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Effects of the MotivAider and Self-Monitoring to Increase On-Task Behavior for Students with Attention Deficit Hyperactivity Disorder

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by

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ABSTRACT

The Effects of MotivAide, Self-Monitoring to Increase On-Task Behavior for Students with Attention Deficit Hyperactivity Disorder

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The following study compared the use of the MotivAider as a self-monitoring tactile device between an elementary age student with ADHD and his teacher to increase on-task behavior. The design of this study was an alternating treatments design, which helped to determine the more effective condition. The results of this study indicated that the use of the MotivAider by the student was more effective than the use of the device by the teacher.

DEDICATION

I would like to dedicate this work to my Mom, Norah Al-Ghalab, and my family who supported me for the past three years. Without their aid and support this would not have been possible. And finally, I would like to dedicate this achievement to all the students with disabilities and the special education field because they are the motivation for everything I do.

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CHAPTER 1

INTRODUCTION

Attention Deficit Hyperactivity Disorder

ADHD impairs an individual's mental capacities, hence making them fail to marshal and sustain attention, control, dictation of their activity levels, and exercise restraint in impulsive actions (Rappley, 2005). Consequently, persons with ADHD display maladaptive behaviors which are different and inconsistent with the appropriate behavior for their age. In neuropsychological and brain-imaging studies, scholars attribute the excessive secretion of dopamine and norepinephrine neurotransmitter systems in the brain as being the leading causes of this disorder (Nigg, Quamma, Greenberg, & Kusche, 1999). Furthermore, studies have shown significant correlations between the portrayal of ADHD symptoms with low birth weights in infants, deleterious environmental conditions that augment susceptibility, exposure to industrial toxins such as lead and head trauma (Ramos, Freire, Julvez, Fernández, & García-esteban, 2013). However, researchers have failed to pinpoint the actual cause of a majority of the ADHD cases in children and adolescents, albeit the existence of extensive scientific data linking the aforementioned aggravating factors to ADHD (Steinhausen, 2009). Individuals with ADHD exhibit maladaptive behaviors in such areas as school, in events, public functions, and at home. ADHD has been attributed to reduced cognitive abilities in students, consequently, resulting in reduced performance levels owing to the inabilities of these students to pay attention (Kofler, Rapport, Bolden, Sarver, & Raiker, 2011). As such, the detrimental implications of ADHD to students' academic performance have prompted increased debate, research, and development of interventions to alleviate this disorder.

There are two criteria for the diagnosis of ADHD, the *DSM-IV* and the *ICD-10* (Posserud, Ulleb, Plessen, Stormark & Gillberg, 2014). Consequently, the prevalence of the disease is dependent on the diagnosis criteria adopted with DSM-IV being in 5-7 percent of children (Young, Moss, Sedgwick, Fridman, & Hodgkins, 2015). Alternatively, the prevalence rates are one to two percent in children in diagnosis undertaken through ICD-10 method (Cowen, Harrison, & Burns, 2012). As such, the prevalence of ADHD is estimated to range from 3 to 7 percent in children with a high proclivity being recorded in boys more than girls (Barbaresi, Katusic, Colligan, & Pankratz, 2002). The on-set of ADHD is normally between the ages of six and twelve and its symptoms are felt over a lifetime (Faraone, Kunwar, Adamson, & Biederman, 2009). To affirm this, studies show that at least 3 to 5 in every ten adults diagnosed with ADHD when they were children continue to experience symptoms with the disorder's prevalence being within 2 to 5 percent of adult populations (Kooij, Bejerot, Blackwell, & Caci, 2010). As such, early diagnosis has been seen to determine the course of treatment all through an individual's lifetime.

Psychiatrists propose the use of a medication, counseling, and lifestyle changes to effectively manage ADHD (Daly, Creed, Xanthopoulos, & Brown, 2007). From such, counseling and lifestyle changes have been forwarded as the choicest options for management of ADHD in mild cases. Alternatively, medication had been seen applicable in severe cases for minors and adults. Conversely, different countries and regions adopt various approaches to managing this disorder with some adopting a multivariate approach combining counseling and medication to effectively handle this disorder (Jensen, Garcia, Glied, & Crowe, 2005). Treatment interventions in the management of ADHD have been

found to augment the ability of adolescent and adults to adopt relevant skills to cope with their counterparts and improved their attention spans especially in activities they love (Cleave & Leslie, 2008). On the other hand, some treatment practices involve the use of stimulants, which, over time been contentious. However, scholars argue that this alternative has a low efficiency in the treatment process and can only be applicable for 14 months (Brown & Perrin, 2007). As such, the use of medication and therapy have been seen as the most effective interventions in ADHD management.

Attention Problem and On-Task Behavior

Attention insufficiency is an inherent inability in individuals with ADHD and systemically impairs their abilities to augment their on-task behavior and performance (Slattery, Crosland, & Iovannone, 2016). Owing to their inability to sustain attention, this has affected their academic performances, cognitive competencies, and execution of tasks in comparison to their counterparts (Harris, Friedlander, Saddler, Frizzelle, & Graham, 2005). With regard to individuals with ADHD, attention and on-task behavior can be connoted as the ability to psychologically sustain the desire to learn something new and consequently organize and complete set roles regarding the task. Carter, Robertson, Nordahl, and O'Shora-Celeya, (1993) in testing the attention of individuals with schizophrenic behavior, found a consistency of interference effects in these participants similar to those exhibited by ADHD subjects. The concentration span and ability of the individuals to marshal longer attention levels in learning and executing new tasks was low which is inherent with the prevalent cognition of individuals with ADHD on-task behavior.

Alternatively, the inability to sustain attention as a detrimental on-task behavior may be a precipitate of the inherent weaknesses in the cognitive functioning of individuals with ADHD (Adams, Milich, & Fillmore, 2010). As such, to effectively analyze the attention deficiencies exhibited in individuals with ADHD, scholars and psychiatrists tend to assess the intellectual abilities of these individuals holistically. Such studies provide the backdrop upon which researchers can establish the discrepancies between individuals with ADHD and normal individuals, the comparative weaknesses, and their decrements (Frazier & Demaree, 2004). Through such neuropsychological assessments of individuals with ADHD, scholars are consequently able to quantitatively identify the specific cognitive processes that are missing in these individuals. However, differing studies approach the assessment of attention through a specific set of tasks that test this cognitive ability (Biederman et al., 1993). This school of thought argues that the inherent weaknesses in on-task behavior in individuals with a mental disorder are a product of disruption in the neuropsychological abilities such as sustained attention, working memory, impulse, and motor control (Barkley, DuPaul, & McMurray, 1990). This approach has facilitated studies that have specifically aimed at testing the attention abilities of individuals with ADHD with controls targeting the other neuropsychological abilities (Garcia-Sanchez, Gonzalez, Romero, & Junque, 1997). The use of controls has been effective in ensuring the response of the individuals with ADHD to stimuli is not a product of disruptions from other neuropsychological abilities albeit their instruments testing the subjects attention abilities. For instance, Fox (1993) studied the attention bias of individuals with anxiety in response to various stimuli. This study found out that individuals with high anxiety had inherent inabilities to sustain attentional focus as

opposed to the assertion that the anxiety-producing stimuli will yield an attentional bias. This study affirms the understanding that sustained attentional decrements in individuals with mental disorders is consistent regardless of the stimuli these individuals are exposed to. The study on individuals with anxiety can be replicated to ADHD and in turn yield similar results because of the comorbidity of the two disabilities. Shekim and colleagues (1990) in a study on adult individuals with ADHD found out that from a sample of 56 participants who displayed ADHD symptoms, only seven were exclusively individuals with ADHD with the remaining exhibiting symptoms of other mental disorders.

Sustained attention is crucial to the exposition of cognitive abilities in individuals with ADHD. Psychiatrists are guided by this perception whenever they undertake a diagnosis of ADHD. An attention deficit diagnosis may vary and incorporate different approaches. There are cases where unilateral information sources are used to assess attention as seen in unstructured interviews with individuals and parents as seen in children's diagnoses (Aebi, Kuhn, Metzke, Stringaris, & Goodman, 2012). Alternatively, clinical approaches can incorporate cognitive and neuropsychological tests with the aid of scales, several informants, analyses and review of behavior and procedural interviews that provide standardized measurement criteria (Frazier & Demaree, 2004). Comprehensive, detailed, and multivariate approaches to testing have been seen as effective in objectively making ADHD diagnoses because they eliminate alternative causes the attention relapses in on-task behaviors.

ADHD Impact on Student Education

The DSM-IV criteria for diagnosis dictate that hyperactive, impulsive, and attention deficits behavior inherent with ADHD can only be affirmed if they are present

in children under seven years for more than six months and significantly impair their daily functioning in school and home (APA, 1994). The American Psychological Association further assessed that when it came to the behaviors of children with ADHD in school, they were consistent with: (a) the inability to take turns in various roles, (b) regularly interrupting others, (c) not listening when being spoken to, (d) and intruding upon their peers in both academic and recreational roles. The proclivity of these characteristics was seen to be inherent with school-age students; however, McDonnell and Glod, (2003) and Hutchings, Daley, Jones, & Thompson, (2009) in separate studies, showed significant populations of pre-school students with these behaviors.

ADHD symptoms have been proven to have significant effects on the academic performance of students. Impulsivity, inattentiveness, and hyperactivity in students with ADHD have been seen to be significantly augmented by the comorbidity of the disability to other mental disorders (Biederman, Newcorn, & Sprich, 1991). These studies have shown that ADHD symptoms which impair the cognitive abilities of students stem from co-morbid disorders like ODD (Oppositional Defiant Disorder) and anxiety in a quarter to 30% of students with ADHD and bipolar disorder in 10 to 22 percent of these students (Faraone, Biederman, & Wozniak, 2012). Collectively, these comorbid disorders have been found to greatly deteriorate the reading, ability to write and arithmetic skills (Biederman, Newcorn, & Sprich, 1991). Cherkasova et al., (2009) in a neurological study showed that ADHD has significant effects in 'resizing and diminishing' the prefrontal cortex in these students. As such, the diminished prefrontal context which is essential to the executive functioning of these students, such as responding to inhibition and working memory, was subsequently impaired (Fischer, Barkley, Smallish, & Fletcher, 2002).

Undoubtedly, ADHD has been affirmed to adversely affect the cognitive abilities of students which have led to increased research on this disorder.

Studies on ADHD and their impact on education have conceptualized the disability as either being a disorder of dysregulation of the intellectual abilities of students because of diminished inhibitory control (Mota, Schachar, Logan, Tannock, & Klim, 2000) or the expression of a motivational style inherent with a changed reward mechanism in students (Coghill, 2005). In the latter theoretical camp, ADHD has impaired academic performance by posing difficulties for a student in impulse control, their ability to marshal and sustain attention, additionally causing hyperactive tendencies which make these students fail to concentrate in class (Lahey, Pelham, Loney, & Kipp, 2004). As such, ADHD's impact on academic performance has stemmed from the fact that it's comorbidity augments the disorder in itself with other mental disorder. These comorbid disorders aggravate the symptoms experienced by these children which consequently impairs their ability to concentrate in class. Additionally, the existence of this disorder in these students with ADHD has deleterious neurological impacts that inherently weaken the cognitive abilities of these students.

Intervention to Improve On-Task Behavior

Based on literature addressing the various interventions used in the treatment of ADHD, those studies that tackle the central nervous system's stimulants, behavior improvements, and combined treatment techniques, have provided conclusive and empirical information (Pelham, Wheeler, & Chronis, 1998). These strategies have included self-monitoring techniques, relaxation training in psychosocial and behavioral interventions, video self-monitoring, and effective education for cognitive reconstructing

(Dobson, 2001). Self-monitoring interventions to improve on-task behavior differ from the other interventions as they confer the students with ADHD with the position to individually improve their attentiveness by following set examples in the accomplishment of tasks. In most applications of self-monitoring interventions, students are required to follow the instructions given by their teachers (Hallahan & Hudson, 2002). This intervention has, however, a short-term implication in treating inattentiveness in students, and the inherent personal differences in students determine the acceptance of this treatment (Mirnasab & Bonab, 2011).

Secondly, video-self-modeling techniques give opportunities for students to emulate past successes of doing tasks that they love. In improving on-task behavior, this technique has been showing the students successfully undertaking the desired behavior (Bellini & McConnell, 2010). VSM has been used to improve the social interaction and behavioral responses, especially in children. Studies have shown that sustained and effective application of VSM can improve the overall on-task behaviors (Bellini & McConnell, 2010). These include augmented playing abilities in kids, consistency and better blending with their mates in the various games played and adhered to the controls of these games (Buggey, 2005). As such, VSM has been seen to augment the children's ability to control impulsivity and hyperactivity by moderately blending and emulating the widely acceptable and self-desired behavioral response.

On the other hand, relaxation techniques have also been used in the improvement of the on-task behavior in students with ADHD. This technique aims at limiting the impulsivity and hyperactivity that may impair the execution, attention, and overall behavior of individuals in being attentive and, subsequently, executing tasks accurately

(Safren, Sprich, Mimiaga, Surman, Knouse, Groves, & Otto, 2010). This technique aims at improving the composure of students with ADHD within a majority of its applications, being long-term (Safren et al., 2010). Relaxation training involves the use of concertation meditation sessions to improve the ability to control impulsivity (Zylowska, Ackerman, & Yang, 208). Secondly, limiting distraction in the process when applying the techniques improves the concentration levels of students with ADHD. Lastly, using physical approaches to 'relax' the person's body have also been effective in alleviating the proclivities of hyperactivity in children with ADHD (Safren et al., 2010). This non-medicinal intervention, when sustained over a longer period, has been seen to be effective in lowering the adverse symptoms of ADHD.

Cognitive reconstruction is also an alternative treatment for improving the on-task behavior in ADHD persons. This approach tackled treatment from the understanding that prolonged mistakes and distortion in the cognitive functioning of individuals with ADHD, and, if cured, can improve the on-task behavior of individuals with ADHD (Knouse & Safren, 2010). As such, this treatment has been used to better the esteem, perceptions, and abilities of the affected individuals through psychotherapeutic interventions. By changing the 'eternally accepted truths' about the various aspects of the cognitive functions, cognitive reconstitution changes the distortions in the mental states of individuals with ADHD, and, consequently improving the on-task behavioral patterns (Safren et al., 2010). This, and other alternative approaches that tackle the improvement of psychosocial responses of individuals with ADHD concentrate on improving the inherent, yet detrimental cognitive functioning of these persons.

MotivAider

The MotivAider is a user-friendly, personal electronic tool for all ages that offers the ability to make desired changes in a quicker, easier, and private way to an individual's behavior and habits. This tool has been psychologically proven to improve the behaviors of individuals for the past three decades in more than 50 countries globally (MotivAider, 2017).

Application

The MotivAider works by giving the user the ability to ingeniously adjust their behavior and habits. This tool offers the user improved attentiveness and motivation which makes it easier for them to make behavioral adjustments and to adopt their newly chosen habits (MotivAider, 2017b). The inventors of this tool took into consideration the need to provide a tool that can assist in making any desired behavioral change by tapping into a person's inherent motivation to change. This invention works by engaging the student mind to fully focus on the desired change automatically through a user-friendly interface (MotivAider, 2017b). The user begins by choosing a phrase, message or image that motivates them to change. Secondly, the user has to connect their message to the MotivAider's gentle vibration, so that when it vibrates, it reminds them of their message (MotivAider, 2017b). Lastly, the user has to set the MotivAider to relay private signals repeatedly to enable them to stay focused on their desired change.

Benefits

The MotivAider is an easy-to-use device. The device is lightweight for easier portability and works automatically. The device can be privately used, meaning it does not interrupt nor disrupt one's attention to daily activities (MotivAider, 2017b). Secondly,

this tool automatically sends a constant stream of reminders to your mind that can help an individual remain focused to change behavior. Thirdly, this tool has been scientifically proven to boost behavior changes in thousands of people (MotivAider, 2017b). Resoundingly, based on its inventors' review, has conferred a lot of cognitive improvements not only to the ADHD and other mental disorder persons, but also to people who inherently seek changes in their lives. The purpose of this study is to determine:

(a) To what extent can the MotivAider timer be used to increase on-task behavior of students with ADHD?

(b) To what extent can teachers use the MotivAider to increase student's on-task behavior?

(c) Is there a relationship between the function of student behavior and the use of the MotivAider timer to increase on-task behavior?

CHAPTER 2

REVIEW OF THE LITERATURE

The Extent of MotivAider's Use as an Intervention to Increasing On-Task Behavior

Studies that have involved the use of MotivAider as an intervention to improving the on-task behavior for students with ADHD have established significant improvements in the subjects using this tool (Legge, DeBar, & Alber-Morgan, 2010). As aforementioned, this behavioral self-monitoring and self-management tool has proven effects in motivating and retaining an individual's focus towards the desired change. The aspect of self-management of one's performance, inherent with the use and application of MotivAider, is in tandem with the prevalent practice of managing one's academic performance and social behavior (Carr & Punzo, 1993). From this assumption, this device can be classified as a self-monitoring and self-management tool applicable to on-task behavioral improvements (Legge, DeBar, & Alber-Morgan, 2010). The applicability of MotivAider to improve the cognitive abilities stems from the fact that most of students with ADHD lack these abilities (Barkley, 2014). The inability to indubitably exhibit the required cognitive functioning is a product of the intrinsic hyperactivity, inattentiveness, disorganization. (Fowler, 2010). The use of MotivAider as a behavioral self-management tool that helps students with ADHD to take up the responsibility of reforming their on-task behavior.

Studies on the behavioral self-management techniques have shown that a consistent application of this intervention can confer cognitive improvements in on-task behavior for students from all ages (Harris, Reid, & Graham, 2004). This study's assertion affirms the validity of using MotivAider, which is equally and primarily a

behavioral self-management and self-monitoring tool for the use of behavioral improvements of students with ADHD. Given this theoretical thought, it is consequently valid to attribute the behavioral improvements advertised by the tool's inventors (MotivAider, 2017), to the inherent abilities of this tool to reform on-task behavior. As such, studies have shown that valid behavioral self-management interventions have the intrinsic abilities to assist students in augmenting their social behavior and academic performances (Bruhn & Watt, 2012). From this affirmation, it is valid for researchers to aim at establishing the linkage between the use of MotivAider to cognitive improvement in the academic performance of students and on-task behavior (Legge, DeBar, & Alber-Morgan, 2010). To affirm this theoretical thought, separate studies to correlate the impact of behavioral self-management interventions on students have established significant improvements to the academic productivity of students (Mooney, Ryan, Uhing, Reid, & Epstein, 2005). Conversely, the use of behavioral self-management interventions in students has also been established to intrinsically improve the abilities of students to complete their assignments (Gureasko-Moore, DuPaul, & White, 2007). As such, one can argue that using behavioral self-management techniques will augment on-task responses from ADHD students as a result of improved cognitive responses.

A prevalent, yet intrinsic, aspect of MotivAider is the fact that it can be used as a self-monitoring tool. The inventors of this tool argue that the device can relay prompts clearly, uninterruptedly. and privately to a user and in turn aid him to focus and angle their cognitive responses to effect the desired change (MotivAider, 2017b). Arguably, the bone of contention is in such a tool, self-monitoring intervention, to have a resultant impact on the cognitive abilities of students with intellectual disorders. Behavioral

techniques to on-task improvements use self-reinforcement, self-graphing, self-monitoring, self-instruction, and self-evaluation. Of the above interventions, self-monitoring is the widely studied (McDougall, 1998). One can argue that the extensive attention that self-monitoring as intervention has received from research stems from the fact that such studies' use of controls is limited, and the overall improvements in the primary measurements. The view of measuring the ultimate behavior change in research is guided by the principle of the cognitive-behavioral principle of reactivity; such that if one raises the awareness of the student's behavior, then this will trigger the need to reform regarding the student's behavior (Meichenbaum, 1977). Based on this thought, subsequent application processes of self-monitoring interventions use self-assessment approaches followed by self-recording (Glynn, Thomas, & Shee, 1973). In essence, application entails a student to respond to a self-assessed question then self-record their response. Their responses are then typically prompted in the form of audiovisual or visual cues to subjects bordering on the one used in MotivAider.

Research has backed the validity of using this approach as an intervention to augmenting on-task behavior from students over the years. Researchers have established a significant correlation between self-monitoring interventions to the resultant improvements in the social and academic responses of students (Green, 2014). Descriptive, analytical, and meta-analytical studies have established that self-monitoring interventions can offer moderate to strong progress in on-task behaviors for students and adults (Mooney, Ryan, Uhing, Reid, & Epstein, 2005). Its application within the school context to improve on-task behavioral responses has proved to have significant impacts to experienced improvements (McDougall, Skouge, Farrell, & Hoff, 2006). The extent of its

applicability in the school setting has, however, relied on the use of extensive controls to boost the performance of students with disabilities (McDougall, 2006). Such approaches denote that future applications of self-monitoring interventions should also address the impact of the environment in which the student is in and create distractions to the attentiveness of the students. By limiting the distractions created by the environment, studies can, in turn, be able to provide a facilitative environment for measuring the impact of this self-monitoring interventions.

Alternatively, introducing self-monitoring approaches in improving off-task behavioral responses may augment the quality of on-task and arithmetical responses (Carr & Punzo, 1993). Consequently, researchers have established a significant correlation between the improvements achieved in off-task behavioral improvements as a result of the application of the MotivAider as a self-monitoring intervention to the resultant on-task behavioral improvements experienced after the application of the technique (Farrell & McDougall, 2008). As such, the replicability, albeit contentious, assertion of this intervention in improving on-task behavioral responses could be asserted by such studies. On the other hand, the MotivAider inherently confers the behavioral self-monitoring and self-management benefits to students, and as such, it can be applied in similar studies to study the extent of resultant improvements significantly.

The Extent to Which the MotivAider's Can Be Used by Teachers as an Intervention to Increase On-Task Student Behavior

The efficiency of the MotivAider as an intervention to improving the on-task behavior of students within classrooms is of great essence. A study has shown that teachers find it hard to control the behavior of students with disabilities in their

classrooms since most of these students need the consistent attention (Rafferty, 2010). Repeated follow-ups may cause these students to become increasingly reliant on their teachers, which intrinsically may hamper the on-task improvements. As such, the application of behavioral self-management interventions has centered on allowing these seemingly dependent students to be autonomous in the understanding and execution of tasks (Gureasko-Moore, DuPaul, & White, 2007). Besides, Rafferty (2010) argues that the application of behavioral self-management within the classroom setting is valid because most interventions are adaptable to the multiple and inherent qualities of several students. From this assertion, one can undoubtedly affirm that self-monitoring and self-management approaches are adaptable to a variety of students towards the improvement of on-task behavior in students.

The essence of using the MotivAider by teachers is to improve the on-task behavior of students by increasing the academic performances and decreasing the exhibition of off-task behaviors and bolstering independence (Amato-Zech, Hoff, & Doepke, 2006). The MotivAider has been tipped to offer, to a greater extent, a majority of these desired qualities (MotivAider, 2017b). Descriptive studies have shown that the use of self-monitoring and self-management interventions to improving the on-task behavior of student offers less invasive and ethically acceptable avenues to intervene than teacher-centered approaches (Rock & Thead, 2007). As such, using the MotivAider as an intervention to on-task behavioral improvement offers a better self-monitoring avenue than alternative techniques (Amato-Zech et al., 2006). To affirm this, analytic studies on the impact of self-monitoring interventions, as opposed to teacher-medicated techniques on the responsiveness of students in on-task instructions, found a greater sense of

improvement in the self-reliance, responsibility, and initiative in several students (Falkenberg & Barbetta, 2013). Alternatively, researchers have argued that the inherent cognitive weaknesses in a majority of students with ADHD are proof to the poor academic performances exhibited by these students (Kofler et al., 2011). Therefore, an intervention that can augment their cognitive abilities will intrinsically boost their likelihood of having better academic performances. Studies have affirmed this view by correlating improved academic performances to the use of behavioral self-monitoring and self-management interventions (Rock & Thead, 2007). As such, the use of the MotivAider, as an intervention to on-task behavioral improvement is a valid approach.

The application of the MotivAider as self-monitoring intervention should entail the inherent aspect of this practice, which is self-observation and self-recording. Within the classroom setting, teachers can aid in the self-observation aspect by guiding students with ADHD on the desired behavior and the resultant desired response (Amato-Zech et al., 2006). By aiding students in self-observation and consequently letting them self-record the execution of their observation for future repeated prompts, teachers harness the desired application of MotivAider (MotivAider, 2017b). The MotivAider's use in improving academic performances within the classroom setting is valid. Research work on the use of similar self-monitoring interventions has centered on analyzing the resultant implication on-task and academic performance of students (McDougall et al., 2006). The academic performance and the productivity of these students as a result of self-monitoring and behavioral self-management approaches have also received to a great extent researchers' attention (Harris et al., 2005). Into the bargain, researchers have tackled the impact of self-monitoring interventions in improving the learning disabilities

and cognitive responses of students with mental disorders (Rouse, Everhart-Sherwood, & Alber-Morgan, 2014). Furthermore, researchers have proven that such interventions. when undertaken in self-contained classrooms with minimal distractions. have greater effectiveness as compared to the general classrooms (Moore, Anderson, Glassenbury, Lang, & Didden, 2013). Therefore, teachers using the MotivAider as a self-monitoring intervention to on-task behavioral responses are in line with the affirmations of previous studies.

The use of the MotivAider, which offers audio cues for prompting students, is in line with the widely practiced and highly effective approaches (McDougall et al., 2006). As such, teachers can use this intervention to augment the attentiveness, independence, and aid students in controlling their hyperactivity and in turn responding accordingly to instructions given. However, the practicability of teachers using MotivAider to improve on-task behavior by students may be challenged by the complexity of the classroom setting. The application of this intervention should minimize the disruption it could cause to a teacher's lesson, neither should its prompts impair the attentiveness of students to the teacher's instruction, it should also be adaptable to the student's classwork (Amato-Zech et al., 2006). Given these requirements, the MotivAider's invention took into consideration the need to be sublime in its prompting, privacy, and consistency to enhance attentiveness and focus to the desired change (MotivAider, 2017b). Based on this view, teachers can be allowed to use MotivAider in the classroom setting to improve on-task behavioral responses.

The Extent to Which the MotivAider Improves On-Task Behavior in Students with ADHD

The correlation between the use of MotivAider and the resultant improvements in students' cognitive abilities is of great importance in not only establishing the effectiveness of the device in augmenting these abilities but also as a behavioral self-monitoring intervention. In prior research work, researchers offered students a task to complete, a self-recording platform and auditory signal in separate and fixed times that students responded in affirming whether they were on-task (McDougall, 1998). Such approaches that rely on auditory prompts have been proven to have resounding implication in improving the on-task behavioral responses and the accuracy of responses given by students (Legge et al., 2010). The MotivAider offers a similar approach because it offers consistent, private, and less interruptive auditory prompts (MotivAider, 2017b). A good case to show such application was research that incorporated a MotivAider in improving the appropriate classroom behavior in a student with intellectual disorders (Christensen, Young, & Marchant, 2004). In this study, the researchers used this device in two-thirds of the students in providing prompts in fixed times to analyze and compare the behavioral responses of these students. The research's findings established that this technology had significant effects in increasing the students' behavior.

As well, some studies have specifically tackled the impact of self-monitoring interventions in improving the on-task behavior amongst students. Notably, Amato-Zech et al., (2006) used the MotivAider to analyze the effects of self-monitoring in three students with behavioral and learning disabilities. In this study, the researchers observed the self-observing and self-recording aspects of self-monitoring by providing the students

with the MotivAider to make the self-observation and a self-recording piece of paper (Amato-Zech et al., 2006). The MotivAider was set to vibrate on fixed intervals of three minutes and students were required to write on a self-recording paper as to whether they were on-task (with a 'Yes, I was attentive) or (a No, for I was not attentive). Based on the study findings, the on-task behavioral responses grew from 50% before the behavioral intervention was administered to above 70% during the administration of MotivAider. From this research, one can argue that an effective application of MotivAider in students with impaired cognitive responses can have resultant positive impacts by improving their on-task behavioral responses. In the case of Amato-Zech et al. (2006) researchers aimed at helping the autistic and students with various disabilities in first being able to use the device. It is essential in the application of such on-task behavioral interventions in fitting seamless to the classroom setting as argued in their study. Guided by theoretical thought, the researchers took the students through a class on how to use the device for self-recording and self-observation purposes before the study.

In a separate study on the impact of self-monitoring intervention to improve on-task behavioral responses on three, fifth and sixth graders who had autism and mental disorders, a significant correlation occurred with the resultant improved cognitive abilities (Legge et al., 2010). The study specifically aimed at assessing the resultant cognitive abilities in completing the mathematical assignments independently. Based on the MotivAider's inventor's guidelines on the portability of the device, the researchers let the three students wear the device. The prompts were pre-set to vibrate at fixed times for the students to undertake a self-recording of whether they were on-task or not (Legge et al., 2010). Based on the research's approach, there was a significant correlation between

the MotivAider used and the resultant increased on-task behavior among this students (Legge et al., 2010). The study also affirmed that the application of this self-monitoring intervention increased the arithmetic abilities of the students significantly in comparison to multiple baselines across students. This can be attributed the inherent advertised capabilities of the device in promoting focus to a targeted change in its users (MotivAider, 2017b). Another critique of self-monitoring interventions is their ability to offer sustained impacts on the on-task behavioral responses among students long after their application (Mirnasab & Bonab, 2011). In this study, the researchers recorded a sustained high percentage of performances of students for longer periods, even after the application of MotivAider as an assistive tool was discontinued. These recordings affirm the benefits that this device confers to a variety of students. Given the findings of this study, it is inherently valid for researchers to attribute the improvements in the responsibility, initiative, and the cognitive abilities of students with various intellectual disorders.

In a separate research study that sought to analyze the impact of withdrawing this device in the cognitive abilities of a student with a moderate intellectual disability, researchers affirmed that the use of this device has a lasting beneficial impact (Boswell, Knight, & Spriggs, 2013). The study used the MotivAider on the 11-year-old-boy as a tactile prompt, with the boy being subsequently required to record whether he was on-task or not in first, three minutes' intervals. The task being a mathematical assignment, researchers further extended the intervals to 15 minutes and further assessed the mathematical fluency of the student in handling his assignments before and after the intervention. The study established that the student's ability to self-monitor his on-task

behavior was significantly improved. Additionally, the study recorded a 100 percent growth in the mathematical fluency. As such, the use of MotivAider in boosting the on-task behavioral responses is valid, albeit there is limited research germane to the device's effectiveness.

CHAPTER 3

METHODS

Participants

For this study, there were two participants, an elementary-aged student, Adam, who had been identified as having ADHD, and his classroom teacher, Ms. Eva. The inclusion criteria for the student were: a) identification as having ADHD, b) exhibition of a high rate of off-task behavior, (c) enrolled as an elementary-aged student, d) demonstrated good attendance, and, e) parental informed consent for his participation. Ms Eva was selected as a participant since: a) she was Adam's regular classroom teacher, b) she gave informed signed consent to participate, and c) was willing implement the MotivAider procedures with Adam.

Adam was an 8 years old Caucasian male in 3rd grade. He had been diagnosed with ADHD in the 1st grade. His teacher indicated that he was performing at an average or above average 3rd grade level. Adam attended a general education classroom. Despite his ADHD diagnosis, Adam was not receiving any special education services. The teacher, Ms. Eva, reported that Adam exhibited a high rate of off-task behavior that was disruptive for the whole class. Ms. Eva further noted that Adam's off task behavior and her subsequent attempts to redirect Adam, interfered with her ability to deliver instruction to other students in the classroom.

Ms. Eva was a general education 3rd grade teacher who had almost two decades of experience. She had 20-25 students in her classroom, two of whom had disabilities; Adam, and another student, whom she reported as having a learning disability. Ms Eva was a certified in early childhood education, but had no training in special education. She

reported having a difficulty dealing with Adam and the other student with a disability.

Setting

This study took place in a public school in Eastern Tennessee. The student's 3rd grade classroom consisted of a total of 20-25 students. The interventions took place during Math class from 8:45am to 9:15am and Language Arts from 12:15pm to 12:45pm. Sessions were each 30 minutes long.

Materials

The materials used in this study consisted of three items. The first was a signaling device, the MotivAider (see APPENDIX C), a commercially available timer that could be set to emit a vibrating signal at specific time intervals. The MotivAider, which is a simple timer that vibrates like a phone at timed intervals to prompt the student or the teacher to do a specific behavior (e.g., paying attention) was used alternately by Adam and Ms. Eva to signal the passage of standard time intervals, beginning with 3 minutes, at which time Adam was to evaluate whether or not he had been On-Task during that interval. On those sessions when Adam used the MotivAider, Adam wore the device clipped to his belt. When Ms. Eva used the MotivAider she wore it clipped to her side and then verbally prompted Adam to evaluate his On-Task behavior during the preceding interval.

The second item was a Self-Monitoring recording (see APPENDIX A) sheet which is a checklist in student friendly language so the student can record his own on or off-task behavior during class, it had a table of three columns. The first column was with smiley face which denotes to the student: "I was on-task". The second column was with a sad face which denoted to the student: "I was off-task". The third column was with question mark which denoted to the student: "what does my teacher think about me being

on-task?"

The third item was the functional assessment screening tool (FAST) (Iwata & DeLeon, 2005) (see APPENDIX D) which is a brief interview instrument in which the interviewee is asked to respond to a series of questions that attempt to identify the function of the student's challenging behavior.

Dependent Measure

The dependent variable in this study was the amount of time on-task for Adam during instructional activities. On-task behavior is defined in systematic screening for behavior disorders (SSBD) manual (Walker & Severson, 1992), as academic engagement during small group instructions, whole group instructions, and seatwork (e.g., the student is looking at the teacher's direction, not talking out without raising his hand, not playing with objects, in his seat, and following directions). Off-task behavior is defined as: not engaging during academic activities (e.g., Looking outside the window during the instructions, talking to his peers during the instructions, playing with items on his table during the instructions, student is not doing what he supposed to do).

The investigator and the observer reviewed the definition of On-Task and Off Task behavior (or Academic Engaged/Not Engaged time from the observation manual of the SSBD. They then practiced the observation procedure using the video practice examples from the SSBD by using academic engagement time (AET) recording form from SSBD manual (Walker & Severson, 1992) which has the starting time, ending time, time on stopwatch, and length of the session. They conducted these practice observations until they achieved 80% or better interobserver agreement. Interobserver agreement was calculated by dividing the smaller number of minutes/seconds recorded by one observer

by the larger number of minutes/seconds recorded by the other observer and multiplying by 100 to yield a percentage of total duration agreement.

Observations were conducted during two instructional activities Math and Language Arts that occurred each day from 8:45am to 9:15am and 12:15pm to 12:45pm. They used the stopwatch feature to record the total duration of Adam's On-Task behavior. To record the behavior, the observers selected the clock/stopwatch feature of their respective cell phones and when they observed Adam, to be on task, they tapped the start button of the stopwatch program. When they observed Adam to be off task, they again tapped the start button to temporarily stop recording and when they observed Adam to again engage in On-Task behavior they tapped the start button. In this way, their stopwatch programs recorded the total duration of Adam's On-Task behavior for each session.

Procedures

Teacher and Student Training

Training was conducted for both Adam and Ms. Eva in the operation and use of the MotivAider. There was a single training session lasting approximately 45 minutes. The investigator conducted this session which included how to operate and wear the MotivAider. A mock instructional activity was used to demonstrate and practice the use of the MotivAider and to provide examples of On-Task and Off Task behaviors per the definition of Academic Engagement in the SSBD (Walker & Severson, 1992). During this practice session, Adam was also shown how to record his behavior on a self-recording checklist at the end of each MotivAider signal. The training session was conducted one day before the beginning of the study and before any data collection.

Teacher's Perception of the Student's Off Task Behavior Function

The functional assessment screening tool (FAST) (Iwata & DeLeon, 2005), is a brief interview instrument in which the interviewee is asked to respond to a series of questions that attempt to identify the function of the student's challenging behavior. FAST was used to evaluate the possible relationship between student behavior function and the effectiveness of the student vs teacher use of the MotivAider. FAST included a series of yes/no questions in three parts social influences, social reinforcement, and nonsocial. The investigator used the FAST to interview and record Ms. Eva's responses about Adam's off task behavior. This interview was conducted two days before the observations and MotivAider intervention was begun.

Intervention

The intervention had two conditions. In the first condition, the MotivAider was used by Adam himself to signal when he was supposed to evaluate his On-Task behavior during the preceding time interval. At the beginning of the session, Adam had to attach the MotivAider to his belt or pants waist, click the device to the "on position," and then wait until he received a vibration signal from the MotivAider. At that signal, Adam had to think about and record his on/off task behavior during that interval using the checklist referenced previously. In the second condition, the teacher, Ms Eva, wore the MotivAider at her waist. When she received a vibratory signal from the device, Ms Eva then looked immediately to Adam and verbally prompted him to go back On-Task or praised him if he was already On-Task during that preceding time interval.

The two conditions, the "student" use of the MotivAider and the "teacher" use of the device, were randomly alternated across the days of the study during the instructional activities. This random alternation was determined by the investigator using a random number generator application for the iPhone. This random schedule for the two intervention conditions was determined approximately 1 week prior to the beginning of the data collection and intervention procedures.

There were several phases of the intervention conditions. During phase 1, the student had to wear the MotivAider on his waist belt during the math class from 8:45am to 9:15am for 30 minutes. During this time the initial MotivAider signaling interval for both student and teacher use was 3 minutes. Every 3 minutes the MotivAider was set to signal either Adam or Ms. Eva. After receiving the signal directly or after being prompted by Ms. Eva., Adam would then record whether he was on or off task during that interval

on a checklist sheet. During this 3 minute interval phase, Adam could potentially record up to 10 instances of On-Task behavior (i.e., 30 minute session divided by 3 minute signaling intervals). At the end of a session, Ms. Eva would switch off the MotivAider and would confirm the student's recording sheet. If the student had at least 8 check marks in on-task behavior column, he earned an extra 10 minutes of computer time.

During the second intervention condition, the teacher wore the MotivAider during the 30-minute instructional activity. During that time, when the MotivAider vibrated, the teacher prompted Adam verbally. When Adam was on-task, Ms. Eva would praise him verbally for example by saying, "good job for being on-task." When Adam was off-task, Ms. Eva would remind him to go back on-task or to do what he supposed to do.

Replicate the Direct Effect of the Intervention

Once Adam had increased his On-Task behavior in the morning math class between 8:45am and 9:15am, the investigator applied the same procedures in Adam's language arts class between 12:15pm to 12:45pm.

Fading of the MotivAider

When Adam achieved the target level of on-task behavior (85% = 25:25mins) under the initial signaling interval of 3 minutes, the investigator increased the MotivAider signaling interval from 3 minutes to 5 minutes. As Adam continued to meet that On-Task criterion, the investigator increased the MotivAider signaling interval to 7 minutes and then finally to 10 minutes.

Maintenance

After the final reduction of the MotivAider signaling interval to 10 minutes, the investigator removed the MotivAider entirely, but continued to assess Adam's On-Task

behavior during math and language arts. This was done over the next 8 sessions, which were around 2 weeks in order to evaluate the maintenance of Adam's On-Task behavior.

Experimental Design

The basic design of this study was a single subject Alternating Treatments Design (Kennedy, 2005). The alternating treatments contrasted were Adam's use of the MotivAider and Ms. Eva's use of the device. Once the difference between the two conditions was clear, the more effective condition, Adam's use of the MotivAider was continued while Ms. Eva's use was discontinued. Maintenance of the On-Task behavior change was evaluated under successive adding conditions in which the time interval for the MotivAider signal was gradually increased from 3 to 5 to 7 to 10 minutes. A final phase in which all use of the MotivAider was discontinued was conducted over the last 8 observation sessions.

CHAPTER 4

RESULTS

On-Task Behavior

The percentages of On-Task behaviors were calculated as the total duration of On-Task behavior (recorded by the investigator) and then divided by the length of the instructional activity for that session. Table 1 shows the On-Task Behavior total minutes of the two intervention conditions (Adam's use of the MotivAider and Ms. Eva's use of the MotivAider). As can be seen from the data in Figure 1, both intervention conditions produced relatively high levels of On-Task behavior, whereas with the exception of one session, Adam's use of the MotivAider consistently produced the highest levels. As the MotivAider signaling interval was increased, Adam's On-Task remained within the original intervention levels. Even when the MotivAider was completely discontinued after 7 sessions, the On-Task behavior remained high and within original intervention levels.

Table 1. *On-Task Behavior Total Minutes*

Condition	Internal	Range	Average
Student	3 minutes	25:16 mins (84.2%) and 28:29 min (94.9%)	26:52 min = 89.6%
Student	5 minutes	26:12 mins (87.3%) and 28:13 min (94%)	27 mins = 90%
Student	7 minutes	23:10 mins (77.2%) and 28:16 min (94.2%)	26 mins = 86.75%
Student	10 minutes	29:05 mins (96.9%)	_____
Student	No MotivAider	26:46 mins (89.2%) and 29:45 min (99.1%)	28:53 mins = 95.1%
Teacher	3 minutes	18:38 mins (62.1%) and 29:46 min (99.2%)	21:39 mins = 71.3%

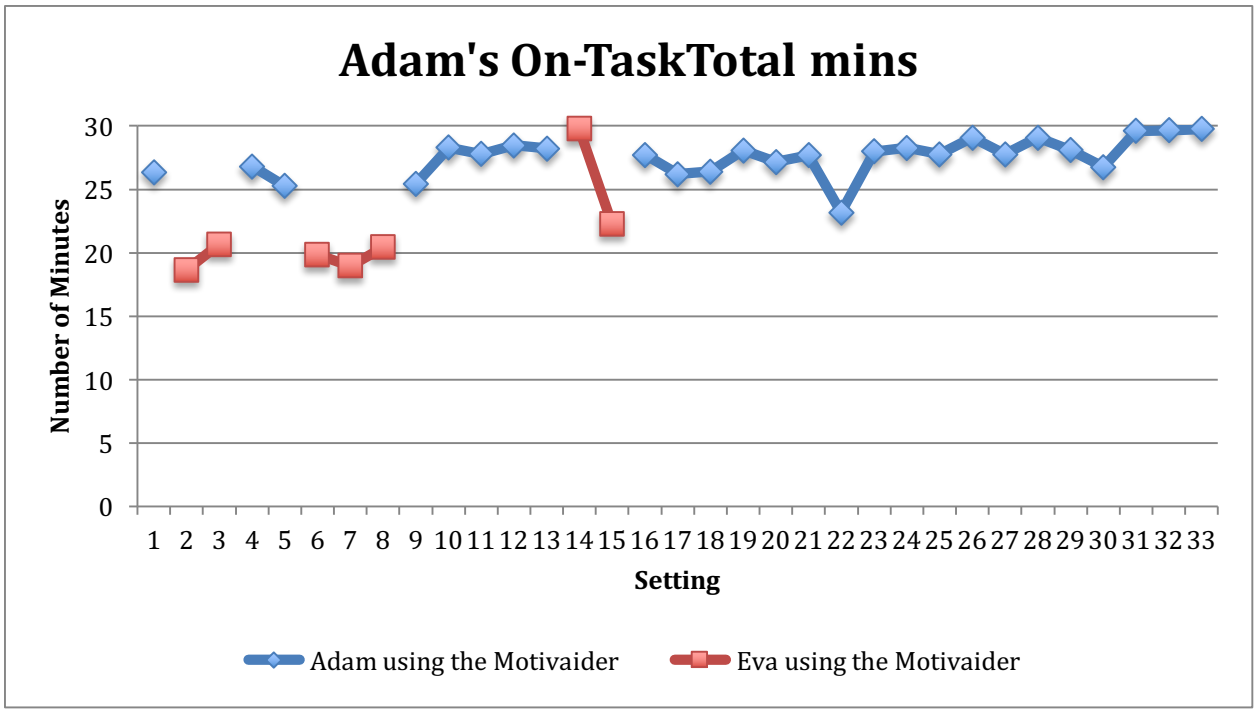

Figure 1. Adam's On-Task behavior level.

During the student use of the MotivAider, Adam's on-task behavior had a range between 25:16 mins (84.2%) and 28:29 min (94.9%) average of 26:52 min = 89.6% during the 3 min interval. During the 5 min interval, Adam on-task behavior had range between 26:12 min (87.3%) and 28:13 min (94%) with average of 27 mins = 90%. During the 7 min interval, Adam on-task behavior had range between 23:10 mins (77.2%) and 28:16 min (94.2%) with average of 26 min = 86.75%. During the 10 min interval, Adam's on-task behavior was 29:05 mins(96.9%). When the MotivAider was withdrawn, Adam's on-task behavior had range between 26:46 min (89.2%) and 29:45 min (99.1%) with average of 28:53 min = 95.1%.

During the teacher use of the MotivAider, Adam on-task behavior had range between 18:38 mins (62.1%) and 29:46 min (99.2%) with average of 21:39 min= 71.3%

Replicate the Direct Effect of the Intervention

During the afternoon setting, Adam on-task behavior had range between 26:12 min (87.3%) and 29:45 min (99.1%) with average of 27:27 min = 93%.

The Functional Assessment Screening Tool (FAST)

The scale scoring summary for questions which had a "yes" answer were 5 of 8 for social reinforcement (attention), 4 of 8 for social reinforcement (access to specific activity/item), 6 of 8 for social reinforcement (escape), 4 of 6 for automatic reinforcement (sensory stimulation), and 1 of 6 for automatic reinforcement (pain attenuation).

Inter-Observer Agreement (IOA)

The interobserver agreement data were collected for 30% of the observations. IOA was calculated by dividing the smaller duration of On-Task behavior (recorded by one observer) by the larger duration of (recorded by the other observer). The interobserver agreement were conducted seven times during phase 1 and twice during phase 2. Across the interobserver agreement sessions, IOA had a mean of 95.89% agreement with a range of 92.4% to 99.6%. The individual IOA results are shown below in Table 2.

Table 2. *Total Duration Interobserver Agreement*

Setting number	Investigator	Co-observer	IOA %
1	26:20 mins	24:21 mins	92.4%
4	26:48 mins	26:53 mins	99.6%
6	19:50 mins	20:55 mins	94.8%
9	25:25 mins	23:40 mins	93.11%
13	28:13 mins	27:14 mins	96.5%
14	29:46 mins	29:21 mins	98.6%
18	28:04 mins	26:57 mins	96%
20	27:42 mins	27:04 mins	97.7%
25	27:46 mins	29:26 mins	94.3%

Social Validity

Social Validity was evaluated in two ways. First, the investigator conducted an interview with Ms. Eva and asked her to indicate a percentage of time that indicated an acceptable level of On-Task behavior during the targeted instructional activities ("What is a good student's on-task behavior percentages that you will be fine with?"). Ms. Eva indicated that the level of On-Task behavior she would find acceptable as 85% of the instructional activity which equal 25:25 mins of the 30 mins session.

A second evaluation of the social validity of the intervention effects involved using the normative scores for Adam's age group for On-Task behavior as shown in the SSBD manual for Academic Engaged Time. For Adam's grade level, the SSBD indicated that AET was 75.19% for students in grades 1 through 3 which equal 22:30 mins of the 30 mins session (Walker & Severson, 1992).

CHAPTER 5

DISCUSSION

The purpose of this study was to evaluate the effect of using the MotivAider as a tactile self-monitoring device to increase on-task behavior for student with ADHD. The Alternating Treatments Design (Kennedy, 2005) which had been used in this study to compare the use of the MotivAider in two condition: (a) the use of the MotivAider by the student and (b) the use of the MotivAider by the teacher. The finding of this study indicate that using the self-monitoring intervention with the MotivAider as tactile device resulted in increasing of on-task behavior as shown in both (Legge, DeBar, & Alber-Morgan, 2010) and (Amato-Zech, Hoff, & Doepke, 2006) studies' results.

Student Use of the MotivAider

The first study question was to evaluate using the MotivAider by a student as a tactile, self- monitoring device for on-task behavior. The implications of the MotivAider were positive. The results indicated that the student's on-task behavior had improved through the interventions sessions. The investigator noticed that the student enjoyed using the MotivAider. He kept asking the teacher when he could use it during the study. Before the instructional activity begun and when student was wearing the MotivAider, he explained to his peers what the device did and how it worked. After one week of the study, the teacher reported that the MotivAider was helpful and if she could use it in different setting. In session 22, the student scored 23:10 mins (77.2%) of time on-task. During that session, the investigator noticed that when assigning Adam to work in a group with particular student, the student started engaging in disruptive behavior, which, in turn, resulted in disrupting Adam. In the last session when Adam scored 29:45 min

(99.1%) of time on-task, he was taking a test. During the test, the students should be quit which can explain why Adam scored high percentage. Even if the last session point omitted, the results still indicated the effectiveness of the MotivAider.

Using the MotivAider by the Teacher

The second study question was to evaluate using the MotivAider by the teacher in the form of a reminder to prompt the student's on-task behavior. The results indicated that when the MotivAider had been used by the teacher, the student scored between 18:38 mins (62.1%) and 22:16 mins (74.2%) if the session 14 data point was omitted. The reason for omitting the session 14 data point was the same reason for omitting last session data point which was during testing. When the functional relationship was established between the two intervention conditions, the investigator discontinued the teacher condition. The reason being, the on-task behavior remained under the target level for this study. The investigator noticed that the teacher couldn't keep up with the prompting due to having a 22 students in her classroom without having an assistant to help her with students. It's logical because while the teacher was working with another student on the other side of the classroom, the MotivAider sent a signal which meant "prompt the student." The teacher couldn't stop in middle of helping the student and move to Adam to prompt him.

The function of student behavior and the MotivAider

The functional screening tool, FAST, for off-task behavior scored high for two different functions seeking attention and escape from task demands or access to social attention. Are these functions of off-task behavior accurate? Maybe or maybe not for two main reasons. The first reason is that a single functional behavioral assessment scale was

used instead of doing full functional behavioral assessment. The second reason is that the functions had not been the test which is a main part of FBA to write the hypothesis statement of the function of the behavior and testing the accuracy of it. If these functions were accurate and had been tested, could the MotivAider address them? Based on the study results, the MotivAider was capable on addressing these function in student's condition. During the teacher condition, the MotivAider seemed to be not very effective. The FAST indicated that the function of the student's off-task behavior was seeking attention. If that was accurate, it might be the reason that the MotivAider wasn't effective when the teacher used it because the student is acting out with "off-task" behavior to access the teacher attention.

Limitations

The first limitation was the numbers of participant which preclude the generalization of the impact of the intervention. The second limitation was the number of students in classroom during the teacher condition which made the teacher unable to keep up with the prompting. The third limitation was the co-observer's family circumstances which precluded the conducting IOA for more than 9 sessions. The last limitation was only one measure of functional behavior assessment that had been used and not fully functional behavioral assessment.

Future Researches

Future researchers should consider using an ABAB design to evaluate the use of the MotivAider by teachers and students. This design could show the relationship between the use of the MotivAider to the baseline. When evaluating the effectiveness of this intervention for the teacher, the researchers should consider applying it in small

group or one-on-one settings. The researchers should also consider conducting this intervention for a large group of participants with different disabilities in different settings to generalize the effect of the MotivAider across settings and disabilities. And, finally, when evaluating the effectiveness of this intervention on addressing particular function, the researchers should consider conducting a full functional behavioral assessment (FBA) to make sure that the MotivAider is capable to address such function.

REFERENCES

Adams, Z. W., Milich, R., & Fillmore, M. T. (2010, October). Examining Manual and Visual Response Inhibition Among ADHD Subtypes. *Journal of Abnormal Child Psychology, 39*(7), 971-83.

Aebi, M., Kuhn, C., Metzke, C. W., Stringaris, A., Goodman, R., & Steinhausen, H. C. (2012). The use of the development and well-being assessment (DAWBA) in clinical practice: a randomized trial. *European child & adolescent psychiatry*, *21*(10), 559-567.

Amato-Zech, N. A., Hoff, K. E., & Doepke, K. J. (2006). Increasing On-task Behavior in the Classroom: Extension of Self-monitoring Strategies. *Psychology in the Schools, 43*(2), 211-221.

APA, A. P. (1994). *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV)* (Vol. 4). Washington, DC: American Psychiatric Association.

Barbaresi, W. J., Katusic, S. K., Colligan, R. C., & Pankratz, V. S. (2002, March). How Common is Attention-Deficit/Hyperactivity Disorder? Incidence in a Population-Based Birth Corhort in Rochester, Minn. *Archives of Pediatrics & Adolescent Medicine, 156*(3), 217-24.

Barkley, R. A. (2014). *Attention-Deficit Hyperactivity Disorder: A Handbook for Diagnosis and Treatment.* New York : Guilford Publications.

Barkley, R. A., DuPaul, G. J., & McMurray, M. B. (1990). Comprehensive Evaluation of Attention Deficit Disorder with and without Hyperactivity as Defined by Research Criteria. *Journal of Consulting and Clinical Psychology, 58*, 775-789.

Bellini, S., & McConnell, L. L. (2010). Strength-Based Educational Programming for Students with Autism Spectrum Disorders: A Case for Video Self-Modeling. *Preventing School Failure, 54*(4), 220-227.

Biederman, J., Faraone, S. V., Spencer, T., Wilens, T., Normal, D., Lapey, K. A., . . . Doyle, A. (1993). Patterns of Psychiatric Comorbidity, Cognition, and Psychosocial Functioning in Adults with Attention Deficit Hyperactivity Disorder. *American Journal of Psychiatry, 150*(12), 1792-1798.

Biederman, J., Newcorn, J., & Sprich, S. (1991, May). Comorbidity of Attention Deficit Hyperactivity Disorder with Conduct, Depressive, Anxiety, and Other Disorders. *The American Journal of Psychiatry, 148*(5), 564-77.

Boswell, M. A., Knight, V., & Spriggs, A. D. (2013). Self-monitoring of On-task Behaviors Using the MotivAider® by a Middle School Student with a Moderate Intellectual Disability. *Rural Special Education Quarterly, 32*(2), 23 - 30. doi:10.1177/875687051303200205

Brown, R. T., & Perrin, J. M. (2007, Jan/Feb). Measuring Outcomes in Attention-Deficit/Hyperactivity Disorder. *Ambulatory Pediatrics, suppl. Measuring Outcomes in Attention Deficit Hyperactivity, 7*(1), 57-59.

Bruhn, A., & Watt, S. (2012). Improving Behavior by Using Multicomponent Self-monitoring within a Targeted Reading Intervention. *Behavioral Disorders, 38*(1), 3-17.

Buggey, T. (2005). Effectiveness of video self-modeling to promote social initiations by 3-year-olds with autism spectrum disorders. *Focus on Autism and Other Developmental Disabilities, 20*, 180-204.

Carr, S., & Punzo, R. (1993). The Effects of Self-Monitoring of Academic Accuracy and Productivity on the Performance of Students with Behavioral Disorders. *Behavioral Disorders, 18*(4), 241-250.

Carter, C. S., Robertson, L. C., Nordahl, T. E., & O'Shora-Celeya, L. (1993). Abnormal Processing of Irrelevant Information in Schizophrenia: The Role of Illness Subtype. *Psychiatry Research, 48*(1), 17-26.

Cherkasova, M. V., & Hechtman, L. (2009, October). Neuroimaging in Attention-Deficit Hyperactivity Disorder: Beyond the Frontostriatal Circuitry. *Canadian Journal of Psychiatry, 54*(10), 651-64.

Christensen, L., Young, K., & Marchant, M. (2004). The Effects of a Peer-Mediated Positive Behavior Support Program on Socially Appropriate Classroom Behavior. *Education and Treatment of Children, 27*, 199-234.

Cleave, J. V., & Leslie, L. K. (2008, January). Approaching ADHD as a Chronic Condition: Implications for Long-term Adherence. *Pediatric Annals, 37*(1).

Coghill, D. R. (2005, June). Delay of Reinforcement Gradients and Attention-Deficit/Hyperactivity Disorder (ADHD): The Challenges of Moving from Causal Theories to Causal Models. *Behavioral and Brain Sciences, 28*(3), 428-429.

Cowen, P., Harrison, P., & Burns, T. (2012). "Drugs and Other Physical Treatments. *Shorter Oxford Textbook of Psychiatry, 6*, 546.

Daly, B. P., Creed, T., Xanthopoulos, M., & Brown, R. T. (2007, March). Psychosocial Treatments for Children with Attention Deficit/Hyperactivity Disorder. *Neuropsychology Review, 17*(1), 73-89.

Dobson, K. (2001). *Handbook of Cognitive-Behavioral Therapies* (Vol. 2). New York: Guilford.

Falkenberg, C. A., & Barbetta, P. M. (2013). The Effects of a Self-Monitoring Package on Homework Completion and Accuracy of Students with Disabilities in an Inclusive General Education Classroom. *Journal of Behavioral Education, 22*(3), 190-210.

Faraone, S. (2011). Chapter 25: Epidemiology of Attention Deficit Hyperactivity Disorder". In M. Tsuang, M. Tohen, & P. Jones, *Textbook of Psychiatric Epidemiology* (3rd ed., p. 450). New York: John Wiley & Sons.

Faraone, S. V., Biederman, J., & Wozniak, J. (2012, December). Examining the Comorbidity Between Attention Deficit Hyperactivity Disorder and Bipolar I

Disorder: A Meta-Analysis of Family Genetic Studies. *The American Journal of Psychiatry, 169*(12), 1256-66.

Faraone, S. V., Kunwar, A., Adamson, J., & Biederman, J. (2009, April). Personality Traits Among ADHD Adults: Implications of Late-Onset and Subthreshold Diagnoses. *Psychological Medicine, 39*(4), 685-693.

Farrell, A., & McDougall, D. (2008). Self-monitoring of Pace to Improve Math Fluency of High School Students with Disabilities. *Behavioral Analysis in Practice, 1*(2), 26-35.

Fischer, M., Barkley, R. A., Smallish, L., & Fletcher, K. (2002, May). The Persistence of Attention-Deficit/Hyperactivity Disorder into Young Adulthood as a Function of Reporting Source and Definition of Disorder. *Journal of Abnormal Psychology, 111*(2), 279-289.

Fowler, M. (2010). Increasing on-task performance for students with ADHD. *The Education Digest, 76*(4), 44.

Fox, E. (1993). Attention Bias in Anxiety: Selective or Not? *Behavior Research and Therapy, 31*(5), 487-493.

Frazier, T. W., & Demaree, H. A. (2004). Meta-Analysis of Intellectual and Neuropsychological Test Performance in Attention-Deficit/Hyperactivity Disorder. *Neuropsychology, 18*(3), 543–555.

Garcia-Sanchez, C., Estevez Gonzalez, A., Suarez Romero, E., & Junque, C. (1997). Right Hemisphere Dysfunction in Subjects with Attention Deficit Disorder with and without Hyperactivity. *Journal of Child Neurology, 12*, 107-115.

Glynn, E. L., Thomas, J. D., & Shee, S. M. (1973). Behavioral Self-Control of On-task Behavior in an Elementary Classroom. *Journal of Applied Behavior Analysis, 6*(1), 105-113.

Green, M. J. (2014). The Effects of Direct Instruction and Self-Management (DS) on the Organizational Skills of Elementary Students with Organizational Impairment. *Doctoral Dissertation John Hopkins University*.

Gureasko-Moore, S., DuPaul, G., & White, G. (2007). Self-management of Classroom Preparedness and Homework: Effects on School Functioning of Adolescents with Attention Deficit Hyperactivity Disorder. *School Psychology Review,, 36*, 647-644.

Hallahan, D., & Hudson, K. (2002). *Self-Monitoring of Attention* (Division for Learning Disabilities of the Council for Exceptional Children ed.). Virginia: University of Virginia.

Harris, K. R., Danoff Friedlander, B., Saddler, B., Frizzelle, R., & Graham, S. (2005). Self-monitoring of attention versus self-monitoring of academic performance: Effects among students with ADHD in the general education classroom. The Journal of Special Education, 39(3), 145-157.

Harris, K. R., Reid, R. R., & Graham, S. (2004). Self-regulation Among Students with LD and ADHD. *Learning about Learning Disabilities, 3*, 167-195.

Hutchings, J., Daley, D., Jones, K., & Thompson, M. (2009). Attention Deficit Hyperactivity Disorder (ADHD) in Pre-school Children, Current Findings, Recommended Interventions and Future. *Child: Care, Health and Development*. Retrieved from 10.1111/j.1365-2214.2009.00938

Iwata, B., & DeLeon, I. (2005). *The functional analysis screening tool*. Gainesville, FL: The Florida Center on Self-Injury, University of Florida.

Jensen, P. S., Garcia, J. A., Glied, S., Crowe, M., Foster, M., Schlander, M., ... & Hechtman, L. (2005). Cost-effectiveness of ADHD treatments: findings from the multimodal treatment study of children with ADHD. American Journal of Psychiatry, 162(9), 1628-1636.

Knouse, L. E., & Safren, S. A. (2010, September 1). Current Status of Cognitive Behavioral Therapy for Adult Attention-Deficit Hyperactivity Disorder. *Psychiatric Clinics of North America- Journals, 33*(3), 497–509. doi:10.1016/j.psc.2010.04.001

Kofler, M. J., Rapport, M. D., Bolden, J., Sarver, D. E., Raiker, J. S., & Alderson, R. M. (2011). Working memory deficits and social problems in children with ADHD. Journal of abnormal child psychology, 39(6), 805-817.

Kooij, S., Bejerot, S., Blackwell, A., & Caci, H. (2010). European Consensus Statement on Diagnosis and Treatment of Adult ADHD: The European Network Adult ADHD. *BMC Psychiatry, 1067*. doi:10.1186/1471-244X-10-67

Lahey, B. B., Pelham, W. E., Loney, J., & Kipp, H. (2004, November). Three-Year Predictive Validity of DSM-IV Attention Deficit Hyperactivity Disorder in Children Diagnosed at 4-6 Years of Age. *The American Journal of Psychiatry, 161*(11), 2014-20.

Legge, D. B., DeBar, R. M., & Alber-Morgan, S. R. (2010). The Effects of Self-monitoring with a MotivAider® on the On-task Behavior of Fifth and Sixth Graders with Autism and Other Disabilities. *Journal of Behavior Assessment and Intervention in Children, 1*(1).

McDonnell, M. A., & Glod, C. (2003, October-December). Prevalence of Psychopathology in Preschool-Age Children. *Journal of Child and Adolescent Psychiatric, 16*(4), 141-52.

McDougall, D. (1998). Research on Self-management Techniques Used by Students with Disabilities in General Education Settings: A Descriptive Review. *Remedial and Special Education, 19*(5), 310-320.

McDougall, D., Skouge, J., Farrell, A., & Hoff, K. (2006). Research on Self-Management Techniques Used by Students with Disabilities in General Education Settings: A Promise Fulfilled? *Journal of the American Academy of Special Education Professionals, 1*, 36-73.

Meichenbaum, D. (1977). *Cognitive Behavior Modification.* New York, NY: Plenum Press.

Mirnasab, M. M., & Bonab, B. G. (2011). Effects of Self-monitoring Technique on Inattentive Behaviors of Students with Attention Deficit Hyperactivity Disorder. *Iranian Journal of Psychiatry, 6*(2), 84-86.

Mooney, P., Ryan, J. B., Uhing, B. M., Reid, R., & Epstein, M. H. (2005). A Review of Self-management Interventions Targeting Academic Outcomes for Students with Emotional and Behavioral Disorders. *Journal of Behavioral Education, 14*(3), 203-221.

Moore, D. W., Anderson, A., Glassenbury, M., Lang, R., & Didden, R. (2013). Increasing On-task Behavior in Students in a Regular Classroom: Effectiveness of a Self-management Procedure Using a Tactile Prompt. *Journal of Behavioral Education, 22*(4), 302-311.

Mota, V. L., Schachar, R., Logan, G. D., Tannock, R., & Klim, P. (2000, June). Confirmation of an Inhibitory Control Deficit in Attention-Deficit/Hyperactivity Disorder. *Journal of Abnormal Child Psychology, 28*(3), 227-35.

MotivAider. (2017). *MotivAider®: Making People Better, One Habit at a Time*. (Behavioral Dynamics) Retrieved October 11, 2017, from Habitchange.com: http://habitchange.com/

MotivAider. (2017b). *About the MotivAider*. (Behavioral Dynamics) Retrieved October 11, 2017, from Behavioral Dynamics: http://habitchange.com/MotivAider.php

Nigg, J. T., Quamma, J. P., Greenberg, M. T., & Kusche, C. A. (1999, February). A Two-year Longitudinal Study of Neuropsychological and Cognitive Performance in Relation to Behavioral Problems and Competencies in Elementary School Children. *Journal of Abnormal Child Psychology, 27*(1).

Pelham, W. J., Wheeler, T., & Chronis, A. (1998, June). A Review of Empirically Supported Psychosocial Treatments for Attention Deficit Hyperactivity Disorder. *Journal of Clinical Child Psychology, 27*(2), 190-205.

Posserud, M. B., Ullebø, A. K., Plessen, K. J., Stormark, K. M., Gillberg, C., & Lundervold, A. J. (2014). Influence of assessment instrument on ADHD diagnosis. European child & adolescent psychiatry, 23(4), 197-205.

Rafferty, L. (2010). Step by step: Teaching Students to Self-monitor. *Teaching Exceptional Children, 43*(2), 50-58.

Ramos, R., Freire, C., Julvez, J., Fernández, M. F., García-Esteban, R., Torrent, M., ... & Olea, N. (2013). Association of ADHD symptoms and social competence with cognitive status in preschoolers. European child & adolescent psychiatry, 22(3), 153-164.

Rappley, M. D. (2005, January 13). Attention Deficit–Hyperactivity Disorder. *The New England Journal of Medicine, 352*, 165-173. doi:10.1056/NEJMcp032387

Rock, M. L., & Thead, B. K. (2007). The Effects of Fading a Strategic Self-Monitoring Intervention on Students' Academic Engagement, Accuracy, and Productivity. *Journal of Behavioral Education, 16*(4), 389-412.

Rouse, C. A., Everhart-Sherwood, J. M., & Alber-Morgan, S. R. (2014). Effects of Self-Monitoring and Recruiting Teacher Attention on Pre-Vocational Skills. *Education and Training in Autism and Developmental Disabilities, 49*(2), 313-327.

Safren, S., Sprich, S., Mimiaga, M., Surman, C., Knouse, L., Groves, M., & Otto, M. (2010). Cognitive Behavioral Therapy vs Relaxation With Educational Support for Medication-Treated Adults With ADHD and Persistent SymptomsA Randomized Controlled. *Journal of the American Medical Association, 304*(8), 875–880. doi:doi:10.1001/jama.2010.1192

Shekim, W. O., Asarnow, R. F., Hess, E., & Zaucha, K. (1990). A Clinical and Demographic Profile of a Sample of Adults with Attention Deficit Hyperactivity Disorder, Residual State. *Comprehensive Psychiatry, 31*(5), 416-425.

Slattery, L., Crosland, K., & Iovannone, R. (2016, July). An Evaluation of a Self-Management Intervention to Increase On-Task Behavior With Individuals Diagnosed With Attention-Deficit/Hyperactivity Disorder. *Journal of Positive Behavior Interventions, 18*(3), 168.

Steinhausen, H.-C. (2009, November). The Heterogeneity of Causes and Courses of Attention-Deficit/Hyperactivity Disorder. *Acta Psychiatrica Scandinavica, 120*(5), 392-399.

Walker, H. M., & Severson, H. H. (1992). *Systematic screening for behavior disorders (SSBD)*. Sopris West, 1140 Boston Ave., Longmont, CO 80501.

Young, S., Moss, D., Sedgwick, O., Fridman, M., & Hodgkins, P. (2015, January). A Meta-Analysis of the Prevalence of Attention Deficit Hyperactivity Disorder in Incarcerated Populations. *Psychological Medicine, 45*(2), 247-258.

Zylowska, L., Ackerman, D., & Yang, M. (208). Mindfulness Meditation Training in Adults and Adolescents with ADHD: A Feasibility Study. *Journal of Attention Disorder, 11*(6), 737-746.

APPENDIXES

APPENDIX A: SELF-RECORDING SHEET

On-Taskand Respectful! 	**Disrespectful/Not on-task** 	**My teacher said. . .** ?
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

I got _____ points!

I could earn extra Computer Time!!!

APPENDIX B: ACADEMIC ENGAGED TIME RECORDING FORM

Systematic Screening for Behavior Disorders
ACADEMIC ENGAGED TIME (AET) RECORDING FORM*

SESSION #2

Date _____

Time Start _____ Time Stop _____ Length of Session _____

_____ ÷ _____ = _____ x 100 = _____

Time on Stopwatch | Length of Session | AET | % AET

Convert time to total # of seconds (i.e., minute equals 60 seconds) before computing. Divide time on stopwatch by total time observed.

Classroom Activity During Observation

_____

_____

Total Time Engaged for Sessions 1 & 2 = _____ seconds = _____ Total AET

Total Time Observed for Sessions 1 & 2 = _____ seconds

Average Percent AET for Sessions 1 & 2 = Total AET _____ x 100 = _____ Percent AET

APPENDIX C: THE MOTIVAIDER DEVICE

The photo was provided by Behavioral Dynamics, Inc.

APPENDIX D: FUNCTIONAL ASSESSMENT SCREENING TOOL (FAST)

FUNCTIONAL ASSESSMENT SCREENING TOOL (FAST)

Name:_____ Age: _____ Date:_____

Behavior Problem: _____

Informant:_____ Interviewer:_____

To the Interviewer: The Functional Analysis Screening Tool (FAST) is designed to identify a number of factors that may influence the occurrence of problem behaviors. It should be used only as an initial screening toll and as part of a comprehensive functional assessment or analysis of problem behavior. The FAST should be administered to several individuals who interact with the person frequently. Results should then be used as the basis for conducting direct observations in several different contexts to verify likely behavioral functions, clarify ambiguous functions, and identify other relevant factors that may not have been included in this instrument.

To the Informant: After completing the section on "Informant-Person Relationship," read each of the numbered items carefully. If a statement accurately describes the person's behavior problem, circle "Yes." If not, circle "No." If the behavior problem consists of either self-injurious behavior or "repetitive stereotyped behaviors," begin with Part I. However, if the problem consists of aggression or some other form of socially disruptive behavior , such as property destruction or tantrums, complete only Part II.

Informant-Person Relationship

Indicate your relationship to the person: _____Parent _____Teacher/Instructor _____Residential Staff _____Other

How long have you known the person? _____Years _____Months

Do you interact with the person on a daily basis? _____Yes _____No

If "Yes," how many hours per day?_____ If "No," how many hours per week? _____

In what situations do you typically observe the person? (Mark all that apply)

_____Self-care routines _____Academic skills training _____Meals _____When (s)he has nothing to do

_____Leisure activities _____Work/vocational training _____Evenings _____Other:_____

Part I. Social Influences on Behavior

1.	The behavior usually occurs in your presence or in the presence of others	Yes	No
2.	The behavior usually occurs soon after you or others interact with him/her in some way, such as delivering an instruction or reprimand, walking away from (ignoring) the him/her, taking away a "preferred" item, requiring him/her to change activities, talking to someone else in his/her presence, etc.	Yes	No
3.	The behavior often is accompanied by other "emotional" responses, such as yelling or crying	Yes	No

Complete Part II if you answered "Yes" to item 1, 2, or 3. Skip Part II if you answered "No" to all three items in Part I.

Part II. Social Reinforcement

4.	The behavior often occurs when he/she has not received much attention	Yes	No
5.	When the behavior occurs, you or others usually respond by interacting with the him/her in some way (e.g., comforting statements, verbal correction or reprimand, response blocking, redirection)	Yes	No
6.	(S)he often engages in other annoying behaviors that produce attention	Yes	No
7.	(S)he frequently approaches you or others and/or initiates social interaction	Yes	No
8.	The behavior rarely occurs when you give him/her lots of attention	Yes	No
9.	The behavior often occurs when you take a particular item away from him/her or when you terminate a preferred leisure activity (If "Yes," identify:_____)	Yes	No
10.	The behavior often occurs when you inform the person that (s)he cannot have a certain item or cannot engage in a particular activity. (If "Yes," identify:_____)	Yes	No
11.	When the behavior occurs, you often respond by giving him/her a specific item, such as a favorite toy, food, or some other item. (If "Yes," identify:_____)	Yes	No
12.	(S)he often engages in other annoying behaviors that produce access to preferred items or activities.	Yes	No
13.	The behavior rarely occurs during training activities or when you place other types of demands on him/her. (If "Yes," identify the activities: ____self-care ____academic ____work ____other)	Yes	No

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14.	The behavior often occurs during training activities or when asked to complete tasks.	Yes	No
15.	(S)he often is noncompliant during training activities or when asked to complete tasks.	Yes	No
16.	The behavior often occurs when the immediate environment is very noisy or crowed.	Yes	No
17.	When the behavior occurs, you often respond by giving him/her brief "break from an ongoing task.	Yes	No
18.	The behavior rarely occurs when you place few demands on him/her or when you leave him/her alone.	Yes	No

Part III. Nonsocial (Automatic)Reinforcement

19.	The behavior occurs frequently when (s)he is alone or unoccupied	Yes	No
20.	The behavior occurs at relatively high rates regardless of what is going on in his/her immediate surrounding environment	Yes	No
21.	(S)he seems to have few known reinforcers or rarely engages in appropriate object manipulation or "play" behavior.	Yes	No
22.	(S)he is generally unresponsive to social stimulation.	Yes	No
23.	(S)he often engages in repetitive, stereotyped behaviors such as body rocking, hand or finger waving, object twirling, mouthing, etc.	Yes	No
24.	When (s)he engages in the behavior, you and others usually respond by doing nothing (i.e., you never or rarely attend to the behavior.)	Yes	No
25.	The behavior seems to occur in cycles. During a "high" cycle, the behavior occurs frequently and is extremely difficult to interrupt. During a "low" cycle the behavior rarely occurs.	Yes	No
26.	The behavior seems to occur more often when the person is ill.	Yes	No
27.	(S)he has a history of recurrent illness (e.g., ear or sinus infections, allergies, dermatitis).	Yes	No

Scoring Summary

Circle the items answered "Yes." If you completed only Part II, also circle items 1, 2, and 3

								Likely Maintaining Variable
1	2	3	4	5	6	7	8	Social Reinforcement (attention)
1	2	3	9	10	11	12	13	Social Reinforcement (access to specific activities/items)
1	2	3	14	15	16	17	18	Social Reinforcement (escape)
19	20	21	22	23	24			Automatic Reinforcement (sensory stimulation)
19	20	24	25	26	27			Automatic Reinforcement (pain attenuation)

Comments/Notes:_____

_____

_____

_____

_____

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