement by increasing the probability of correct responding during future opportunities to engage in the behavior or skill. Cooper et al. (2020) cite that "behaviors other than the target behavior can occur during the delay; the behavior temporally closest to the presentation of the reinforcer will be strengthened by its presentation" (p. 286). Therefore, practitioners must provide feedback or reinforcement immediately following the correct behavior to increase the likelihood of the behavior occurring in the future. Throughout the self-management process, it is essential to emphasize that teachers should fade their responsibilities as soon as possible. Most self-evaluation interventions include forms attached to self-monitoring forms. Patton et al. (2006) give examples of recording forms with questions like "Did I meet mastery today?" or questions asking about matching to the teacher's recordings (pp. 19-20).

Another study investigated self-monitoring and self-evaluation on employment soft skills using a treatment package called *UPGRADE Your Performance* (Clark et al., 2018). The researchers used a multiple probe design across two settings to study the effectiveness of the treatment package's instruction. This study showed positive results in the students' self-selected soft skills and overall performance in both in-school job sites, such as working in the cafeteria, making copies, as well as other important vocationally related activities.

Students can also graph their progress. Self-graphing is the visual display of a student's progress, typically collected and tracked by themselves (Cooper et al., 2022; Kubina & Yurich, 2012). In one study, researchers studied the effect of a student's accurately completing math problems using self-graphing and self-monitoring (Sheehey et al., 2017). The researchers used a

single-subject reversal design to investigate the influence of self-monitoring and self-graphing on a student's basic math problems completed and completed accurately. The study increased the completion and accuracy of basic math problems (Sheehey et al., 2017). The study displays additional support of self-monitoring effects on student's academic performance.

Studies show positive results for self-graphing in all academic levels, including early childhood education (Gunter et al., 2003; Hyland & Keaton, 1994; Ritter et al., 2021; Stotz et al., 2007; Wells et al., 2017). One study investigated a peer-assisted literacy package and self-graphing together and alone with kindergarteners' early literacy skills using an alternating treatment design (Ritter et al., 2020). The study's results indicate that the self-graphing intervention positively impacted students' phonemic awareness.

Gunter et al. (2003) also conducted a study using self-graphing. In this study, a student with an emotional or behavioral disorder graphed her performance on the rate of correct words read per minute. This study displayed increased reading rates when she used a computer and a standard spreadsheet to record and graph her data. This concept appeals to students and assists in motivation toward reaching the goal because of the impact of the visual representation's effects at improving the students rate of correctly read words.

Self-reinforcement. The last component of self-management discussed in this section is self-reinforcement. Zirpoli (2012) describes self-reinforcement as the student choosing the reinforcer and delivering it when they meet the appropriate behavior. Self-reinforcement is not for students that are new to self-management strategies. At this level of self-management, teachers may find it more suitable for older students, such as those at the secondary level. When teachers begin self-reinforcement, they control reinforcement, fading their involvement, and putting more responsibility on the student (Shapiro & Cole, 1994).

In one study, Pigott et al. (1985) displayed the improvement of student's math performance by students scoring and reinforcing the whole group. The study assigned separate roles for each group member involving self-instruction, self-observation, self-evaluation, and self-reinforcement. The researchers used an ABAB withdrawal design to evaluate the group intervention. Based on their baseline data, the study displayed positive results in the student's math performance (Pigott et al., 1985).

Humphrey et al. (1978) investigated self-administered rewards and punishment on second graders regarding their reading rates, disruptive behavior, and accurate completion of workbook reading. The researchers conducted a multiple baseline design to show the effectiveness of the self-reward and self-punishment procedure. The study showed improved reading rates and workbook performance when investigating the self-reward strategy (Humphrey et al., 1978). The study was seminal for self-reinforcement strategies, displaying positive results over self-punishment.

Another study investigated adolescents with ADHD's academic performance using a combined inverted design using a self-reinforcement strategy and stimulant medication (Chase & Clement, 1985). The researchers included six elementary students with ADHD and administered a combined inverted design. The study found that the self-reinforcement method improved academic performance more than the stimulant alone and showed significant improvement with both the stimulant medication and self-reinforcement strategy (Chase & Clement, 1985).

Beaver et al. (2017) investigated the effect of self-reinforcement compared to teacher-delivered reinforcement with students diagnosed with autism spectrum disorder (ASD). The study assessed four teenage students' on-task behavior and completion independent of tasks. The researchers used an adapted alternating-treatments design using teacher-delivered reinforcement,

self-reinforcement, and a control condition. The study displayed positive results of a self-reinforcement intervention compared to teacher-directed reinforcement and control condition. Like all aspects of self-management, student involvement appeared imperative in choosing reinforcers and criteria for reinforcement.

Other self-management strategies

Practitioners find categorizing other self-management strategies used with students. Cooper et al. (2020) identify these strategies as self-instruction, habit reversal, self-directed systematic desensitization, and massed practice (p. 757).

Self-instruction. Shapiro and Cole (1994) state that "self-instruction involves teaching children specific verbalizations to direct their own behavior" (p. 9). Essentially, self-instruction teaches students to talk to themselves through how to solve a problem. Previous studies show positive results in teaching students who are considered impulsive to self-instruct, assisting with their on-task behavior and independent work performance (Billings & Wasik, 1985; Bornstein & Quevillon, 1976; Bryant & Budd, 1982; Meichenbaum & Goodman, 1971). Self-instruction involves explicit instruction to teach students about relevant stimuli, planning a response, performing as expected, coping with feelings, and evaluating performance (Kauffman & Landrum, 2013). One study examined self-instruction among elementary students with impulse deficits (Meichenbaum & Goodman, 1971). The study aimed to increase students' self-control by teaching them to talk to themselves. Students improved their ability to control their impulses in an academic setting (Meichenbaum & Goodman, 1971).

Habit reversal. Azrin and Nunn (1973) developed a strategy called habit reversal. In this strategy, practitioners teach students to self-monitor habits and interrupt behavior chains by engaging in replacement behaviors or behaviors incompatible with the problem behavior (Azrin

& Nunn, 1973). In one study, students aimed to improve their public speaking skills by reducing nonsense syllables and word interjections (Mancuso & Miltenberger, 2016). The study used a noncurrent multiple baseline across participants to evaluate problem behaviors and intervene with appropriate replacement behaviors. Students began by becoming self-aware of the problem behaviors. Then, the researchers introduced replacement behaviors incompatible with problem behaviors. Replacement behaviors involved pauses or placing the tongue against the bottom teeth to intercept the use of nonsense syllables and word interjections, thereby improving the student's public speaking skills. The study showed immediate and lasting decreases in the target behaviors (Mancuso & Miltenberger, 2016).

Self-directed systematic desensitization. Cooper et al. (2020) cite "systematic desensitization as a widely used behavior therapy for anxieties, fears, and phobias that features self-management strategy by engaging in an alternative behavior (p. 758). Wolpe (1973) introduced systematic desensitization, where individuals develop a hierarchy of situations from least to most fearful and then expose themselves to situations to overcome fear, starting with the most minor and moving to the most fearful. Practitioners use these procedures to achieve muscle relaxation in fearful situations to help individuals overcome fears and phobias (Martin & Pear, 2015; Wenrich et al., 1976).

Massed practice. Cooper et al. (2020) define forcing oneself to perform an undesired behavior repeatedly. Wolff (1977) conducted a study with an individual with compulsive, ritualized routines where they would conduct several security checks every time they entered their home. The study began with the individual repeating the 13 steps multiple times when entering their home. After one week, the individual only checked when they wanted to but

repeated the behavior five times. Eventually, they ceased the repetitive and compulsive routine altogether (Wolff, 1977).

Self-management strategies used for on-task behavior

Many self-management studies focus on increasing attention and on-task behavior in the classroom (Axelrod et al., 2009; Fantuzzo & Polite, 1990; Grossman & Hughes, 1992; Harris et al., 2005; Nelson et al., 1991). Hallahan et al. (1981) investigated the effect of self-management on 10-year-old students using a wrist counter and a tape recorder with audible beeps. In this study, the students asked if they were paying attention when the tape recorder beeped and recorded on the wrist counter whether they thought they exhibited appropriate on-task behavior during the measurement interval. The study showed an increase in the student's on-task behavior after a day of implementation, even after the researcher faded the wrist counter and tape-recorded cueing system (Hallahan et al., 1981).

In a seminal study, researchers studied the effects of a self-monitoring and recording strategy on 12 students with varying disabilities (Blick & Test, 1987). The researcher taught the students to self-monitor and record with audible cues. The study used a multiple baseline design across groups to study the effects on the students' on-task behavior. The results displayed a functional relationship between the self-management intervention and increased on-task behavior. The study also showed positive results in students' academic performance in both training and non-training settings (Blick & Test, 1987).

Prater et al. (1991) implemented a self-monitoring intervention with five 17-year-old students with learning disabilities or behavioral disorders described as easily distracted or non-compliant. The researchers used an ABC with fading research design in various academic settings. Students and an independent interobserver used momentary time sampling to collect on-

task behavior during observation periods. During the intervention, the students increased their on-task behavior using visual and auditory cues and a self-tracking device (Prater et al., 1991).

More current researchers (Axelrod et al., 2009; Kolbenschlag & Wunderlich, 2019) focused on increasing on-task behavior using self-management strategies as well. One study examined the effectiveness of "naturalistic, home-based, self-management intervention for students with attention problems and behavioral disorders" (Axelrod et al., 2009, p. 325). The participants were all high school students in a residential program. The participants used a tape recorder with an audible beep and a self-monitoring sheet to monitor their on-task behavior during homework. Participants displayed significant increases in on-task behavior at 3- and 10-minute intervals compared to their baseline data (Axelrod et al., 2009).

Kolbenschlag and Wunderlich (2019) used a discreet auditory prompt with a single wireless in-ear headphone to investigate the effects of self-monitoring plus reinforcement on on-task behavior and the accuracy of the recordings. The study included four students with low levels of on-task behavior during instructional tasks. The researchers trained the students to use a headphone connected to an iPod® as a cueing device and a recording sheet for self-monitoring. The device cued students using a two-minute momentary time sampling. The study used a multiple baseline across participants design. The results display a reduction of off-task behavior for all three participants and an increase in the accuracy of their recordings when compared to interobserver ratings (Kolbenschlag & Wunderlich, 2019).

Research also evaluated multiple dependent variables simultaneously, including on-task behavior (Harris et al., 2005; Trevino-Maack et al., 2015; Wolfe et al., 2000). Wolfe et al. (2000) investigated the effect of a self-monitoring strategy on four elementary school boys with learning disabilities. The study included both on-task behavior and written language performance in the

dependent variables and used a reversal experimental design. The researchers used a recorded tone at 60-second intervals and responded to the question, "Am I on-task?" The written performance variable involved students writing for 10 minutes, counting, and graphing the number of words written. The results showed positive results for self-monitoring of the students' on-task behavior. The effects of self-monitoring and self-graphing showed fewer positive results than the self-monitoring strategies (Wolfe et al., 2000).

Maag et al. (1993) also conducted a multiple design combined with a multiple dependent variables baseline across subjects design in this study. The dependent variables included the percentage of on-task behavior, the number of problems completed, and the percentage of problems completed correctly. The participants included six elementary students identified with learning disabilities and high levels of off-task behavior and low levels of task completion on math assignments. The students received instruction on the self-monitoring strategy for all three dependent variables. The researchers used tape-recorded tones to signal the students to self-monitor. Self-monitoring for attention used a recording sheet where students marked if they were on-task or off-task when cued by the tape recorder. On a tally sheet, the students recorded the number of problems completed since the last tone for self-monitoring of productivity. Lastly, the students counted the number of problems they completed correctly since the previous tone and recorded the number on a tally sheet for the self-monitoring of accuracy variable. The findings displayed improved results in all three dependent variables. Social validity showed that students preferred to monitor academic outcomes versus on-task behavior (Maag et al., 1993).

Another study examined the effects of a self-monitoring intervention on students' academic engagement, productivity, and accuracy with and without disabilities (Rock, 2005). The study selected nine students by teacher referral identified as consistently disengaged from

the learning process. The study used the self-monitoring approach called the ACT-REACT strategy. The strategy uses a mnemonic representing six steps: articulate your goals, create a work plan, take pictures, reflect using self-talk, evaluate your progress, and ACT again (Rock, 2005). The researcher taught the students how to use the strategy and to self-record attention and performance data. The study used a multiple baseline across subjects design with an embedded reversal. The results displayed significant increases in engagement and productivity during both intervention phases and slight increases during the second baseline. The study cited no significant improvements in student's accuracy (Rock, 2005). The researchers attribute the increases in engagement and productivity to increased choice in the study, suggesting that student autonomy assists in students on-task behavior and efficiency in the classroom (Rock, 2005).

In one study, Harris et al. (2005) examined the benefits of a self-monitoring strategy on elementary students with ADHD related to their on-task and spelling study behaviors. The study used a tape recorder with audible tones for the on-task variable to cue the student. Upon the cue, the student would ask, "Was I paying attention?" and subsequently record the answer on a tally sheet. For the spelling behavior, students recorded the number of times they practiced their spelling words weekly. The study yielded positive results for on-task behavior and correct spelling outcomes using self-monitoring strategies. This study considered seminal research demonstrating the positive effects of a self-monitoring strategy on students with ADHD (Harris et al., 2005).

Additionally, Trevino-Maack et al. (2015) used a combined group contingency strategy with self-management intervention to improve classwork and classroom engagement with secondary students considered at-risk. The researchers included 15 students identified with

difficulties with attention and writing problems. The study used an ABAB or withdrawal design to compare the intervention and baseline. The dependent variables included the total words written and the percentage of class-wide and individual active student engagement. Active engagement included reading aloud, writing information relevant to the lesson, silent reading, answering questions, and talking about the topic (Trevino-Maack et al., 2015). The study included a token economy and self-monitoring strategy requiring students to log their performance. The study displayed positive results in students reading logs and overall classroom academic engagement (Trevino-Maack et al., 2015).

Dalton et al. (1999) investigated a self-management program's effect on decreasing off-task behavior in two general education classes and a study hall class. The participants included two high school students with learning disabilities. The researchers used a checklist, a behavior rating scale, and a self-monitoring form. The students completed training to identify and record on-task behavior. The study used a multiple baseline design across settings for each participant. The results display an increase in on-task behavior in all three settings with both students. Also, teacher ratings cited improvements in student behavior (Dalton et al., 1999).

In more recent studies, researchers utilize technology to execute self-management strategies. In a seminal study with technology, Epstein et al. (2001) used a single-subject study to investigate the effects of computer software and a paging device as a prompting cue. The researcher used a reversal design with a student with ADHD. The results showed positive results in initiating and completing daily tasks using the digital prompting device. Parents and teachers both reported a high degree of satisfaction with the device and its results. The study encouraged further research on technology for cueing students with ADHD (Epstein et al., 2001).

Another early study used videotape feedback and self-recording intervention to increase on-task behavior with a fourth-grade student with emotional or behavioral disorders (Walther & Beare, 1991). The student viewed video recordings of himself on-task and off-task to discriminate the differences between the two types of behaviors and to identify the correct behavior. The student also recorded his on-task behavior during in-seat assignments when prompted. The study used a withdrawal design and revealed an increase in on-task behavior during the intervention and a decrease related to on-task behavior during baseline. "Results suggest a functional relationship between the videotape procedure and the student's on-task behavior rate" (Walther & Beare, 1991, p. 53).

Coyle and Cole (2004) also investigated videotaped self-modeling and self-monitoring strategies to decrease off-task behavior. The study selected three elementary students with autism and a single-subject withdrawal design was used to examine the effectiveness of the intervention package. Students viewed three-minute tape recordings of themselves engaged in on-task behavior in the classroom. The researcher also used a laminated communication card to represent on-task behavior, a timer for the cueing device, and a self-monitoring sheet to record behavior (Coyle & Cole, 2004). The study displayed decreased off-task behavior for all three students in the intervention phases (Coyle & Cole, 2004).

Another study used video recordings and self-monitoring strategies to increase on-task behavior (King et al., 2014). The researchers selected four students in either the second or third grade with high rates of off-task behavior with and without identified disabilities. The video modeling used self-models of on-task behavior for each student. The study used the MotivAider® device, a vibrating device worn by the student to prompt recording of on-task behavior every 60 seconds. The student recorded their on-task behavior on a self-monitoring

sheet provided by the researchers. The study used a multiple probe design to evaluate the effectiveness of the intervention in three phases: baseline, intervention, and follow-up. During baseline, researchers cited mean baseline data at 47% on-task behavior during observations (King et al., 2014). The intervention phase increased the mean of recorded on-task behavior to 85% of observations using interval recording procedures (King et al., 2014). Finally, the follow-up three weeks following the intervention displayed maintenance of on-task behavior at a mean of 84% (King et al., 2014).

Gulchak (2008) investigated the effect of self-monitoring intervention using a mobile computer on student's attention. The study included one eight-year-old male with an emotional or behavioral disorder identified with academic disengagement. The researcher taught the participant the difference between on-task and off-task behavior and how to operate the handheld computer. During observation sessions, the handheld computer prompted the student in 10-minute intervals to select "yes" or "no" options for their on-task behavior. The study used an ABAB withdrawal design to compare baseline data to the implementation of the self-monitoring intervention. The self-monitoring device showed positive results for improving the student's on-task behavior (Gulchak, 2008).

One study used a mobile device called the MotivAider® to implement a self-management procedure with three students with a diagnosed disability (Moore et al., 2013). The researchers used a multiple baseline across subjects design. The researchers instructed the students to use the MotivAider® and self-recording sheet through modeling. Formal observations proceeded using a 15-second momentary time sampling of students' on-task behavior. The study increased on-task behavior and displayed positive social validity among all

participants. The results also noted little disruption from the flow of the lesson and fewer demands on the teacher's time and resources (Moore et al., 2013).

Another study investigated the effect of a self-monitoring strategy using the MotivAider® on the academic engagement of three students identified with "off-task behaviors that interfered with their ability to function in the classroom setting" in an intermediate school (Otero & Haut, 2015, p. 93). The researchers trained the students on the study's materials, which included a MotivAider®, a self-recording form, a card representing the condition, a visual image of student engagement, and rewards. The study identified on-task behaviors as following directions, exhibiting behaviors to complete the task at hand, and facing toward the source of instruction. The study used an alternating treatment design in a general education classroom. Two of the three students displayed significant improvements in their on-task behavior. Social validity indicated positive outcomes as well. Teachers reported easy implementation of the intervention and that the self-monitoring strategy revealed positive results (Otero & Haut, 2015).

A third study used the MotivAider® as a tactile prompt for increasing on-task behavior with three elementary students in a special education classroom (Amato-Zech et al., 2006). The study used an ABAB reversal design for each student. Using the SLANT strategy, the researchers trained students to observe and record their on-task behavior. The SLANT strategy includes "sit up, look at the person talking, activate thinking, note key information, and track the talker" (Amato-Zech et al., 2006, p. 214). The MotivAider® cued students every three minutes throughout the study to self-record their on-task or off-task behavior on a recording sheet. On-task behavior increased from a "mean of 55% to more than 90% of the intervals observed" (Amato-Zech et al., 2006, p. 211).

One study used a cell phone to prompt self-recording of the on-task behavior of a kindergarten student (Quillivan et al., 2011). The study evaluated the effects of this intervention using an ABAB withdrawal design. The student's teacher identified him with elevated levels of disruptive behavior during independent seatwork time. The student used worksheets with visual representations of on-task and off-task behavior and a cell phone to cue and monitor his on-task behavior. The cell phone cued the student every two minutes to circle the dog that represented his current behavior. The study displayed significant reductions in off-task behavior during treatment phases and slight decreases during the withdrawal phase (Quillivan et al., 2011).

Blood et al. (2011) conducted a study investigating the effects of using an iPod Touch® for video modeling and self-monitoring purposes on a fifth-grade student exhibiting off-task behavior. The study used a changing conditions design to assess the impact of video modeling and the combination of video modeling and self-monitoring. The student watched a video on an iPod Touch® modeling appropriate math group behavior during the transition time in the classroom. The video modeling phase alone showed positive but variable results across settings. During the video modeling plus self-monitoring, the researchers taught the student to differentiate between on-task and off-task behavior using video models of both behaviors. Then, the researcher introduced the student to the self-monitoring sheet. The "timer" application on the iPod Touch® cued the student to record his on-task or off-task behavior every 30 seconds. The monitoring sheet included the question, "Am I doing my work?" and two columns with "yes" and "no." The student recorded his answer by checking the box next to the respective behavior. The intervention phase, including video modeling and self-monitoring, displayed significant and consistent increases in on-task behavior (Blood et al., 2011).

One additional study used a withdrawal design (i.e., reversal design, Cooper et al., 2022) on two high school students with a diagnosed disability to improve their on-task behavior (Wills & Mason, 2014). In this study, researchers delivered a self-monitoring intervention using the I-Connect© application on a smartphone. The study trained the students on the device and application to self-monitor their on-task behavior in a general education science classroom. Students used the I-Connect© application on a tablet the size of a typical smartphone with no wireless or cellular connection. The application prompted students with text cues, such as, "Are you on task?" at 5-minute intervals. Students responded by touching the "yes" and "no" buttons. The study showed significant improvements in the students' on-task behavior in all study phases, including the generalization phase (Wills & Mason, 2014).

Clemons et al. (2016) also used I-Connect© to conduct a discreet self-monitoring strategy to study classroom engagement. The study displayed positive results in all three student's classroom engagement. The researchers used the ABAB withdrawal design in both self-contained and general education classrooms. A third study used I-Connect© to study the effect of on-task behavior and task completion in students with ASD (Rosenbloom et al., 2019). In this study, the researchers used ABAB single-subject withdrawal design. This study also trained students on using the device in general and special education classrooms. The intervention showed positive results in both dependent variables in all four subjects across both special and general education settings (Clemons et al., 2016).

As mentioned above, many studies explored the effectiveness of self-management with students, but usually in the resource room or small group setting. Wills and Mason (2014) state that studies rarely explore self-management in the general education setting. The current research proves the effectiveness of self-management with high school students with ADHD. Shapiro and

Cole (1994) state that "one of the primary goals of education is to ensure that children learn increasingly varied and complex skills of self-management" (p. 1). Self-management skills are imperative to help children become less teacher-dependent and more independent. As Cooper et al. (2020) cite, classrooms are busy places, and students who monitor, evaluate, and reward their own behavior are not dependent on the teacher's direction and feedback. In summary, self-management is the goal of education, to create self-directed and independent individuals.

Summary

The current research indicates that ADHD diagnoses in the classroom are increasing. Students with ADHD often display disruptive behaviors, including off-task and disengagement in the classroom setting. The present research on self-management strategies includes different educational levels, disability areas, and dependent variables. This literature displays a positive effect of self-management strategies to improve on-task behavior. Alivernini and Lucidi (2011) suggest that students with strong self-control skills are more likely to experience success in the classroom setting. These research studies highlight the importance of targeted intervention for increasing students' self-management skills. The previous research on self-management interventions displays positive outcomes on students' on-task behavior, which means self-management strategies may increase academic achievement.

CHAPTER 3

Methodology

This chapter addresses research questions, population and setting, human subjects, informed consent, and dependent measure. Interobserver reliability, procedural integrity, and social validity are also described. Finally, the chapter outlines the experimental design and procedures, including baseline, general procedures, and intervention procedures.

Research Questions

The experimental questions addressed within this chapter are as follows:

1. What is the effect of self-management procedures on the daily on-task behavior of high school students with attention deficit hyperactivity disorder?

2. Are the definitions of the behavior and measurement system for daily on-task a reliable measurement procedure?

3. Will the procedural integrity measures of the self-management procedures ensure fidelity of the intervention implementation?

4. What effect will the self-management procedures exhibit on the perceptions of students, special education personnel, and general education personnel?

Population and Sample

The study included three high school students enrolled in a public high school. The participants are all female, ranging from 17 to 18 years of age. All participants receive special education services and are on an Individual Education Plan (IEP). Two of the students are classified under other health impairment category for attention deficit hyperactivity disorder (ADHD). The remaining student is labeled under the category of specific learning disability but also possesses a medical history of ADHD. Subject selection is based upon a population sample

of convenience and on recommendations from general and special education teachers based on the study's criteria.

Human Subjects and Informed Consent

The primary researcher completed the CITI Human Subject's Training on September 21st, 2022. Documentation of the completion of this training is on file in the Office of Research at the University of South Dakota (i.e., Appendix A). Human Subjects approval is also obtained from the Office of Research at the University of South Dakota and the public school's principal (i.e., Appendix B).

Parental Consent. The researcher obtained parental consent by sending a form to the parent(s) or guardian(s). The researcher discussed the nature of the study with the parents or guardians in person or by phone. This form is mailed home and returned to the researcher, confirming the parents' or guardians' consent to allowing their child to participate in the study (see Appendix C). The informed consent contained information about the study, the contact information of the primary researcher, the researcher's advisor, and the research compliance office at the University of South Dakota.

Subject Assent. After parent or guardian approval is received, the researcher discussed the study with the participants. Information about the study is presented in terms appropriate for each participant's cognitive abilities. Each student signed a subject assent form attached to the parental consent form (see Appendix D).

Setting

The initial setting took place in the high school resource room, where the students received instruction on behavior skills. The students received small-group instruction from the special education teacher for 20 minutes every day. The students received direct instruction for

part of the time and then worked independently on how to apply self-management skills. The students generalized self-management skills in a language arts classroom where a general education teacher and special education teacher are present.

The enrollment demographic of the high school is 1,259 students and 71 full-time teaching staff. The school population is 86.6% white/Caucasian, 4.3% Hispanic, 4.5% American Indian or Alaska Native, 0.1% Native Hawaiian/Pacific Islander, 0.7% Asian, 0.7% Black or African American, and 3.1% two or more races. Students with disabilities make up 12.4% of the total high school population. Roughly 20% of the school is currently considered economically disadvantaged. The high school exhibits an 88% completion rate.

The researcher conducted the intervention in a resource room office used for instruction. The 4.5 meters by 4.5 meters resource office possesses three .7 meters by 1.2 meters teacher desks and one round desk with a 1.2 meters diameter (see Figure 1).

The language arts room where the study is generalized and observed measures at 9.1 meters by 9.1 meters. There are 12 double student tables, all facing the front of the room, where a 1.5 meter by .6 meter whiteboard is located. There is also access to a television equipped with a wireless connection situated to the right of the student desks. The teacher's desk is located at the front of the room (see Figure 2).
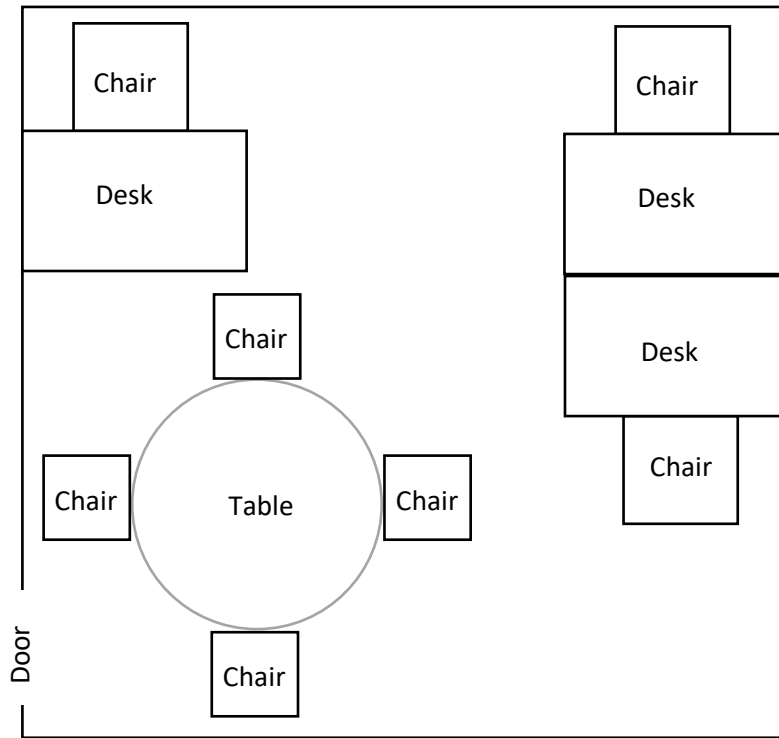
Figure 1: Diagram of setting for research sessions (resource office).
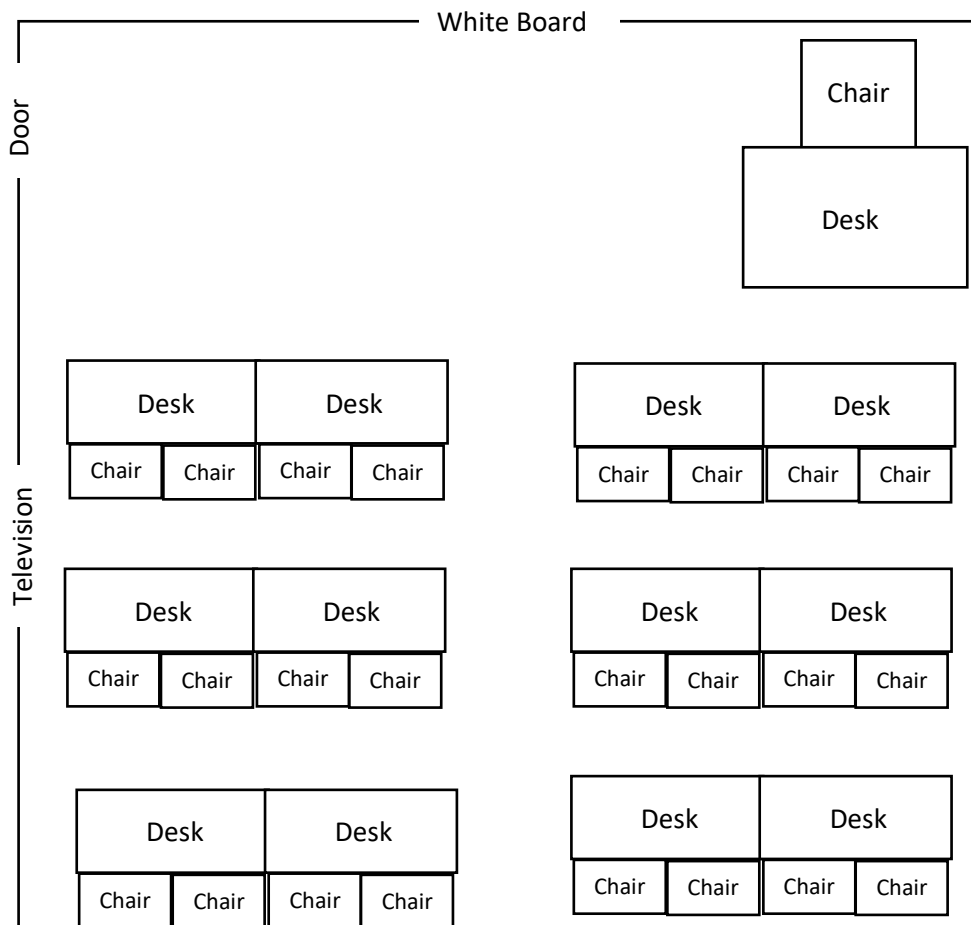
Figure 2: Diagram of setting for research sessions (language arts classroom).

Dependent Measures

The dependent variable measured during this study is the percentage of observed intervals of time on-task behavior a student exhibits during a 45-minute period. Clare, et al., (2000) define time on-task as "eye contact with the teacher, working quietly, and appropriately orienting to a task" (p. 517). The study defines off-task behavior as engaging in "non-work-related activities, playing with objects, and daydreaming" (Williamson, et al., 2009, p. 1074).

Percentage of on-task behavior. For this study, the researcher defines on-task behavior as the student engaging in eye contact with the speaker, taking appropriate notes, viewing the relevant documents on their computer, and completing the independent seatwork. The researcher considered the students off-task if they are not making eye contact with the speaker, not engaging in appropriate note-taking behavior, viewing inappropriate sites or documents on their computer, and not completing the independent seatwork. Observers also considered the student's off-task behavior if the student is out of the room using the bathroom, going to the locker, etc. If a student is absent for more than 20 consecutive minutes attending a meeting with administration, counselor, etc., the student is considered absent from that recording session.

The observer attended the classroom for data collection purposes five days a week: Monday, Tuesday, Wednesday, Thursday, and Friday. This data collection resulted in observations five sessions per week for seven weeks. Each observation session lasted approximately 45 minutes. The observer completed recording and scoring the behavior during and directly after each class session. Each session began when all students are in their specified location, and the teacher started the lesson roughly 3 minutes after the tardy bell sounded. The observer sat at the back of the room, facing the teacher.

The observer recorded on-task and off-task behavior within the study using momentary time sampling (Cooper et al., 2020). The observer started a timer that alerted the observer silently every five minutes when the lesson began. The observer immediately observed and recorded the first student's behavior when the alert went off with a plus (+) sign for on-task behavior or a minus (-) sign for off-task behavior. Then, the observer proceeded to record the behavior of the remaining students in a predetermined order. The observation at the end of the interval took approximately 3-4 seconds for each student. The observer repeated this procedure for eight intervals total in the 45-minute class period, considering the 3 minutes for the class to begin and 2 minutes to allow students to save their work and pack their things at the end of class. The study used the data collection sheet to record the observations for each interval (see Appendix D).

The observer documented the behaviors of the three target students throughout the entire study. The observer recorded each student as either on-task or off-task at that moment of the interval. On-task behaviors are recorded with a plus (+) sign and off-task behavior are recorded with a minus (-) sign. Finally, the researcher transferred data from momentary time sampling observations into a percentage used to estimate the on-task behavior for the total observation sessions. A percentage is calculated by taking the number of on-task observation intervals divided by the total number of observation intervals and multiplied by 100, which provided cumulative session percentage. This data collection and recording procedure is used throughout all observation sessions in the study.

Interobserver Reliability

Interobserver agreement or interobserver reliability is defined by Johnston and Pennypacker (2009) as "a procedure for enhancing the believability of data that involves

comparing simultaneous but independent observations" (p. 148). The study established interobserver agreement by comparing data from two observers, the primary observer and the independent observer (Cooper et al., 2020). This agreement is made by matching the time sampling observations of the primary observer with the independent observer.

The special education teacher acted as the primary observer of this study in the classroom setting. The independent observer is the researcher. Training of the primary observer occurred before the data collection began. The researcher trained the primary observer on the definitions of on-task and off-task behaviors and how to observe and record on-task and off-task behavior using the data record form (see Appendix E). The training included demonstrations and guided practice by the primary observer.

The researcher explained on-task and off-task behavior as defined by the study. The researcher provided the primary observer with verbal situations and recorded examples to practice data collection using the data recording form (i.e., Appendix E). The researcher trained the primary observer to use the timer and record on the data collection device. The independent researcher encouraged the primary observer to ask questions to help clarify any of the observation or recording procedures.

Thirty percent of the observation sessions are randomly selected for the independent observer to observe. Sessions are randomly selected by blind selection of session dates (i.e., dates of sessions written on the back of cards and chosen without knowledge of what date is written on the cards), resulting in the dates where the primary researcher and independent observer recorded observations for that session. For these randomly selected sessions, the scores recorded by the independent observer are compared to the scores recorded by the primary researcher.

Interobserver agreement (i.e., also known as interobserver reliability) is calculated as the percentage of agreement in the observations of on-task or off-task behavior for each student in the eight interval observations (Johnston & Pennypacker, 2009). The primary researcher and independent observer's scores (i.e., + or -) for each interval and student are recorded and compared (Appendix F). The agreements are then added together and divided by total intervals of all students. The total of these agreements is then multiplied by 100 to calculate a percent of interobserver agreement. During the comparison process, if the researcher calculated discrepancies of greater than 80% in a total of all students' observations, the researcher would retrain the primary observer on the definition and observation of on-task and off-task behavior.

Experimental Design

Single-case design or single-subject design are used in many different research fields, including psychology, medicine, education, rehabilitation, social work, counseling, and other disciplines (Kazdin, 2011). The single-subject design focuses on investigating with a single subject through repeated measures of the target behavior. Through repeated measures in this design, the researcher examines the effect of an intervention on the individual subject. Single-subject design is a frequently used by researchers and practitioners in special education to evaluate the appropriateness of individualized education programs.

For this study, the researcher used ABAB single-subject reversal design with three high school students identified with attention deficit hyperactivity disorder to compare the effects of self-management procedures on the percentage of time on-task completed with repeated measures on baseline conditions and during intervention conditions. The symbol A, in an ABAB design, represents baseline measures, while the symbol B represents the effects of the introduction of the intervention (i.e., independent variable).

Baseline (A1 and A2) conditions consisted of daily classroom procedures and activities that included lecture, independent seatwork, viewing of visual representations (i.e., visual presentations, videos, and examples), and assessments. The observer observed and measured the on-task behaviors of the three students involved in the study repeatedly during each session and across all baseline sessions. No specific intervention focusing on improving the students' on-task behavior is implemented during baseline condition. At the same time, the classroom teacher is responsible for monitoring and rewarding group behavior during the intervention phases (B1 and B2).

After a steady state of responding is established during the intervention condition, the researcher withdrew the intervention and returned the study to baseline conditions (Cooper et al., 2020; Johnston & Pennypacker, 2009; Kazdin, 2011). The reversal to baseline is closely monitored, and when on-task behavior displayed a decline, the intervention condition is reinstated.

Procedures

General Procedures. Data collection took place over thirty-two sessions. Approximately eight sessions are planned for baseline (A1) data collection, assuring a steady state of responding before moving to the intervention phase. The following eight sessions are used to collect data for the first intervention (B1) phase. The following eight sessions are used to withdraw the intervention and return to baseline (A2). In the final eight sessions, the researcher returns the intervention and collected data for the second intervention phase (B2).

Baseline (A1 and A2) Procedures. During baseline, the teacher delivered instruction as would any typical day. The teachers did not provide any options for self-management strategy and provided the same consequence for behavior as before the study. For the students in the

study, this experimental condition included redirection to pay attention or proximity to staff to ensure the appropriate use of computers or note-taking.

During baseline, the class period began with a bell, which is the general bell that the school uses as a signal to change classes during the day. The students entered the room, gathered their materials, and took their assigned seats. The classroom teacher began the lesson by reading today's objectives and instructing the students to get out required materials. At this point, the researcher started the 5-minute timer to observe and record the three target students' on-task behavior using the momentary time sampling procedure and the data recording form (Appendix E). The teacher introduced the lesson's topic using a variety of activities, including whole group instruction, small group exercises, and independent seatwork. The end of the lesson included work time on the assignment. The teacher concluded the lesson by instructing students to turn in their work completed thus far in their student folders and replace into their class section's crate.

Intervention (B1 and B2) Procedures. Before instruction, the researcher defined the behaviors of each student. After the researcher's definition is complete and concise, the teacher set up the classroom conducive for direct instruction of self-management skills by watching a video of on-task and off-task behavior examples. The researcher also set up a dry erase board to write the goals and benefits of the behavior change. The researcher prepared the behavior contract to appear ready for editing and printing.

The lesson began by discussing with the students the behavior and the problems often caused by that behavior. The researcher showed the students the data collection during baseline, and they addressed a satisfactory goal for this behavior. The researcher showed pictures and videos of appropriate on-task and inappropriate off-task behavior. The class discussed which behavior is the appropriate way to act in the classroom. After viewing the videos and how peers

respond to off-task behavior, the class discussed the benefits of changing the behavior and the drawbacks of exhibiting it. The researcher wrote these on the dry erase board or poster paper so that the students could see the examples of on-task and off-task behavior. The class also discussed the small number of benefits of displaying negative behavior and compared the benefits of on-task versus off-task behavior. Some benefits of displaying on-task behavior that the class discussed are going to the office less, not losing activity time, better grades, not getting teased less by peers, appearing socially accepted, and making more friends, and exhibiting a better relationship with the teacher and staff, etc. The teacher and students each sign a behavior contract (Appendix G).

The researcher then began a guided practice session. The researcher introduced the self-management form (Appendix H), and the WatchMinder® self-monitoring watch. The researcher showed the students how to attach the watch to their wrist, explaining that it should be worn on the nondominant arm. Next, the students learned to fill out the worksheet when the watch vibrates with the cue at 5-minute intervals. The researcher explained that another person is taking data at the same intervals, and the student needed to match their observations. The researcher modeled the self-recording procedure first by putting a worksheet before themselves, starting the watch to set the 5-minute interval, and beginning the worksheet. After 5 minutes, the watch vibrates, and the researcher checks the watch for the cue, and records their on-task behavior. The researcher continued this recording procedure for two more intervals and efficiently filled out the monitoring sheet. After observing this model, the students are given a mathematics worksheet assigned the day before. The start timer is set, and students are expected to begin within 1 minute. After 5 minutes, their watches vibrate, and the teacher prompts the students to fill out the

self-management form if they have not done so already. The students are prompted to go back to work and fill out the next observation interval independently.

After a few guided instruction sessions in the resource room, the student take the self-management form and the self-monitoring watch to the general classroom setting. The students are instructed to wear the watch for the entire period. The researcher placed a self-monitoring sheet on a small index card for discreetness. After a week, the students record their monitoring on a weekly chart describing if they met mastery that week (Appendix I).

Procedural Integrity. An independent observer measures procedural integrity. For this study portion, an independent teacher is used as the observer. The independent observer observed digitally recorded lessons of the classroom instruction to ensure intervention procedures are implemented as the research defines.

The researcher broke down the classroom activities and procedures and the procedures and activities for the intervention into a step-by-step checklist (Appendix J). The researcher provided the independent observer with the checklist to observe and complete during observations. Lastly, the researcher provided the independent observer directions and time for clarification about the checklist.

The independent observer completes the procedural integrity observation by reading through all the checklist items for baseline and intervention. Then, the observer watches the digital recording of the lesson and identifies if this is a baseline or intervention observation. If the statement reads true and the procedure is followed, the observer writes an "X" in the space beside the statement. The observer places an "O" if the statement is false, and the procedure was not followed. The observer places an "X" if the statement is completed correctly and in the proper sequence. The independent observer writes an "O" if the statement is not completed or

out of sequence. After observation, the independent observer totals the number of items marked with an "X" and divides by the total number of spaces possible. Then, the number is multiplied by 100 to calculate the percentage of steps correctly followed.

Social Validity

Social validity is used to ensure that interventions and research methods "take into account the concerns of society and the consumers" (students, teachers, parents, etc.) of those interventions and methods (Kazdin, 2011, p. 53). When choosing a topic, the researcher needs to decide that the topic is worthy of exploring. Researchers must ask themselves if the intervention is relevant to everyday life or if the procedures are acceptable for their consumers.

The researcher developed a survey and an interview administered to the students and the teacher included in the study at the conclusion (see Appendix K-N). After the survey and interview are conducted and the researcher analyzes and compares the responses to measure social validity. This social validity inquired about the relevancy and usefulness of self-management procedures to increase on-task behaviors. The researcher used the survey and interview as tools to assess the perceived likes and dislikes and the observed usefulness of self-management strategies. The responses from all stakeholders are collected to find the effectiveness (Appendix O).

Data Analysis

Using the data collection sheet (Appendix E), the researcher observed and recorded the on-task behavior of three high school students with attention deficit hyperactivity disorder by using momentary time sampling measurement system and calculating the number of intervals the student is observed on-task and divided by the total number of intervals in the observation. The researcher then calculated these into percentages by multiplying them by 100. Then, the

researcher organized these session percentages into the respective baseline and intervention conditions. The researcher also included procedural integrity and interobserver reliability using tables, narratives, and descriptive statistics. The table containing the written survey and interview results reports social validity.

Summary

This chapter addressed population and setting, human subjects, informed consent, and the dependent measure. The research questions and interobserver reliability are also included. Finally, the chapter described the experimental design and procedures, procedural validity, and data analysis procedures.

CHAPTER 4

Results

This chapter presents the results of the study evaluating the effects of a self-management strategy to increase on-task behavior in students with attention deficit hyperactivity disorder. Data related to each student's on-task behavior are summarized in a narrative, tables, and graphically. Procedural integrity, interobserver reliability, and social validity are also included in this chapter.

Results of On-Task Behavior

Combined Median and Range of All Students

The data in Table 1 and the individual data contained in Figures 3, 4, and 5 indicate the self-management strategy was effective at increasing on-task behavior in students with attention deficit hyperactivity disorder when applied in a high school general education classroom setting. The overall median percentage of on-task behavior during the first baseline phase for all three students was 33.4%. The overall range of percentage scores related to on-task behavior during the first baseline phase was 13% to 50%. The overall median percentage of on-task behavior during the first intervention phase was 60.4%. The overall range related to percentage scores of on-task behavior during the first intervention phase was 25% to 100%. The overall median percentage of on-task behavior during the second baseline phase for all three students was 54.2%. The overall range related to percentage scores of on-task behavior during the second baseline phase was 25% to 100%. The overall median percentage of on-task behavior during the second intervention phase was 100.0%. The overall range of on-task behavior during the second intervention phase was 63% to 100%. See Table 1 for individual scores for the median and ranges of the percentage of time on-task for all students across all phases.

Table 1

Overall and Individual Median and Range of Percentage of On-Task Behavior

Student		Baseline A	Intervention A	Baseline B	Intervention B	Overall Baseline	Overall Intervention
Addison	Median	37.5%	50.0%	50.0%	100.0%	37.5%	62.5%
	Range	13-50%	25-75%	25-75%	63-100%	13-75%	25-100%
Rachel	Median	31.3%	56.3%	50.0%	100.0%	37.5%	62.5%
	Range	13-38%	38-88%	38-100%	63-100%	13-100%	38-100%
Erica	Median	31.3%	75.0%	62.5%	100.0%	37.5%	100.0%
	Range	25-50%	50-100%	38-100%	88-100%	25-100%	50-100%
Overall	Median	33.4%	60.4%	54.2%	100.0%	37.5%	75%
	Range	13-50%	25-100%	25-100%	63-100%	13-100%	25-100%

Addison's Medians and Ranges for On-Task

The data in Figure 3 indicated that Addison's percentage of on-task behavior increased throughout the study using the self-management strategy (see Table 1 for a summary of medians and ranges across all experimental conditions for individual participants). The median percentage of on-task behavior during the initial baseline phase (i.e., Baseline A) was 37.5%, with a range of 13% to 50% across eight sessions. The median percentage of on-task behavior during the initial intervention phase (i.e., Intervention A) was 50.0%, with a range of 25% to 75% across eight sessions. The median percentage of on-task behavior during the second baseline phase (i.e., Baseline B) was 50.0%, with a range of 25% to 75% across seven sessions, as she was absent for one session. The median percentage of on-task behavior during the second intervention phase (i.e., Intervention B) was 100.0%, with a range of 63% to 100% across eight sessions. Median percentages for each phase are displayed on Figure 7 by dashed lines, along with the deterioration of performance in the second baseline phase.

The overall median percentage of on-task behavior for the combined baseline phases (i.e., Baseline A and Baseline B) for Addison was 37.5%, with a range of 13% to 75%. The overall median percentage of on-task behavior for the combined intervention phases (i.e., Intervention A and Intervention B) for Addison was 62.5%, with a range of 25% to 100%. Figure 4 also shows the summative improvement across all conditions related to the percentage of on-task behavior in baseline compared to her overall performance during the self-management intervention.

Figure 3

Addison: The Percentage of On-Task Behavior Across All Experimental Phases

Figure 4

Addison: Median Percentage of On-Task Behavior Across Phases

Rachel's Medians and Ranges for On-Task

The data in Figure 5 indicated that Rachel's on-task behavior increased throughout the study using the self-management strategy (see Table 1 for a summary of medians and ranges across all experimental conditions for individual participants). The median percentage of on-task behavior during the initial baseline phase (i.e., Baseline A) was 31.3%, with a range of 13% to 38% across eight sessions. The median percentage of on-task behavior during the initial intervention phase (i.e., Intervention A) was 56.3%, with a range of 38% to 88% across eight sessions. The median percentage of on-task behavior during the second baseline phase (i.e., Baseline B) was 50.0%, with a range of 38% to 100%, across seven sessions, as she was absent for one session. The median percentage of on-task behavior during the second intervention phase (i.e., Intervention B) was 100.0%, with a range of 63% to 100% across seven sessions, as she was absent for one session. Median percentages for each phase are displayed on Figure 7 by dashed lines, along with the deterioration of performance in the second baseline phase.

The overall median percentage of on-task behavior for the combined baseline phases (i.e., Baseline A and Baseline B) for Rachel was 37.5%, with a range of 13% to 100%. The overall median percentage of on-task behavior for the combined intervention phases (i.e., Intervention A and Intervention B) for Rachel was 62.5%, with a range of 38% to 100%. Figure 6 also shows the summative improvement across all conditions in the percentage of on-task behavior in baseline compared to her overall performance in the self-management intervention.
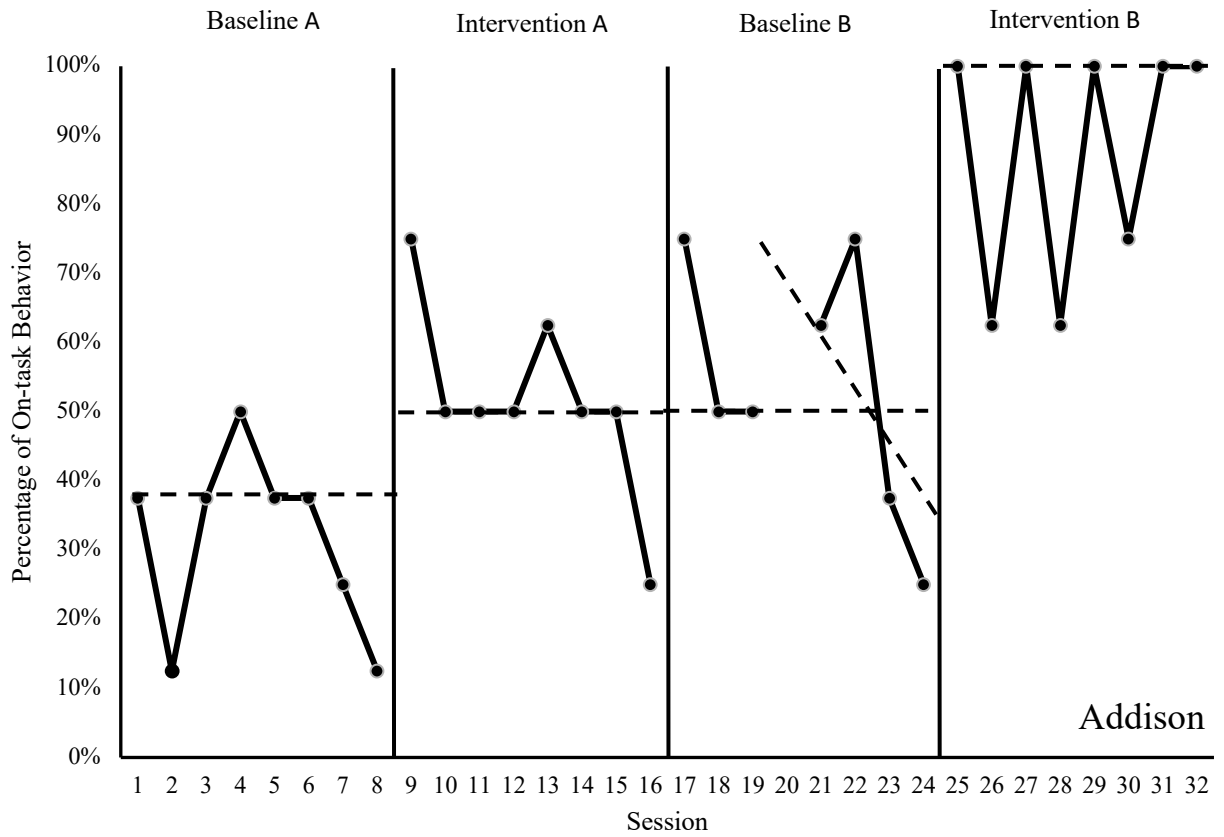
Figure 5

Rachel: The Percentage of On-Task Behavior Across All Experimental Phases
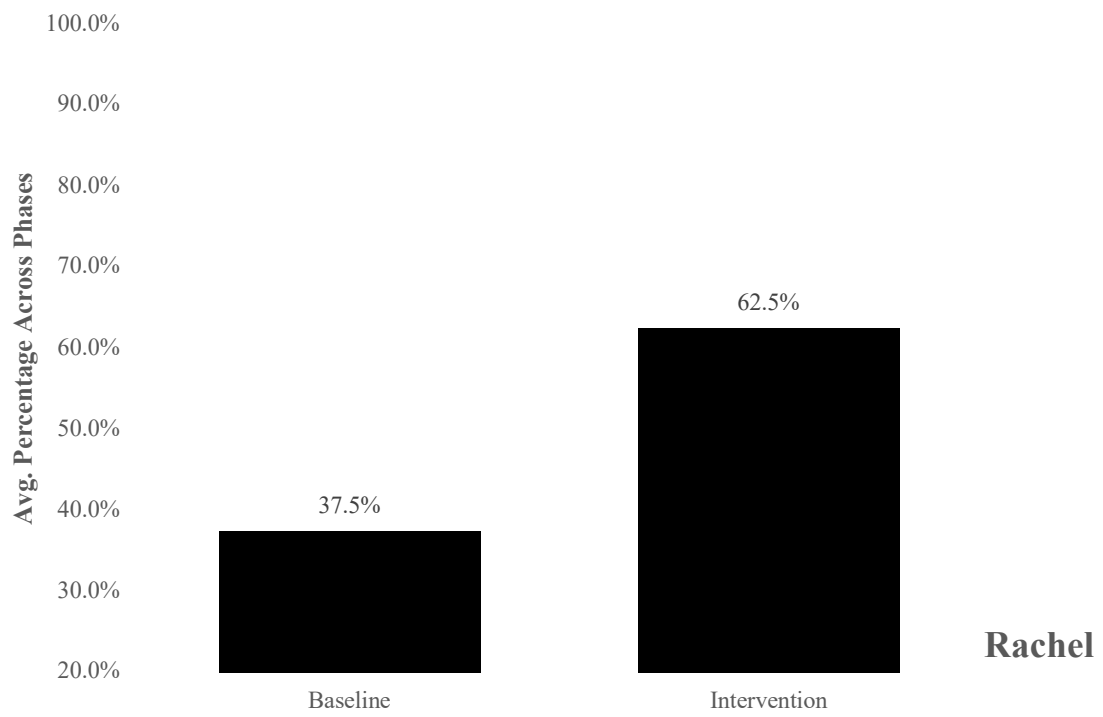
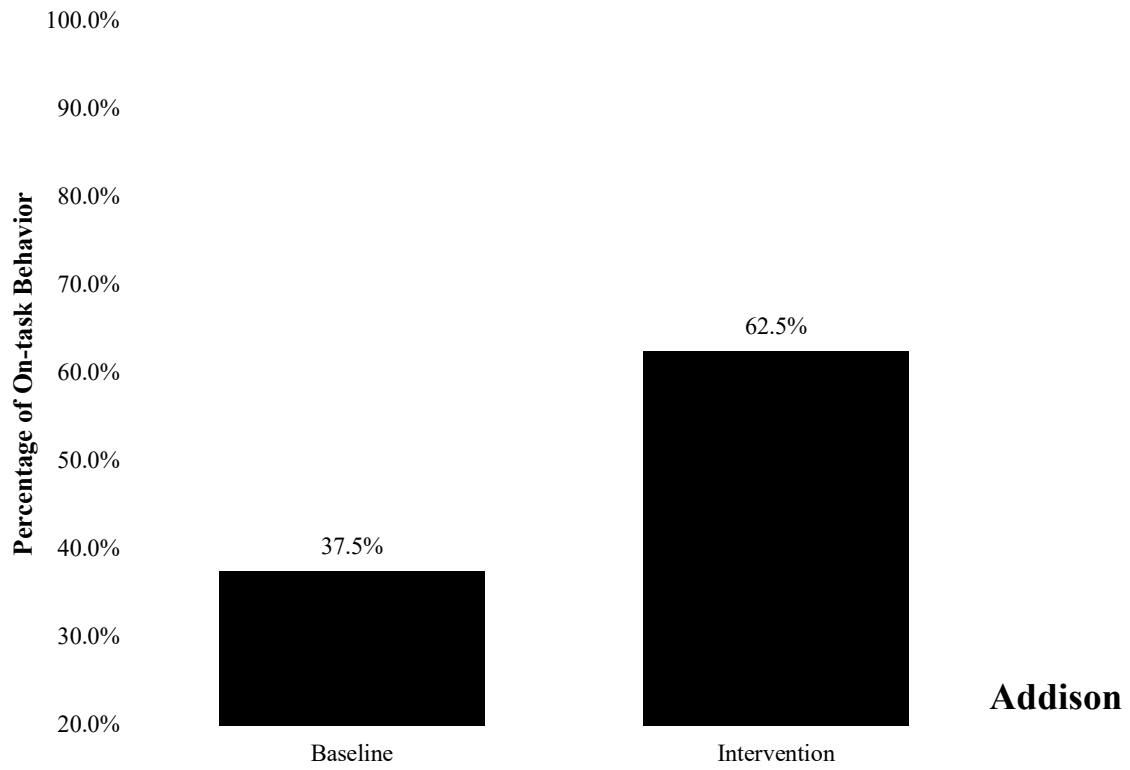Figure 6

Rachel: Median Percentage of On-Task Behavior Across Phases

Erica's Medians and Ranges for On-Task

The data in Figure 7 indicated that Erica's on-task behavior increased throughout the study using the self-management strategy (see Table 1 for a summary of medians and ranges across all experimental conditions for individual participants). The median percentage of on-task behavior during the initial baseline phase (i.e., Baseline A) was 31.3%, with a range of 25% to 50% over eight sessions. The median percentage of on-task behavior during the initial intervention phase (i.e., Intervention A) was 75.0%, with a range of 50% to 100% over eight sessions. The median percentage of on-task behavior during the second baseline phase (i.e., Baseline B) was 62.5%, with a range of 38% to 100% over eight sessions. The median percentage of on-task behavior during the second intervention phase (i.e., Intervention B) was 100.0%, with a range of 88% to 100% over eight sessions. Median percentages for each phase are displayed on Figure 7 by dashed lines.

The overall median percentage of on-task behavior for the combined baseline phases (i.e., Baseline A and Baseline B) for Erica was 37.5%, with a range of 25% to 100%. The overall median percentage of on-task behavior for the combined intervention phases (i.e., Intervention A and Intervention B) for Erica was 100.0%, with a range of 50% to 100%. Figure 7 also shows the summative improvement across all conditions in the percentage of on-task behavior in baseline compared to her overall performance in the self-management intervention.
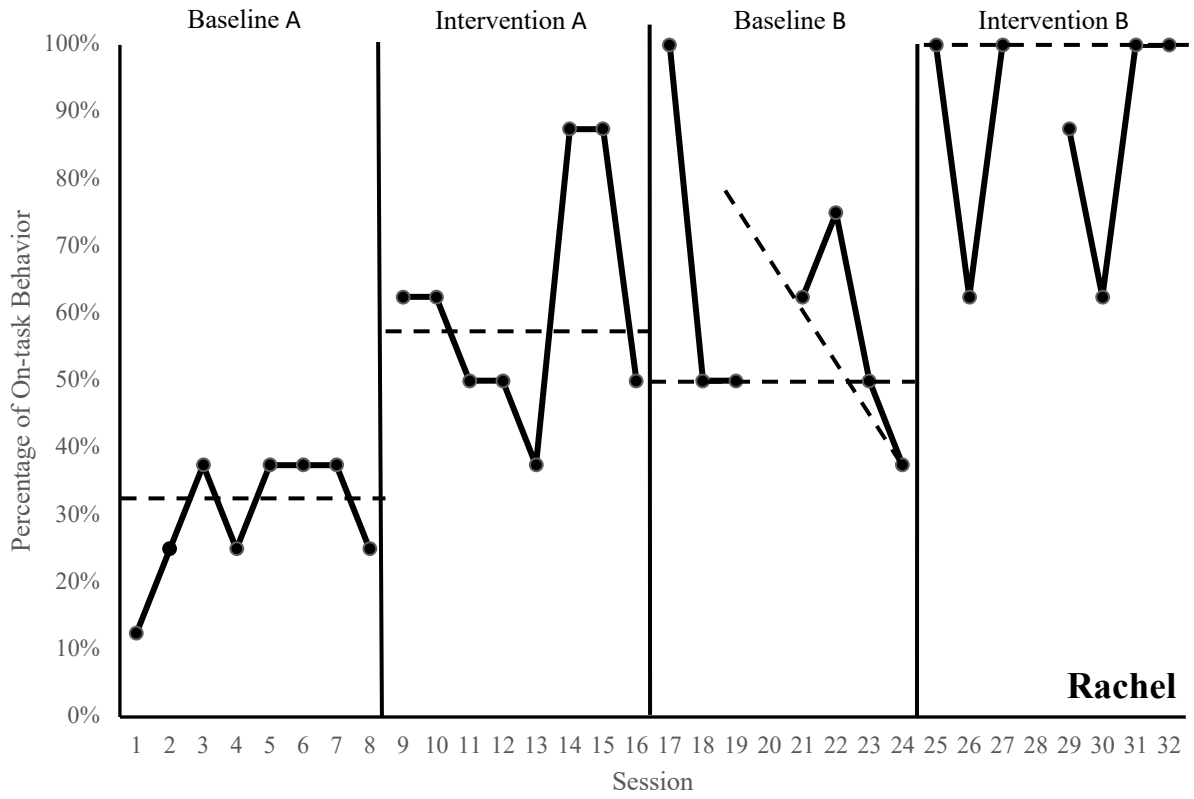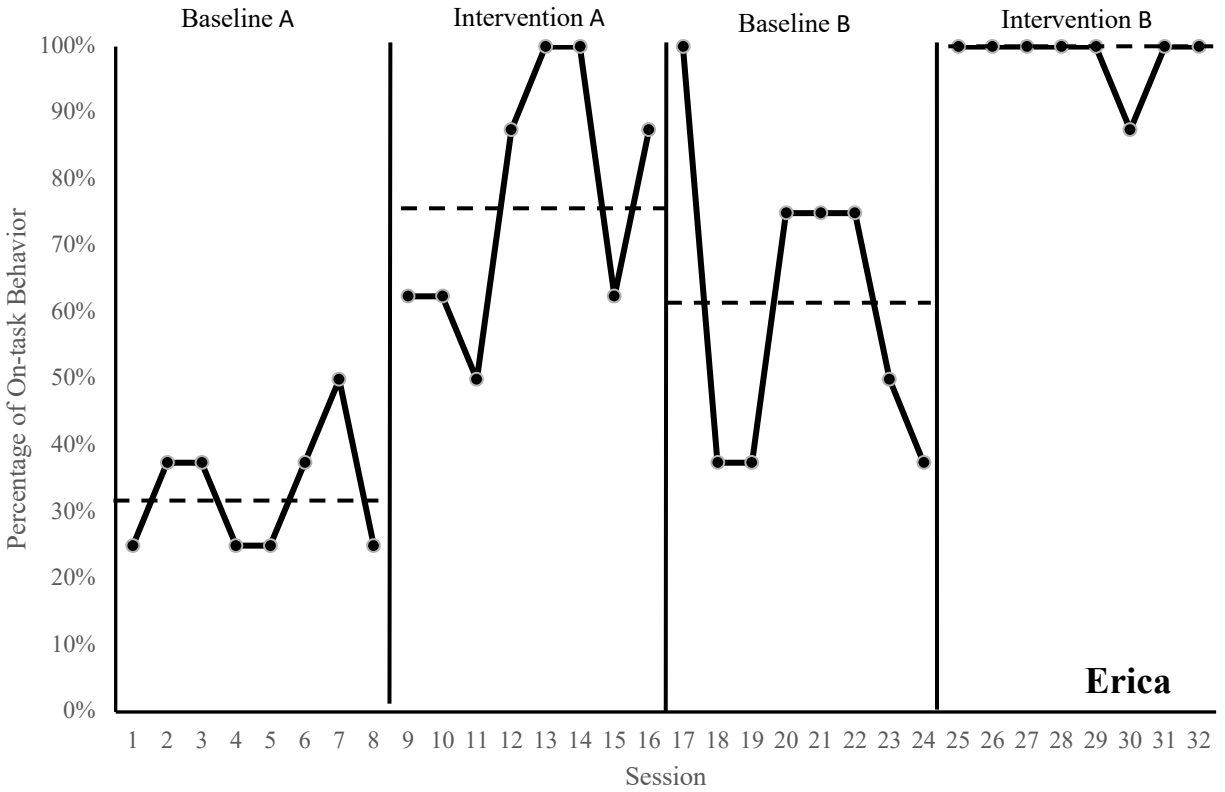
Figure 7

Erica: The Percentage of On-Task Behavior Across All Experimental Phases
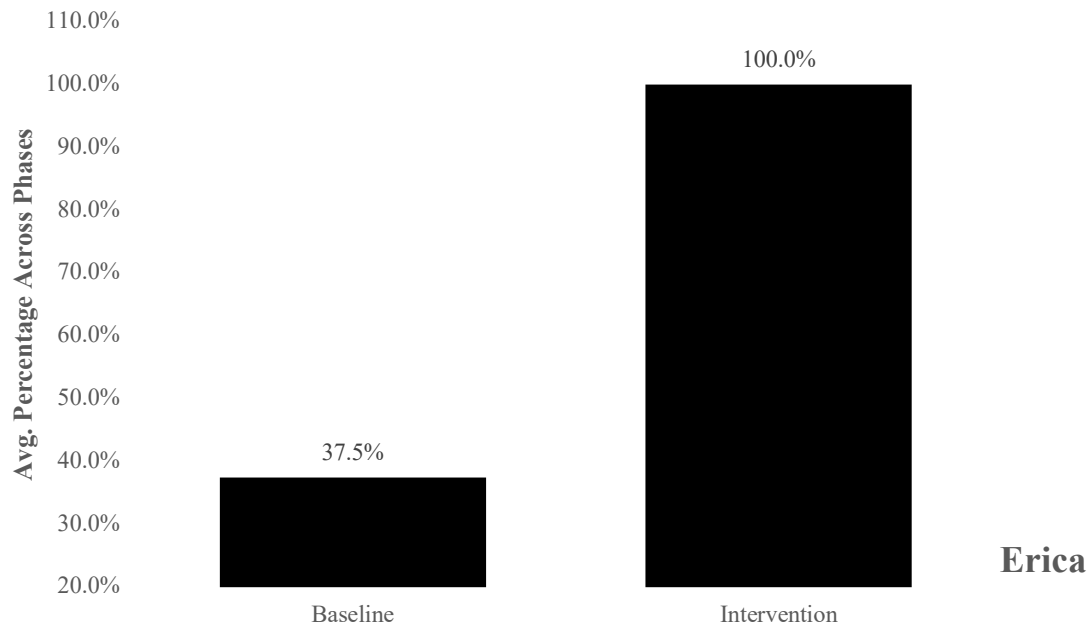
Figure 8

Erica: Median Percentage of On-Task Behavior Across Phases

Summative Results of All Participants

Figure 9 shows all participants summative comparison of the compared baselines (i.e., Baseline A and Baseline B) versus the combined self-management intervention (i.e., Intervention A and Intervention B). This summative comparison showed an increase in the percentage of on-task behavior from the baseline phases to the intervention phases for all three students in the study. Data from Figure 9 and Table 1 indicated an increase in the percentage of on-task behavior.
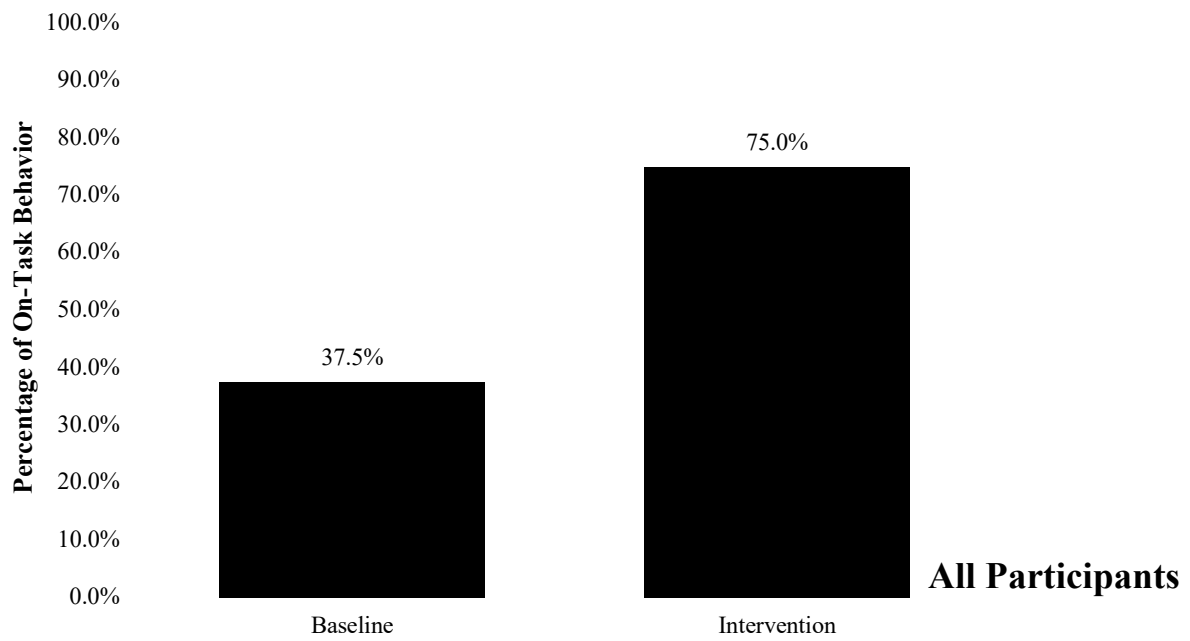
Figure 9

All Participants' Median Percentage of On-Task Behavior Across Phases

Interobserver Reliability

Interobserver reliability was assessed using video recordings of full sessions reviewed by the independent observer. Interobserver reliability was assessed for 30% of all sessions across all experimental conditions and across all students. Interobserver agreement was established by comparing an interval-by-interval basis of the observation and evaluation of the primary observer and the independent observer (Cooper et al., 2020). The independent observer's scoring of a given session was compared to the primary observer's scoring after completion of the independent observation to determine the number of agreed upon on-task behaviors, on an interval-by-interval basis, to establish a percentage of agreement. This percentage of agreement established from the point-by-point comparison (i.e., interval-by-interval throughout an entire session) of the independent observer and the primary observer then served as the means of establishing interobserver agreement, also known as interobserver reliability (Cooper et al., 2020).

$$\frac{\text{Primary Observer's Score}}{\text{Independent Observer's Score}} \quad X\ 100 = \%\ of\ Reliability$$

These comparison percentages were finally added together and divided by the total number of comparisons between the primary observer and the independent observer to determine a summative percentage agreement score across all sessions and students observed.

Overall Interobserver Agreement Scores for On-Task Behaviors

During the comparison process, if the researcher calculated discrepancies of greater than 80% interobserver agreement for an individual student and session, the researcher would review and potentially retrain the primary observer on the definition and observation of on-task and off-

task behavior and practice the recording of the behaviors selected for observation and measurement with the primary observer to correct the problem (Johnston & Pennypacker, 2009).

The mean of the primary observer's scores for on-task behavior across all three students was compared to the mean of the independent observer's scores for identical sessions to calculate an overall mean of reliability and range of scores across all students and sessions evaluated. The mean and range of reliability scores were also calculated for each student.

The overall mean percentages of reliability of the baseline sessions observed and compared by the primary observer and independent observer related to on-task behavior was 96.5%, and the intervention sessions was 99.1%. The overall range of interobserver reliability for baseline sessions varied from 87.5% to 100%, and intervention sessions varied from 87.5-100%. Table 2 displays interobserver reliability for the randomly selected sessions measuring on-task behavior.

Table 2

Interobserver Agreement for On-Task Behavior (10 randomly selected sessions)

Baseline	Addison	Rachel	Erica	Overall
Session 5	100%	87.5%	100%	95.8%
Session 6	100%	100%	100%	100%
Session 8	87.5%	100%	87.5%	91.7%
Session 19	100%	100%	100%	100%
Session 21	87.5%	100%	100%	95.8%
Intervention				
Session 14	100%	100%	100%	100%
Session 15	100%	100%	87.5%	95.8%
Session 25	100%	100%	100%	100%
Session 29	100%	100%	100%	100%
Session 31	100%	100%	100%	100%

Addison's Agreement of On-Task Behavior

The mean percentage of agreement for Addison during baseline was 94.8%, with a range of agreement percentages of 87.5% to 100% related to on-task behavior. During intervention, the mean percentage of agreement was 100%, with a range of agreement percentages of 100% to 100%. Table 2 displays interobserver agreement for randomly selected sessions related to the on-task behavior measurement definitions and procedures.

Rachel's Agreement of On-Task Behavior

The mean percentage of agreement for Rachel during baseline was 97.4%, with a range of 87.5% to 100% agreement related to on-task behavior. During intervention, the mean percentage of agreement was 100%, with a range of 100% to 100% agreement. Table 2 displays interobserver agreement for randomly selected sessions related to the on-task behavior measurement definitions and procedures.

Erica's Agreement of On-Task Behavior

The mean percentage of agreement for Addison during baseline was 97.4%, with a range of 87.5% to 100% related to on-task behavior. During intervention, the mean percentage of agreement was 97.4%, with a range of 87.5% to 100%. Table 2 displays interobserver agreement for randomly selected sessions measuring on-task behavior.

Procedural Integrity

Procedural integrity of the experimental procedures was assessed using video recordings of the full sessions reviewed by the independent observer to verify the proper implementation of baseline and intervention procedures. Twenty-two percent of all sessions, across all experimental conditions, and across all students were assessed for procedural integrity. Results of the procedural integrity measures indicated that the procedures were implemented correctly 95.0%

of the time. In one observation where the procedures were not implemented correctly, the independent observer noted that the instructor did not ask the students to get out their materials, as students had materials out already. The other observation that did not meet the procedural checklist, the independent observer noted that the teacher did not read the agenda out loud, but the agenda was posted on the board.

Social Validity Measures

At the conclusion of the study, all three students and the primary observer were given a 10-question interview and an eight-question written survey designed to solicit their opinions about the self-management intervention.

Student Satisfaction. The three students anonymously took the written survey. See Table 3 for a summary of student responses to the 8-question student satisfaction survey related to the implementation of the self-management strategy. The three students answered each question by circling Yes, Sometimes, or No.

Question 1 asked if participating in the self-management strategy was fun. Two students answered Yes, and the other answered Sometimes. Question 2 asked if using the self-management strategy was a good way to increase on-task behavior. All three students responded Yes. Question 3 asked if the student disliked the self-management strategy. Two students responded No, while the other said Sometimes. Question 4 asked if the student liked recording their own on-task behavior. Two students responded Yes, and the other responded Sometimes.

Table 3

Student Satisfaction Written Survey

	Yes	Sometimes	No
1. Participating in the self-management strategy was fun.	2	1	0
2. Using the self-management strategy was a good way to increase on-task behavior.	3	0	0
3. I disliked the self-management strategy.	0	1	2
4. I liked recording my own on-task behavior.	2	1	0
5. I think my on-task behavior improved since we started the self-management strategy.	3	0	0
6. I would like to continue using the self-management strategy throughout the school year.	2	1	0
7. I would like to participate in a self-management strategy in the future.	3	0	0
8. I think I should use the self-management strategy in other classrooms.	2	1	0

The fifth question asked if students think their on-task behavior improved since starting the self-management strategy. All three students responded Yes. Question 6 asked if the student would like to continue using the self-management strategy throughout the school year. Two students answered Yes, and the other said Sometimes, with a comment that it depended on the class. Question 7 asked if the student would participate in a self-management strategy in the future. All students responded Yes. The final question, question 8, asked the students if they should use the self-management strategy in other classrooms. Two students responded Yes, and the other responded Sometimes.

All three students also completed an interview with the primary researcher. See Appendix K for interview questions. When asked what the students thought the purpose of the self-management strategy was, all students responded that the goal was to help them stay on-task during class. When the primary researcher asked what the students liked best about the self-management strategy, one student responded that it "kept me working in English more than normal," while another student said, "I kept myself on-task the best I could." The final student said, "it kept me more accountable." When asked what they liked least about the self-management strategy, two students expressed a concern about the vibration or operation of the watches, while the other said, "I still got off-task sometimes."

The fourth interview question asked if the self-management strategy helped the student stay on task. Two students expressed that it did help because of the timing and the accountability, while the other student shared that "it made me realize how much I was off task during class." When asked if the use of percentages of "mastery" at the end of the week was helpful, all students agreed it was helpful to see the summary and reflect on their progress. The primary researcher asked the students if they could change anything about the self-management strategy,

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what would it be? One student expressed that there were no changes needed, while the others expressed concern about the functionality of the watches.

The students were asked what suggestions they would give other students to improve their on-task behavior. One student said, "to stay off of your phone," another student said, "give yourself a reward when you are on-task for most of the class." The final student said that they were not sure what to change to improve their on-task behavior. When asked if they would like to use this intervention for other behaviors or classes, two students responded that they would like to use them in another class, and the other student said they would use it, "when you are overwhelmed, to give yourself a minute to relax." The students were asked if they would participate in another study if they were asked. All students responded that they would appear receptive to participate in another study. When asked if there was anything else they would like to say, two students did not provide anything else to share, and the other student responded, "thank you for helping me with English by having me wear the watch and record my behavior."

Educator Satisfaction

The special education teacher and general education teacher who were in the classroom both completed the written survey. See Table 4 for a summary of the teacher responses to the 8-question teacher satisfaction survey related to the implementation of the self-management strategy.

Question 1 asked if using the self-management strategy was a good way to increase on-task behavior. The special education teacher responded Sometimes and the general education teacher responded Yes. Question 2 asked if the teacher disliked the self-management strategy, both teachers responded No. Question 3 asked if they liked the idea of students recording their own on-task behavior, both teachers responded Sometimes. Question 4 asked if the teachers

thought student's on-task behavior improved since starting the self-management strategy. The special education teacher responded Sometimes, and the general education teacher responded Yes. Question 5 asked if they would consider using the self-management strategy throughout the school year, both teachers responded Yes. The sixth question asked if they would implement the self-management strategy in the future, both teachers responded Yes. Question 7 asked if they believed the self-management strategy could improve other behaviors besides on-task behaviors, both teachers responded Yes. The final question, question 8, asked if they believed other teachers should use self-management strategies in their classrooms to improve on-task behavior, both teachers responded Yes.

Table 4

Teacher Satisfaction Written Survey

	Yes	Sometimes	No
1. Using the self-management strategy was a good way to increase on-task behavior.	1	1	0
2. I disliked the self-management strategy.	0	0	2
3. I liked the idea of students recording their own on-task behavior.	0	2	0
4. I think student's on-task behavior has improved since starting the self-management strategy.	1	1	0
5. I would consider using the self-management strategy throughout the school year.	2	0	0
6. I would implement a self-management strategy in the future.	2	0	0
7. I believe the self-management strategy could improve other behaviors besides on-task behaviors.	2	0	0
8. I believe other teacher should use self-management strategies in their classrooms to improve on-task behavior.	2	0	0

The special education teacher and general education teacher participated in an interview. See Appendix L for the questions included in the interview. When asked what the purpose of the self-management strategy was, both responded that the strategy was to monitor and improve on-task behavior for students with ADHD. The primary researcher asked the teachers what they liked best about the self-management strategy. Both teachers shared that the study helped them become more aware of when and how often students were getting off task and helped them make positive adjustments for future classes. When asked what they liked least about the self-management strategy, the special education teacher shared that students were not always honest about their recording at the beginning of the study. In contrast, the general education teacher said it was hard to get them into the routine at first. Both teachers agreed that the end-of-week "mastery" percentages were helpful to students. When asked what they would change about the study, they both shared ways to help the students be more honest throughout the whole study.

The primary researcher asked the teachers what suggestions they would give to other teachers looking to improve on-task behaviors. Both teachers shared that teachers should ensure they assign meaningful work and break up lecture time. The general education teacher also included strict, consistent policies to help improve on-task behavior. Both teachers shared that they would like to use this strategy with other behaviors or classes and would participate in another study if asked. The primary researcher wrapped up the interview by asking if there was anything else they would like to say. The special education teacher shared that it helped her realize the changes she needs to make in her own teaching, and it made her more aware of other students in the classroom who were disengaged or off task. The general education teacher shared that she was thankful for the opportunity to participate in the study, which helped her be more open to research in the future.

Summary

This chapter discussed the results of the study that evaluated the effects of a self-management strategy on the on-task behavior of students with ADHD. Figures and tables within this chapter summarize each participant's on-task behavior using the self-management strategy.

A narrative description of each participant's performance was also provided within this chapter. Interobserver agreement, procedural integrity, and social validity were also discussed in this chapter. Chapter 5 will respond to the research questions as well as discuss limitations and future research suggestions and implications.

CHAPTER 5

Discussion

The purpose of this study was to evaluate the effectiveness of the self-management strategy when used to increase on-task behavior with students identified with attention deficit hyperactivity disorder (ADHD) in a general education classroom at the secondary level. This chapter discusses the results as they related to the four research questions proposed in Chapter One. Also in this chapter appear the relationship between this study and previous research, limitations of the study, suggestions for future research, implications of future practice, and concluding remarks.

Cooper et al. (2020) cite the importance of baseline logic in single-subject experimental design, which entails three elements: prediction, verification, and replication. Prediction is established by the consistency of responses in baseline, shown in this study by baseline medians of all participants. To increase the probability that an observed behavior change is related to the intervention, the study requires verification. The researcher established verification by demonstrating that the baseline measures would have remained unchanged if the intervention was not introduced. When the intervention was introduced, the researcher observed dramatic improvements across all participants. The study also established verification by returning to baseline to show that the intervention was the controlling variable for the observed behavior change. Lastly, the study displayed replication by reintroducing the intervention in the second intervention phase. The researcher reduced the probability that the observed behavior change was due to another factor other than the intervention.

Relationship of This Study's Results to Previous Research Literature

This research appeared consistent with research in the field demonstrating that self-management strategies were effective in increasing on-task behavior of students in a variety of stimulus configurations (Axelrod et al., 2009; Fantuzzo & Polite, 1990; Grossman & Hughes, 1992; Harris et al., 2005; Nelson et al., 1991). This study is an extension of similar research in the field (Epstein et al., 2001; King et al., 2014; Maag et al., 1993; Walther & Beare, 1991), in settings for students of all ages (Mooney et al., 2005; Newstrom et al., 1999; Stotz et al., 2008; Tindall-Ford et al., 2015) and different disability categories (Crabtree et al., 2010; Harris et al., 2005; Kuntz & Carter, 2019; Snyder & Bambara, 1997; Sweeney et al., 1993).

Previous research conducted by Moore et al. (2013) reported increases in on-task behavior when using self-management strategy using a digital cueing device and self-recording sheet in a general education classroom. This study also displayed positive social validity from all participants. One difference with this study and the current study was the participants of this study were diagnosed with any disability, not specifically ADHD. Another difference from this study to the current study was the time intervals used in the momentary time sampling (Moore et al., 2013).

Otero and Haut (2015) conducted another study related to the current study. In this study, the researchers used a tactile prompt, e.g. vibration from digital device, and a self-recording form, similar to the current study. This study investigated both the percentage of on-task behavior using momentary time sampling and the accuracy of student's scoring of on-task behavior compared to the primary observer. The results showed dramatic changes in on-task behavior from baseline to intervention. The range of participants percentage of on-task behavior observed during baseline was 37-47% and percentage of on-task behavior observed during

intervention with reinforcement was 78-95% (Otero & Haut, 2015). Accuracy of the student's behavioral recording also increased with reinforcement. The improvement of on-task behavior observed while using a self-management strategy in this study are similar to the findings found in the current study.

Clemons et al. (2016) also used a digital cueing system and a self-recording device in 5-minute intervals similar to this study. The study displayed improvement in percentage of on-task behavior observed during baseline of a range 35-58% to a range of 92-98% during intervention in all participants. This study also cited similar positive social validity results. Teachers and students stated the self-management strategy improved on-task behavior, work completion, and accuracy of assignments. The major difference in this study compared to the current study was the participants' disabilities and the settings of the study.

While there is an extensive amount of research involving self-management strategies with varying age groups and disability areas, this researcher found the research lacking in general education settings for secondary students diagnosed with ADHD. Clemons et al. (2016) used self-monitoring to increase classroom engagement in both self-contained and general classroom settings for students with varying diagnosed disabilities, such as learning disabilities, autism spectrum disorder, and cognitive disabilities. Another study investigated using self-monitoring to increase the on-task behavior of a student with learning disabilities and another with students exhibiting characteristics of ADHD in a general education science classroom (Wills & Mason, 2014). Rosenbloom et al. (2019) used a self-management strategy to study the effectiveness of this approach on on-task behavior and task completion of students with ASD in both self-contained and general education classrooms.

Research Questions

Question 1: What is the effect of self-management procedures on the daily on-task behavior of high school students with attention deficit hyperactivity disorder? The results of the study indicated that on-task behavior for Addison increased from 37.5% during baseline to 62.5% during the self-management intervention. Data collection regarding Rachel also showed an increase from 37.5% during baseline to 62.5% during the self-management intervention. The third participant, Erica, also increased from 37.5% during baseline to 100% during the intervention. Table 1 displays the median and ranges of percentages related to on-task behavior for all three participants. This study suggests that self-management strategies appeared effective for improving on-task behaviors for all three participants in the general education setting.

The results of all three students showed an important change in observed behavior. This change can be attributed to the self-management intervention based upon the median percentage between baseline and intervention phases. These improvements suggest the possibility of a functional relationship between the self-management strategy and on-task behavior of the students exhibiting ADHD. Existence of this possible functional relationship appears because implementation of the self-management strategy rather than other factors due to experimental procedures.

Question 2: Are the definitions of the behavior and measurement system for daily on-task a reliable measurement procedure? An independent observer measured interobserver reliability in randomly selected sessions throughout the entire study across all experimental conditions. Overall, the interobserver agreement or reliability for on-task behavior resulted in a mean of 97.8% agreement across all experimental conditions between the comparison of the agreement

by the independent observer and the primary observer's scoring of the interval of on-task behavior measured.

Question 3: Will the procedural integrity measures of the self-management procedures ensure fidelity of the intervention implementation? The independent observer used a checklist while viewing the digitally recorded sessions to ensure that the intervention was implemented as intended by the classroom teacher and primary observer. Throughout the study, 22% of the sessions were assessed for procedural integrity. The data indicated that the primary researcher correctly implemented the intervention procedures 95% of the time. There were days when the general education teacher was absent from school, and a substitute teacher was present. The substitute teacher may present possible problems with the consistency in the implementation of experimental procedures. In some cases, unforeseen events would occur (i.e., fire drills, lockdowns, etc.), and the general education and special education teachers were unable to implement the intervention procedures that also impacted the overall fidelity of instructional implementation. The inclusion of only females, all seniors in high school, and all from similar demographic groups increased the internal validity of this study.

Question 4: What effect will the self-management procedures exhibit on the perceptions of students, special education personnel, and general education personnel? The satisfaction of those directly involved with the research was measured using a survey and an interview. The results indicated that overall, the students and the teachers were satisfied with the intervention. The students believed that the self-management strategy helped them stay on-task. The students thought that it was a useful strategy that would work for other classes and behaviors. Some students did express issues with the watches used to cue the students to record on their self-management sheets and how they functioned. One student thought the vibration from the watch

cueing the student was too strong, while another commented that they did not turn off immediately.

The general and special education teachers were also satisfied with the self-management strategy. Both teachers believed that the self-management strategy was effective for increasing on-task behavior. They also believed this strategy was useful for implementation in other classrooms or with other behaviors. The teachers did express concern with the honesty of students' self-recording at the beginning of the study and the adjustment of getting them into the routine of collecting their materials at the start of the study. Even so, the accuracy of student's self-recording was beyond the scope of the current study, and yet, this topic appeared as an excellent subject for future research in self-management interventions.

Limitations

This study was limited by the following factors: (a) participant attendance, (b) participant characteristics, (c) nature of the disability, (d) school-wide activities, (e) classroom teacher availability, and (f) participants perceptions and motivation.

Participant Attendance. Throughout the study, two of the three participants were absent at least one time for different reasons. Overall participant absences ranged from 1 to 2 sessions across all 32 sessions in the entire study. These absences were due to illness or counseling appointments. The extent to which these absences and illnesses influenced the research data collected was not known.

Participant Characteristics. All three students were diagnosed with ADHD and received special education services. Two of the students were classified as other health impairment, and the third student was classified with a specific learning disability. All students were female, white, ages 17 to 18 years old, and from middle to upper-class socioeconomic backgrounds. The

extent to which these participants' demographic factors or specific characteristics of their disability affected or influenced the data gathered made it challenging to generalize the results of this study to other educational settings.

Nature of the Disability. As stated previously, all three students were diagnosed with ADHD and received special education services, but under two different categories. The severity of the disability and behaviors exhibited by each participant varied and were considered highly individualistic throughout the research. Thus, the variability of the behavior and the nature of each individual's manifestation of their disability made it difficult to generalize the data from this study to other educational settings. All three students were identified as exhibiting difficulty remaining on-task. Due to the varying manifestations of the characteristics of their disability and co-morbidity of academic concerns, it is not known to what extent each of these disability characteristics influenced the data collected over the course of the study.

Prevalence of Students Diagnosed with ADHD. The study stated in Chapter 1 the prevalence of ADHD has increased by 42% since 2003, assuming this increase was due to more students exhibiting the condition (DHHS, n.d.). This increase in prevalence could be attributed to more than the condition itself being more common. Other factors that may increase diagnosis prevalence are increased access to health care, decreased stigma of mental health conditions, better awareness of ADHD symptoms, and the changes of how ADHD is defined, such as including inattention rather than hyperactivity only.

School-wide Activities. During the study, several different school-wide activities took place. These activities changed the schedule for these students within the classroom. At times, students were confused by the schedule, which interrupted their daily routines. On one occasion, the schedule was altered due to a grade-wide assembly, and on another occasion, the schedule

was altered because of teacher in-service. In this case, the periods were shortened throughout the day. Due to these schedule changes, the results appeared inconclusive in determining the what extent that these interruptions in the daily schedule influenced student performance and the data collected for on-task behavior during these class periods.

Classroom Teacher Availability. During data collection, the classroom teacher was present for 28 of the 32 sessions. All four of these absences were due to illness or medical appointments. Two absences occurred during baseline conditions, while the other two were during the intervention conditions. No evidence appeared to suggest that student behavior was better or worse during these absences, mainly because the special education teacher was still present. Still, these interruptions could exhibit an unintended effect on the behavior of the students in the class.

Participant Perceptions and Motivations. The self-management strategy that was implemented allowed students to choose from a list of rewards if they met their mastery for the week. The items were limited to what the researcher could afford as well as what the school-wide policies would allow (i.e., cash rewards were not allowed). No direct assessment of potential impact of these secondary rewards for meeting mastery were conducted prior or during to the study. The extent to which these perceptions and motivations influenced the student's behavior was undetermined and may exhibit some uncontrolled influence on the student's overall performance in the study.

Suggestions for Future Research

Little empirical research was found involving using a self-management strategy to increase the on-task behavior of students with ADHD in a secondary general education classroom. This study did yield results suggesting an increase of on-task behaviors due to the

implementation of the self-management strategy. Future research should also address the implementation of the self-management strategy in other secondary settings (i.e., other general education classroom content areas), with other disabilities (e.g., learning disabilities, emotional behavior disabilities), and with other cueing devices (e.g., smartphones or smartwatches). Another topic of consideration for future research is comparing the accuracy of student responses recorded in a self-management intervention when compared to the teacher's responses recorded. Future researchers could focus on the maintenance of this intervention over a long-term period as well. Training teachers in both special and general education on how to effectively implement self-management strategies, as well as training students how to effectively monitor and record their own behavior, would also lead to interesting research in the future (e.g., comparing a teacher's classroom before and after implementation of these potential interventions). Educators must attempt to integrate self-management strategies into the general education classroom setting. Integrating self-management strategies appeared essential to ensure independence, academic engagement, and success of secondary students with ADHD or other disabilities.

Implications for Future Practice

Self-management appeared as an effective intervention for increasing on-task behavior in a secondary general education classroom setting for students identified with ADHD. The self-monitoring and self-recording strategies implemented helped the students manage their own on-task behavior and should help students generalize these behaviors in other classrooms throughout their schooling as well as other aspects of life (i.e., job, extracurricular activities, etc.).

According to the research results and the satisfaction survey, the self-management strategy was effective. The students reported that they enjoyed the self-management strategy and believed it increased their on-task behavior. Additionally, students reported that the self-

management strategy made them more aware and accountable for their on-task behavior. All participants stated they were interested in participating in a self-management strategy in the future. Therefore, if the participants enjoyed the self-management strategy and showed an improvement in their on-task behavior, then the self-management strategy, in all probability, was an effective strategy for increasing on-task behavior and enhancing academic engagement in this group of secondary students identified with ADHD in a general education classroom setting.

Summary and Final Conclusions

The primary purpose of this research study was to evaluate the effectiveness of a self-management strategy when used to increase on-task behavior in three students with attention deficit hyperactivity disorder (ADHD) in a secondary general education setting. The data was analyzed using an ABAB, single subject research design (i.e., baseline, intervention, baseline, intervention), and the results suggested that this type of intervention was effective at improving the on-task behavior for all participants.

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Appendices

Appendix A

CITI Human Subject's Training Certificate

Completion Date	21-Sep-2022
Expiration Date	20-Sep-2025
Record ID	51661848

This is to certify that:

Kelsi Kinnunen

Not valid for renewal of certification through CME.

Has completed the following CITI Program course:

Human Research
(Curriculum Group)
Group 2 Social Behavioral Research Investigators and Key Personnel
(Course Learner Group)
2 - Refresher Course
(Stage)

Under requirements set by:

University of South Dakota

Verify at www.citiprogram.org/verify/?we7f3fe0d-daf1-424e-bd25-ae197a4184a4-51661848

Appendix B

The University of South Dakota Institution Review Board Approval and School Approval

Date: July 20, 2023

The University of South Dakota
414 E. Clark Street
Vermillion, SD 57069

PI: William Sweeney
Student PI: Kelsi Kinnunen
Re: Initial - IRB-23-87, *INCREASING ON-TASK BEHAVIOR AND ACADEMIC ENGAGEMENT WITH STUDENTS WITH ATTENTION HYPERACTIVITY DISORDER USING SELF-MANAGEMENT APPROACHES IN A SECONDARY GENERAL EDUCATION CLASSROOM*

The University of South Dakota Institutional Review Board has approved this study. The approval is effective starting July 20, 2023 and will expire on July 18, 2024.
Veterans Administration (VA) research may not begin until R&D Committee approval is obtained.

Decision: Approved
Category: 7. Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies. (NOTE: Some research in this category may be exempt from the HHS regulations for the protection of human subjects. 45 CFR 46.101(b)(2) and (b)(3). This listing refers only to research that is not exempt.)

Risk Level: Minimal
Research Notes: Date-stamped consent, date-stamped assent, children participants, student-led research

Dear William Sweeney,

The study submission for this proposal has been reviewed and approved under the procedures of the University of South Dakota Institutional Review Board.

In the "Attachments" section of your initial application in Cayuse, you will find a consent document and an assent document that have been stamped with IRB approval and expiration date. You **must** keep these stamped originals on file. Please use the stamped documents to make copies for subject enrollment. **No other consent or assent forms should be used**. Assent and consent forms **must** be signed by the subjects and their parent or guardian prior to beginning any protocol procedures, and you must maintain those signed forms in your files in paper or electronic formats.

No changes may be made to your study protocol unless they are first approved by the IRB. If you want to update or change your protocol, you must file an amendment application with the IRB in Cayuse. If you are uncertain whether something you are doing might require an amendment, please contact the IRB at the phone number or email address below.

Any research-related injury (physical or psychological), adverse side effect, or other unexpected problem encountered during the conduct of this research study must be reported to the IRB within **5 days** of you learning about it.

All approval letters and study documents are located within the attachments in Cayuse IRB.

You have approval for this project through July 18, 2024. When this study is completed please submit a closure form through Cayuse. If the study will last longer than one year, a continuation form needs to be submitted through Cayuse at least **14 days** prior to the expiration of this study.

If you have any questions, please contact: irb@usd.edu or (605) 658-3743.

May 22, 2023

To Whom it May Concern:

As principal of Lennox High School in the Lennox School District, it is my pleasure to write this letter of support related to presentation of increasing on-task behavior and academic engagement with students with attention hyperactivity disorder using self-management approaches in a secondary general education classroom at my school during the Fall Semester of 2023. This self-management project has been an ongoing collaborative effort on the part of Ms. Kinnunen, her university advisor, and her colleagues. Ms. Kinnunen displays the highest level of preparation, professionalism, and utilization of instructional "best practices" for improving the on-task behavior of students in the special and general educational settings.

Ms. Kinnunen and I have discussed this project and I believe it holds a great deal of promise for improving the target student's on-task behavior and academic engagement. I am also aware of the rich empirical research base for the use of self-management strategies in the classroom to improve the on-task behavior and academic engagement students in a variety of educational settings. I do not foresee any potentially harmful effects from the presentations of this data from the experience with the students in my school. In fact, I believe that this study may be a strategy that could be effectively used with a number of students at Lennox High School as well as other schools throughout the Lennox School District.

Ms. Kinnunen, fully understand the importance of confidentiality with regard to this project, and I have the utmost confidence that they will follow through with these requirements in an ethical and responsible manner. Therefore, I fully endorse and support the presentations of tutoring data from the self-management project conducted with twelfth-grade students at Lennox High School by Ms. Kinnunen from the Educational Leadership Program at The University of South Dakota. If you have any questions or concerns about this letter of support please feel free to contact me at Lennox High School at (605) 647-2203. Thank you for your time and consideration of these important demonstration research presentations by the faculty and students at The University of South Dakota.

Sincerely,

Chad Allison, Principal
Lennox High School
Lennox School District

Appendix C

Parental Consent Form

Informed Consent

For Child's Participation in Research

The University of South Dakota

Vermillion, SD 57069

Title: Increasing on-task behavior and academic engagement with students with attention deficit hyperactivity disorder using self-management approaches in a secondary general education classroom

Project Director: *William Sweeney, Ph.D.*

Phone #: *605-658-6648*

Department: *Curriculum and Instruction, Educational Administration*

This is a request for parental permission to allow your child to participate in a research study. It is a basic ethical principle to obtain informed consent from both the parent and child. This consent must be based on the understanding of the nature and risks of the research. This document provides information for this understanding. If you have any questions, please ask. Research projects include only parents and children who choose to take part. Please take your time to make your decision. If at any time you have questions, please ask.

WHAT IS THE PURPOSE OF THIS STUDY?

Your child is invited to be in a research study using a self-management strategy monitoring their on-task behavior during their general education class. The purpose of this research is to determine if monitoring and recording their on-task behavior increases the time on-task.

HOW MANY PEOPLE WILL PARTICIPATE?

Approximately 4 children will take part in this study through the University of South Dakota. Your child will not have to travel; the study will take place at Lennox High School in Lennox, SD.

HOW LONG WILL I BE IN THIS STUDY?

Your child's participation in this study will last for approximately eight weeks. Your child will participate during the regular class time. Each session will last 45 minutes.

WHAT WILL HAPPEN DURING THIS STUDY?

At the beginning of the study, after observing your child's in-classroom on- and off-task behavior, Kelsi Kinnunen will teach your child a self-management strategy involving periodically writing down whether they are on-task or off-task.

Next, your child will be loaned a digital prompting device called a "WatchMinder." The WatchMinder is a small electronic device that your child will wear on their wrist during parts of the study, which will vibrate to prompt your child to write whether they are on- or off-task during class.

After practicing the self-management strategy, your child will sometimes wear the WatchMinder in the general classroom, and it will prompt them to periodically write down whether they are on- or off-task. Ms. Kinnunen will also be watching and videorecording your child to note whether they are on- or off-task during that time.

Your child will not miss special education services (i.e., instruction, related services, etc.) during their school day when participating in this study. Kelsi Kinnunen will video-record each session to ensure that she and her mentor observe the same behaviors. Using the video recording, the percentage of on-task behavior during the session will be recorded. At the end of the week, students will compare their on-task percentage to their individual goals and receive a previously selected reward if they met their goal.

During the 8 weeks the study will take place, your child will sometimes be wearing and using the WatchMinder, and sometimes not, and Ms. Kinnunen will periodically observe and videorecord their on- and off-task behavior.

When the study is complete, your child will be asked their opinion about the self-management strategy. This information will be used to report consumer satisfaction within the study. Questions will be completed anonymously.

WHAT ARE THE RISKS OF THIS STUDY?

Through participation in this study, your child will be learning a strategy to monitor and record their own on-task behavior that is also part of their Individualized Education Program. There are no perceived risks for participation in this study.

WHAT ARE THE BENEFITS OF THIS STUDY?

The self-management strategy we teach your child during the study may help them stay on task, but they also might not benefit from being in this study. However, we hope that in the future other children might benefit from this study because we may learn that implementing this type of intervention may help more students be successful at high school.

ALTERNATIVES TO PARTICIPATING IN THIS STUDY?

The alternative to being in this study is simply for your child to not participate. If you and your child decide not to participate, their behavior and work will not be recorded, nor will they be on the video recording. They will still be able to monitor, record, and reward themselves based on their on-task behavior.

WILL IT COST ME ANYTHING TO BE IN THIS STUDY?

Your child will not have any costs for being in this research study.

WILL I BE PAID FOR PARTICIPATING?

Your child will not be paid for being in this research study.

WHO IS FUNDING THE STUDY?

The University of South Dakota and the research team are receiving no payments from other agencies, organizations, or companies to conduct this research study.

CONFIDENTIALITY

The records of this study will kept private to the extent permitted by law. In any report about this study that might be published, you will not be identified. Your child's study record may be reviewed by Government agencies, USD Research Compliance Office, and the University of South Dakota Institutional Review Board.

Any information that is obtained in connection with this study and that can be identified with your child will remain confidential and will be disclosed only with your permission or as required by law. The research team will be the only individuals viewing the taped sessions, and any report or article we write about this study will describe the study results in a summarized manner so that your child cannot be identified.

IS THIS STUDY VOLUNTARY?

Your child was selected as a possible participant because your child receives services from Kelsi Kinnunen. However, your child's participation is voluntary. Your child may choose not to participate or may discontinue participation at any time without penalty or loss of benefits which your child is otherwise entitled. The decision or not to participate will not affect you or your child's current or future relationship with the Lennox School District, Kelsi Kinnunen, or with the University of South Dakota.

If your child decides to leave the study early, we ask that you and your child notify Kelsi Kinnunen (kelsi.kinnunen@k12.sd.us or 605-2901-809). Your child will not receive any consequences for withdrawing.

CONTACTS AND QUESTIONS

The researchers conducting this study are Dr. William Sweeney and doctoral candidate Kelsi Kinnunen. You may ask questions you have now. If you later have questions, concerns, or complaints about the research, please contact Dr. Sweeney at 605-658-6648 (william.sweeney@usd.edu) or Kelsi Kinnunen at 605-290-1809 (kelsi.kinnunen@k12.sd.us).

If you have any questions regarding your child's rights as a research subject, you may contact The University of South Dakota-Institutional Review Board at (605) 658-3743 or irb@usd.edu. You may also contact this office to tell us about any problems, complaints, or concerns about the research. Please contact this office if you cannot reach research staff, or you wish to talk to someone who is independent of the research.

Please read below, check the appropriate blank according to your wishes, and sign accordingly. You will receive a copy of this form.

_____ I give my permission for my child to participate fully in the study that includes video recording and the collection of data.

_____ I DO NOT want my child to participate in this study. He/she cannot be video recorded and data cannot be collected on him/her.

Child's Name: _____

(Please Print)

Parent/Guardian: _____

(Please Print)

Parent Signature: _____ Date: _____

Appendix D

Subject Assent

The University of South Dakota

Child's Assent Non-Medical

Project Title: **Increasing on-task behavior and academic engagement with students with attention deficit hyperactivity disorder using self-management approaches in a secondary general education classroom**

Investigator(s):   *William Sweeney, Ph.D.*

Kelsi Kinnunen, MA

We are doing a research study. A research study is a special way to find out if something works or doesn't work. We are trying to decide if monitoring and recording your own on-task behavior will increase the behavior.

If you want to be in this study, we will ask you to do several things.

- Work with Ms. Kinnunen to learn what on-task and off-task behavior looks like.
- Learn to observe and record your on-task behavior using a special watch and form.
- Your time in the classroom will be video recorded but the recording won't be shown to anyone. The recordings will be destroyed after the study is done.
- You will earn rewards for your on-task behavior based on a goal you select.

We want to tell you about some things that may happen to you if you are in this study.
Being in this study won't make you miss anything important in class. You won't be hurt or harmed at all.

Not everyone in this study will benefit. We don't know if you will benefit. But we hope to learn something that will help other people some day.

When you are done with this study, we will write a report about what we learned. We will not use your name in the report.

You do not have to be in the study. It is up to you. If you decide to be in the study, but change your mind, you can stop being in the study.

Please read below, check the appropriate blank according to your wishes, and sign accordingly. You will receive a copy of this form.

_____ I want to participate in the study.

_____ I DO NOT to participate in this study.

Name: _____

(Please Print)

Signature: _____ Date: _____

Appendix E

Momentary Time Sampling Form

Session #: _____   Date: _____

Condition (circle one):   Baseline   Intervention

Individual conducting the observation (circle one):   Primary   Independent

Set 5-minute timer. When the timer ends, observe and record students' behaviors in order on the recording sheet. If the student is on-task, record + (plus sign). If the student is off-task, record – (minus sign). Continue this process until the eight sessions are complete. Calculate the percent of on-task by adding the number of +s divided by the number of intervals (8) and multiplying by 100.

Interval #	Student #1	Student #2	Student #3
1			
2			
3			
4			
5			
6			
7			
8			
+s/8			
% Of Intervals			

Appendix F

Steps Completed Independently Inter-Observer Agreement Data Collection Form

Session #: _____   Date: _____

Student: _____

Interval #	Primary Researcher's Score	Independent Observer's Score	Record "Y" if agreement Record "N" if no agreement
1			
2			
3			
4			
5			
6			
7			
8			

Calculate Interobserver Agreement (IOA):

Number of intervals marked (Y)/total number of intervals (8) X 100=_____ %

Appendix G

Example of Student Contract

Directions: Circle your answer:
  1. I want to make better grades in my classes.   YES   NO

 2. I want to make and keep friends.   YES   NO

   3. I understand what on-task behavior is.   YES   NO

  4. I understand that my on-task behavior influences   YES   NO
my grades and ability to make friends.

     5. I will try the self-management plan to the best   YES   NO
of my ability.

Write one sentence telling why you want to change your behavior.

  _____

  _____.

I agree to implement the self-management as described to me.

   Student signature: _____

   Teacher signature: _____

Appendix H

Student Self-Monitoring Session Recording Sheet

Behavior	1st 5 min	2nd 5 min	3rd 5 min	4th 5 min	5th 5 min	6th 5 min	7th 5 min	8th 5 min
On-task								
Place a + (plus sign) in the box if you are on task when your watch cues you. Place an – (minus sign) in the box if you are not on task when your watch cues you.								

Appendix I

Student Weekly Self-Monitoring Chart

Behavior	Monday	Tuesday	Wednesday	Thursday	Friday
On-task					
I met mastery today	Yes No	Yes No	Yes No	Yes No	Yes No
Determine the percentage you were on task for each behavior for each day of the week and record it in the corresponding box. Circle 'yes' if you met mastery for the day and 'no' if you did not. **Mastery:** On-task behavior: ___% (may differ for each student)					

Procedural Integrity Probe Checklist

Session #: _____   Date: _____

Condition (circle one):   Baseline   Intervention

Person conducting the Procedural Integrity Probe: _____

Put an "X" in the underlined space below if the statement reads true and the procedure has been followed. Put an "O" in the underlined space below if the statement is false and the procedure has not been followed. Mark an "X" only when the statement completed correctly and in the proper sequence. If the statement was not completed or out of sequence, mark with an "O".

Baseline and Intervention Checklist

Baseline

_____   Bell rings to signal the start of class

_____   The teacher reads the agenda for the day

_____   The teacher instructs students to take out learning materials

_____   The teacher begins lesson with class discussion or visual representation

_____   The practice or homework begins

_____   Assignments are printed (if applicable) and turned in to individual folders

Total number of items marked with an "X" _____ divided by total number of spaces (6 possible) multiply by 100= _____ percentage of steps correctly followed.

Record the number of marked items and the percentage of steps correctly followed on the Procedural Integrity Sheet.

Baseline and Intervention Checklist (Continued)

Intervention

_____ Bell rings to signal the start of class

_____ The teacher reads the agenda for the day

_____ The teacher instructs students to take out learning materials

_____ Primary observer ensures students have data collection sheets and watches

_____ Students record on-task behavior when cue is given

_____ The teacher begins lesson with class discussion or visual representation

_____ Students record on-task behavior when cue is given

_____ The practice or homework begins

_____ Students record on-task behavior when cue is given (may be multiple times)

_____ Assignments are printed (if applicable) and turned in to individual folders

_____ Primary observer collects data collection sheets and watches from students

Total number of items marked with an "X" _____ divided by total number of spaces (10 possible) multiply by 100= _____ percentage of steps correctly followed.

Record the number of marked items and the percentage of steps correctly followed on the Procedural Integrity Sheet.

Appendix K

Consumer Satisfaction Questions (Student)

I am going to ask you a few questions about the study you participated in over the past few weeks. I want to know your feelings and thoughts about participating in this study. Please be honest with your answers to the following questions:

1. What do you think was the purpose of the self-management strategy?

2. What did you like best about the self-management strategy?

3. What did you like least about the self-management strategy?

4. Do you think that the self-management strategy helped you stay on-task? Explain.

5. Was the use of percentages of "mastery" at the end of the week helpful?

6. If you could change anything about the self-management strategy, what would it be?

7. What suggestions would you give to other students to improve their on-task behaviors?

8. Would you like to use this strategy with other behaviors or classes?

9. Would you participate in another study like this one if you were asked?

10. Is there anything else you would like to say?

Appendix L

Consumer Satisfaction Questions (Teacher)

I am going to ask you a few questions about the study you participated in over the past few weeks. I want to know your feelings and thoughts about participating in this study. Please be honest with your answers to the following questions:

1. What do you think was the purpose of the self-management strategy?

2. What did you like best about the self-management strategy?

3. What did you like least about the self-management strategy?

4. Do you think that the self-management strategy helped students stay on-task? Explain.

5. Do you think the use of percentages of "mastery" at the end of the week helpful?

6. If you could change anything about the self-management strategy, what would it be?

7. What suggestions would you give to other teachers to improve their students' on-task behaviors?

8. Would you like to use this strategy with other behaviors or classes?

9. Would you participate in another study like this one if you were asked?

10. Is there anything else you would like to say?

Appendix M

Consumer Satisfaction Written Survey (Student)

I am going to read a few statements about the self-management strategy study you participated in over the last few weeks. Please listen carefully and circle the choice the option that most accurately how you feel.

1. Participating in the self-management strategy was fun.

        YES   SOMETIMES   NO

2. Using the self-management strategy is a good way to increase on-task behavior.

        YES   SOMETIMES   NO

3. I disliked the self-management strategy.

        YES   SOMETIMES   NO

4. I liked recording my own on-task behavior.

        YES   SOMETIMES   NO

5. I think my on-task behavior has improved since we started the self-management strategy.

        YES   SOMETIMES   NO

6. I would like to continue using the self-management strategy throughout the school year.

        YES   SOMETIMES   NO

7. I would participate in a self-management strategy in the future.

        YES   SOMETIMES   NO

8. I think I should use the self-management strategy in other classrooms.

        YES   SOMETIMES   NO

Appendix N

Consumer Satisfaction Written Survey (Teacher)

I am going to read a few statements about the self-management strategy study you participated in over the last few weeks. Please listen carefully and circle the choice the option that most accurately how you feel.

1. Using the self-management strategy is a good way to increase on-task behavior.

     YES   SOMETIMES   NO

2. I disliked the self-management strategy.

     YES   SOMETIMES   NO

3. I liked the idea of students recording their own on-task behavior.

     YES   SOMETIMES   NO

4. I think student's on-task behavior has improved since starting the self-management strategy.

     YES   SOMETIMES   NO

5. I would consider using the self-management strategy throughout the school year.

     YES   SOMETIMES   NO

6. I would implement a self-management strategy in the future.

     YES   SOMETIMES   NO

7. I believe the self-management strategy could improve other behaviors besides on-task behaviors.

     YES   SOMETIMES   NO

8. I believe other teachers should use self-management strategies in their classrooms to improve on-task behavior.

YES   SOMETIMES   NO