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Use of a Daily Behavior Report Card and Response Dependent Fading to Increase and Maintain
Academic Engagement in an Elementary Student with Developmental Delay

A thesis

presented to

the faculty of the Department of Special Education

In partial fulfillment

of the requirements for the degree

Master of Arts in Special Education

by

Ziyad Alrumayh

December 2018

Dr. James Fox, Chair

Dr. Tina Hudson

Dr. Sarah Hitt

Key Words: Daily Behavior Report Card, Response Dependent Fading System, Academic Engagement, behavior challenges, and ADHD

ABSTRACT

Use of a Daily Behavior Report Card and Response Dependent Fading to Increase and Maintain

Academic Engagement in an Elementary Student with Developmental Delay

by

Ziyad Alrumayh

The initial and maintenance effects of a Daily Behavior Report Card (DBRC) intervention and fading procedure on Academic Engaged Time (AET) of a 6-year-old boy with Developmental Delay and Attention Deficits were evaluated with a reversal design. Following an initial baseline, the DBRC was implemented and then completely removed followed by reapplication of the DBRC. Subsequently, the report card was gradually reduced in the frequency of its use from very daily to every other day. Increased AET reliably varied with the application and then removal of the DBRC. Whereas complete removal of the DBRC resulted in substantial decreases in AET, response dependent fading of the card was associated with AET of 80% or above. Teacher intervention ratings demonstrated social validity of the intervention in terms of its effectiveness, acceptability and efficiency. Research and practical issues are discussed.

DEDICATION

This thesis is dedicated to my mother, Hessa Alblehed, father, Saleh Alrumayh, to my entire family, and my friend Khaled Almuaigl for providing the necessary support required throughout the learning process. Through their support and unconditional love, they have set a good example towards enlightening me on how to work hard for the things I aspire to achieve. Finally, I would also like to thank my colleagues and friends whose names have not been mentioned here due to paucity of space but have in, various ways, contributed to the thesis. I would like to reiterate that their kindness and commitment to my academic journey are invaluable and I will forever be indebted to you.

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CHAPTER 1

INTRODUCTION

Developmental Delay

Developmental delay is a condition when a child exhibits substantial lag in achieving certain cognitive or physical milestones which become increasingly noticeable over the initial months of infancy. Children do not have any fixed time-table to develop the skills. It is normal to expect some variation in their development as each child differs from another (Dyck & Piek, 2014). And at times, the developmental delays are not usually the cause of major concern as the differences are marginal and get made-up with time. However, it emerges as a more serious issue when a child is consistently behind in basic skills like walking, reading or speaking in comparison to his peers (Koul, Al-Yahmedy, & Al-Futaisi, 2012).

At times, it is observed that the terms developmental disabilities and developmental delay are used interchangeably. But they have distinct meaning, developmental disabilities are such issues that children do not outgrow or catch up from, though it is still possible to make some progress with proper interventions and medications. Developmental disabilities are often results of underlying problems like Down Syndrome, autism, fetal alcohol spectrum disorders (FASD) and brain injuries. On the other hand of the spectrum, developmental delays can be the initial symptoms of any underlying learning or attention issues (Dyck & Piek, 2014).

Developmental delay can occur in five major areas of development. The areas are cognitive, social and emotional skills; speech and language skills; fine and gross motor skills; and activities undertaken in day to day lives.

Several studies have shed light on the link between developmental delays and learning and attention issues, it has been found that such delays could be the very first sign of learning

and attention issues (Dyck & Pike, 2014 ; Koul et al., 2012). For instance, if there is a child who is showing signs of speech and language delays can well insinuate that learning or communication disorder could be the underlying problem.

Furthermore, it has been assessed that it is not always feasible to establish the link between development delays and attention disorders until the students start their school and academic life. It is so because, in the learner setting, students become increasingly exposed to studying math, science, reading and writing that make their developmental delays more noticeable (Dyck & Piek, 2014). If a child shows the signs of developmental delay, the first round of intervention comprises of functional test assessment and if it is deemed fit, the child is enrolled into the special education program. In many of such cases, early detection that is followed by early intervention is shown to have a better prognosis than those who do not receive any such treatment for a delayed period of time (Dyck & Pike, 2014 ; Koul et al., 2012).

Attention Deficit Hyperactivity Disorder (ADHD)

ADHD is a complex neurological mental disorder that is characterized by a student having problems paying attention, absent-mindedness, abnormal level of energy or excessive impulsivity which is often not age appropriate.

The student is also excessively active and is unable to control his/her behavior which is inappropriate for his/her age. The symptoms begin appearing when a child is below 12 years old. The condition causes problems in three main settings: the school, the home and at recreational facilities. For the children who have the problem of paying attention, it may hamper their performance at school. Though the condition causes impairments, the majority of the children have an attention span that can enable them to perform some tasks. Irrespective of the numerous studies that have been conducted; the exact cause of the condition in most of the

cases is unknown. It has been discovered that using the DSM-IV basis, it is estimated that about 5 to 7 percent of elementary school children have been affected in America. However, if the rate of prevalence is assessed through ICD-10, the percentage drops by 1 to 2 percent. By 2015, the figures showed that it affected 51.1 million people in America (Fabiano & Pelham, 2003).

These rates are similar in different countries, however; it also depends on how the diagnosis is done. Elementary students with Attention Deficit Hyperactivity Disorder (ADHD) exhibit significant social, behavioral, and academic challenges in academic settings. Children with ADHD have difficulty in sustaining attention for long and often end up exhibiting significant levels of hyperactivity-impulsivity (DuPaul & Stoner, 2003). Issues with ADHD may not exhibit in home settings as they do in classroom settings because of the nature of a classroom where learners are expected to be organized, sustain attention, maintain good behavior, listen attentively, and complete assignments on time. Consequently, ADHD elementary students face challenges that hinder them from fulfilling the requirements necessary for appropriate achievement in their respective class settings. Symptoms exhibited by learners with ADHD impact the affected learners, their classmates, and the instructors who face instruction difficulties because of impulsivity, hyperactivity, and inattention.

According to Fabiano and Pelham (2003), ADHD is a problem affecting about 3% to 5% of elementary school-attending population. On average, these percentages place at least one elementary learner with ADHD in every classroom in the U.S. According to the Centers for Disease Control and Prevention (CDC), the numbers of children with ADHD continued to increase from 7.8% in 2003 to 11% in 2012. Because of the identified challenges and the prevalence rates, learning institutions with students battling with ADHD choose to implement effective interventions for minimizing the classroom impairment characteristics of students with

ADHD. Such interventions include the use of the Daily Behavior Report Card for the student with ADHD (DuPaul & Stoner, 2003).

Based on the DSM-5 diagnosis, the symptoms in a child must be present for a minimum of six months to a level that is higher than that of the other children of the same age for it to be classified as ADHD. They must also create significant problems in at least two main settings: home, school, work or social. This full criterion must be met before the child attains the age of 12. ADHD is of three categories: those who are predominantly attentive (ADHD-PI or ADHD-I), the predominantly hyperactive-impulsive (ADHD-PH or ADHD-HI) and the ones who have a combination of ADHD-C. A child who has the inattentive type of ADHD displays all the following characteristics except in situations where there is an explanation by a psychiatric or a doctor (DuPaul & Stoner, 2004).

They are easily distracted, forget things easily, miss details and they frequently change from one activity to another and unable to sustain a focus on one task. They get easily bored with one task after a few minutes and can sustain their interest a little bit longer if the task is enjoyable. They do not focus their attention on completing or organizing a task. They find it difficult working on homework and sometimes do not complete them. They easily lose things such as pens, pencils, toys, and books (Dyck & Pike, 2014 ; Koul et al., 2012). When they are spoken to, they feign nonchalance as if they are not listening. Because they often indulge in daydreaming, they get easily confused and they, therefore, move very slowly. It is very difficult for them to easily process information and accurately as the rest of the students. They struggle and find it hard to follow instructions. They find it difficult to understand details they, therefore, overlook them (DuPaul & Stoner, 2003).

The children who have ADHD hyperactive-impulse exhibit characteristics such as they squirm, talk and fidget excessively. They move around touching and playing with anything they lay their hands on and are unable to stay still when having meals, doing homework and even during story time. They are constantly moving, impatient and find it hard to perform tasks that require quietness. They show their emotions without any form of restraint. They do not mind the consequences of their actions and find it difficult waiting for the things that they want. They are unable to wait for their turns in games. They frequently interrupt other children's activities or conversations and are unable to form and sustain friendship. The girls are less affected by hyperactivity attention in comparison to boys but show greater symptoms regarding distractibility (Loe & Feldman, 2007).

The Disruptive Behavior Disorder (ODD) is two dimensional because it includes two disorders that are similar: the Opposition Defiant Disorder and (ODD) and the Conduct Disorder (CD).The children who have these disorders exhibit the following symptoms: They defy the authority including the parents, they show angry outbursts and display other behaviors that are defiant, they start lying and even stealing. The main difference between the conduct disorder and oppositional defiant disorder lies in the severity of the symptoms exhibited as well as on a continuum that is based on the progression of development from ODD to CD as the child grows (Loe & Feldman, 2007).

ODD means a pattern of negative defiant disobedience that is recurrent. It also shows a behavior that is hostile towards the figures of authority which last for a period of six months. This group of children loses tempers easily, argues with authority/adults, refuses to follow the directions of the adult's commands and requests, annoys people deliberately, blames others for the mistakes that are not theirs, resentful and angry, quick and easy to annoy other people.CD

involves behaviors that are more severe which includes developing aggression towards people and animals, careless destruction of property, skipping school, lying and even stealing. The behaviors that are connected with CD are commonly referred to as delinquent (Volpe et al., 2006).

Poor reading and mathematical abilities, poor grades, and increased grade retention are associated with ADHD among elementary school learners. Learners who show inattention, hyperactivity, and impulsive symptoms associated with ADHD exhibit poor academic and educational outcomes. The disorder affects their learning abilities through impacting higher-level cognition, problem-solving abilities, time management, and judgment. Accordingly, ADHD leads to limitations in learning and knowledge application, including calculation, reading, and writing. Loe and Feldman (2007) argue that learners with ADHD have issues with academic performance, which includes assignment completion, and academic underachievement that denotes problems with knowledge acquisition and use, and the consequent low grades and test scores. A study by Volpe et al. (2006) reports that students with ADHD show significant poor academic performance and academic underachievement among other educational challenges. Besides, they score lower on arithmetic and reading assessments than students without ADHD (Biederman et al., 1999). Accordingly, these learners are likely to show the increase in repeat grades, assignment for remedial pullout services, after-school programs, and placement in special learning institutions. However, the learning abilities and challenges faced vary depending on the form of ADHD a child has. Loe and Feldman (2007) argue that studies provide varying data concerning the variation of academic and educational characteristics of ADHD-I (inattentive) and ADHD-C (combined) because they find no significant differences in the outcome of academic attainment among the different ADHD

students. However, a great number of elementary school students with ADHD-I are more likely to be rated as below average in academic performance and attainment compared with the learners with ADHD-C (Rapport, Scanlan, & Denney, 1999). The study's outcome indicates that students with ADHD-I have a higher prevalence of learning challenges those with ADHD-C.

Behavior Challenges

Besides the academic achievement impacts of ADHD and developmental delay among learners, the condition poses significant behavioral challenges that affect not only the student but also peers and the teachers. As noted earlier ADHD learners are disruptive, disorganized, and inattentive whereas students' experiencing developmental delays have trouble reading, writing and understanding properly. Consequently, they tend to pay little attention in the classroom and home settings. Greene et al. (2002) asserts that they also exhibit peer-related issues such as being overly intrusive and engaging in negative peer interactions that exacerbate to lack of self-control, argumentativeness with both teachers and fellow students and aggression. Accordingly, these learners have higher chances of being put in detention, suspended, expelled, or compelled to repeat a particular grade.

The common behaviors of interrupting conversation and activities and impatience affect other members in a class. Learners without ADHD may perceive their counterparts as intrusive, aggressive, and selfish, which affects interpersonal associations and operating in collaborative learning. Since the ADHD learners have difficulties in waiting for their turn during indoor and outdoor activities, their counterparts develop enmity, especially when they appear aggressive (Greene et al., 2002).

The behavioral challenges also affect the teachers because they disrupt normal classroom arrangements, work schedule, learning and assessment sessions, and make time management difficult. Besides, the challenges task the instructors with more duties of monitoring the learners to ensure they adhere to classroom rules. The need to treat and manage learners with ADHD is this crucial among elementary school going children to minimize cases of impairment and poor academic and learning engagement and achievement. Since children with ADHD are at greater risk for developing interpersonal and educational issues, it is important to assess and implement intervention strategies that minimize the rate of academic failure, early school dropout rates, and juvenile delinquency (Greene et al., 2002).

Positive Behavior Support

Positive behavior support entails engaging in practices that increase positive activities. Practices that reinforce positive behavior among ADHD students include posting clear rules that inform the learners what is expected of them in classroom setups or during activities that require the certain way of operation. The practice further involves reviewing the rules frequently as a reinforcement method. A different form of positive behavior support involves giving the learners choices throughout the day. Provision of choice provides them with some sense of control, which is significant for learners with challenging behaviors. When these learners feel more in control, they are likely to defy orders because they feel that their opinion matters. Moreover, it is important to allow them to earn time to participate in their preferred activities as a way of reinforcing positive behavior such as completing their assignments on time effectively and following classroom rules. Other positive reinforcement measures include practicing students for following rules and participating in classroom activities. The positive reinforcement

not only reinforces set rules but also increases the student's self-esteem and motivates them to behave in a certain accepted way (Greene et al., 2002).

Specific administration methodologies can be utilized to encourage scholastic engagement and lessen unmistakable behavioral side effects of ADHD. This segment focuses on both precursor centered and outcome arranged methodologies that educators may use to oversee the progress of scholastic engagement and overall impact and feasibility of administration methodologies.

Interventions

Students who start showing signs of developmental delays and it is hinted that they might be suffering from ADHD further have the tendency to react empathically towards the administered methods that are employed to help them perform well academically and reduce the incidences of target behaviors that are typically associated with students suffering from developmental delays and ADHD (Fox et al., 1986). The various methodologies that are employed to assist the target students are token currencies, reaction cost methodology and behavioral contracts. Such methodologies are employed with an intention to reduce the incidences of target problem behaviors that play a detrimental role in exacerbating the child's academic performances.

In the past, teachers and educators have readily employed instructional approach such as repeatedly educating the child a particular social ability, teaching the right ways to ask for help or request administrating and monitoring their behaviors, incorporating positive and negative reinforcements as a response to their target behaviors.

For effective intervention it is imperative that educators recall and record the outbursts of behavior or any target behavior that reduces the academic engagements in the school setting.

Students who have developmental delays or exhibit signs of ADHD need more scrutinized attention and focus than the rest of the peers. Teachers often have to treat such students in a customized and highly individualized fashion as the regular teaching methodologies might not work well with needs and requirements of such students.

The typical token intervention framework comprises of certain predetermined class objectives to be met (for instance, a culmination of autonomous seat-work) and the kind of auxiliary reinforce (token) to be utilized (for instance, poker chips, checks marks) is chosen. Furthermore, it is decided on what number of tokens is to be earned by showing target practices (educators can separate more intricate undertakings into segment parts and give tokens for each part). Eventually, it is shared with the students the types of reward they can achieve in exchange of such tokens, (for instance, five tokens rises to five minutes leisure time at the PC). Thus, the token system has emerged to be one of the most sought-after intervention strategies for students who experience the sings of developmental delay or ADHD. At the same time, it is imperative to monitor the adequacy of the intervention practices in order to decide if they are suitable with the target practices or not (Piffner, 2011).

Another popular intervention methodology to assist students with developmental disabilities is behavioral contract. In behavioral contract, the particular or target practices are illustrated (for instance, number of math questions finished precisely amid situate work task). Obviously, it is critical that the objective conduct that is sketched out is achievable for the target student. The intervention practice should oversee that the work that the target student is expected to complete is in moderation so that it does not become too bothersome for them. It is important to supervise the level and quantity of work as students with developmental dealy as well as ADHD have lower instructional level in comparison to their peers. Thus for for setting

up a behavioral contract the points that must be borne in mind are: The instructor and the target student recognize the objective behavior(s) of the agreement. The program is started with an emphasis on a restricted (for instance, two or less) number of target practices. The practices ought to be particular, discernible, and emphatically expressed (Gilbertson, 2007). The objective of the intervention practice is to have the target student achieve a predetermined objective on a daily basis. For instance, toward the start of utilizing a behavioral contract for math, the student may choose a movement to remunerate if he/she finishes half of the appointed problems (Gilbertson, 2007). This is followed by giving support either toward the finish of the class or by the end of the day. The basis to meet objectives is then gradually expanded as the target student can meet each new objective level.

The target student can well be incorporated in devising the outline for the program on matters like what topics the student would like to study first. The students' inclinations should also be given due importance as it would motivate and encourage him more to be obedient towards the employed intervention strategies. The students may have favored exercises that he or she might want to use as prizes for effectively meeting the goal(s). Action prizes may include: extra time on the PC tending to a creature choosing a book to peruse with the instructor drawing playing a diversion (Piffner, 2011).

Objectives of This Study

- To determine the effectiveness over time of DBRC in increasing the task engagement of students who have difficulty attending to and engaging in classroom academic activities.

- To ascertain the extent to which the use of DBRC can be gradually decreased over time using response dependent fading while maintaining student improved task engagement 80% of the time.
- To determine the possible relationship between the function of the student's challenging off-task behaviors (as indicated by the Functional Assessment Screening Tool) and the initial effectiveness of the DBRC and fading of the intervention over time.
- To determine the extent to which the teacher and the target student(s) view the social validity of the DBRC as indicated by the adult and child versions of the Intervention Rating Profile

CHAPTER 2

LITERATURE REVIEW

Daily Behavior Report Cards

The daily behavior report cards are behavior modification intervention tools used to detect and correct inappropriate behavior exhibited by learners, especially those with ADHD disorders. The daily behavior report card is often used to improve learners' behavior depending on feedback from the learner's instructor. These cards serve as a channel for communicating with students and their teacher about behavior, especially among children exhibiting externalizing and disruptive behavioral issues (Volpe & Fabiano, 2013). Although different learning institutions may have varied forms of the daily behavior report card, it is common for the cards to have a list of behaviors that have been deemed appropriate objectives for intervention and strategies for rating the target behavior (Volpe & Fabiano, 2013). Accordingly, the report cards rate behaviors in terms of frequency and duration. However, the essential components of the report cards include the frequent feedback that the teacher gives to the learner and the parent, as well as feedback regarding progress towards behavioral objectives, and home-based rewards contingent on the child's performance. Moreover, a learning institution or the teacher implementing the report card behavioral intervention method may choose between the traditional daily report cards and an electronic daily behavior report card that has been credited for being effective in increasing parent-teacher communication and reducing disruptive classroom behaviors (Williams et al., 2012).

It has been recommended that DBRC might be plausible, satisfactory, viable in advancing a positive understudy, and an approach to expand parent/educator correspondence.

Likewise, DBRCs are quite beneficial as they involve wide array of observing and mediation potential outcomes helpful in dealing with ADHD.

Numerous researchers have been conducted on the role of DBRC in obtaining the necessary information to guide the development of solutions. A study by Owens et al. (2012) sought to establish the effectiveness of the daily reporting card (DRC) in influencing school students to achieve an improvement in their general classroom education. Through including 66 school children with ADHD or other disruptive behavior, the researchers established that 72% of the sample had a significant improvement, with 8 percent reported a decline. Furthermore, the study proved that about 78 percent of the children achieved the improvement within the first month. As such, the study showed a significant effect of DBRC in adjusting the learning capabilities of students with learning defects. The findings of the study were collaborated by Vannest et al. (2010) who established that the use of DBRC caused an average improvement of 68 percent in 17 studies used in their meta-analysis. Further, the researchers proved varying, but significant effects of the student's age, behavior, the breadth of intervention use, reliability measure, scale construction, and home or school intervention as moderators of the student's response to intervention. As such, it would be necessary to determine the levels of moderation of these factors to collaborate the previous studies conducted on the same. Mainly, the use of DBRC has a significant effect on the correction of learning problems in children with ADHD (Williams et al., 2012).

This method has been appeared to be exceptionally compelling in molding conduct. In a landmark research supported by the National Institute of Mental Health, the kids who consolidated the daily behavior report card technique were appeared to have preferable controlled ADHD manifestations over the individuals who simply endured the solution alone.

For a few kids, the everyday report card procedure alone is adequate to deliver noteworthy change. Others may require extra methodologies to help control the ADHD side effects that hinder learning (Additude Editors, 2014). These include: outlining an understudy/educator objectives and rewards or utilizing a token framework in which a kid gain focuses that can be exchanged for rewards. Each child is unique and special care must be taken to tweak the system to his or her needs.

The ability of the teacher or another instructor to obtain accurate information from observation is critical to the success of the intervention method. Implicatively, it will be necessary to ensure that the teachers involved, including in this study, are adequately prepared to obtain the right set of data. Label, Kilgus, and Briesch's (2008) study was categorical in that teachers achieved a three-level ability to rate student's behavior; specifically, none, in the direct, and secondary levels. However, the teachers showed a similar ability to identify child behavior from observation in the three spheres. The findings give freedom to the application of the method of data collection to include using direct or indirect levels.

Further, the ability to attain interaction with and obtain feedback from children with learning deficiency is paramount in the exercise. The teachers need to cultivate the correct environment to foster communication. A study by Fox et al. (1986) involved the extermination of specific responses and obtained from three children with disabilities from their teacher's probing. The research indicated that the children responded the teacher's praises and prompted by attaining a higher frequency of initiated interactions in the classroom setting. Conversely, an abrupt withdrawal of the teacher's prompting resulted in a similarly sudden reduction in the children's initiations to interactions (Chafouleas, 2002).

The study also established that the observed reactions applied to a response dependent fading approach of intervention. In this case, the preparation of the teachers in collecting the data should be guided by this study. They should encourage responses from the children and consider the level of prompting that accompanied specific reactions while obtaining behavioral data from the children (Williams et al., 2012).

Burke and Vannest (2008) presented an overview of a web-based electronic system for monitoring the behavioral progress. It is imperative to monitor behavioral-progress as it helps in evaluating the responsiveness to various behavioral interventions employed. It further helps in gauging the positive implications of behavior support introduced in various settings, and the accomplishment of individualized education program goals and objectives. In this study, the authors provide a conceptual overview for a criterion-referenced behavioral-progress monitoring program that is referred to as electronic daily behavioral-progress report card (e-DBRC) system.

It is extremely pivotal to monitor behavior as it is one of the most critical parts of special education for students who are dealing with symptoms of ADHD. Monitoring the behavior helps in gauging how well students are responding to the employed intervention and techniques. Furthermore, it also helps in assessing how far improvements have been made in achieving the individualized goals and objectives. The most common approaches for monitoring the progress made in behavior are by employing the social and behavioral scales. However, it has been found that many of such social and behavioral skills are too generic and global thus, it is not extremely effective in properly monitoring the student behavior. A study conducted by Hosp and colleagues (2003) performed a meta-study of behavior-rating scales and categorized the scales on the basis of positive action, negative action or absence of negative action. The researchers

concluded that most of the scales are made up of negative action items. They further noted that the behavior-rating scales were devoid of actions questions that are based on observations, hence the nature of majority of items listed on the rating scales were highly inferential. Thus, it was concluded by Hosp and colleagues that the utility of behavior rating scales is very limited and microscopic in nature.

Universal screening is extremely vital in identifying students who are experiencing emotional and behaviors disorder right from the onset of an early age (Hintze, 2005). Systematic screening for behavior disorders is beneficial to externalize as well as internalize the various wide ranging spectrums of behavioral disorders using a multiple gating approach. Monitoring behavioral progress is an essential component in the context of positive behavioral support, behavior-intervention plans as it gives proper analysis of the work done in this regard and how much work still needs to done. The primary method for keeping track of the progress is by directly observing the students with cognitive and social disabilities. Many researchers argue that direct observations is a reliable and genuine approach as there is a greater scope for increased technical adequacy, sensitivity, utility, and social validity

Mires and Lee (2017) have well documented that poor academic characteristics like low IQ, poor reading and comprehension skills, consistently poor grades in science and Maths insinuate that student has academic difficulties that could possibly be linked to his mental impairment and disabilities. Students in the school setting can be actively managed by the right guidance and instructions from the teachers. It is understandable that teachers also need to be pre-equipped with necessary and requisite teaching methodologies as teaching in such a scenario can be extremely challenging as well as demanding. However, on a promising note, interventions from teachers can yield maximum effective results as the students tend to spend

maximum time of their day in the classroom. Moreover, it is imperative to note that students with ADHD often show heightened degree of symptoms in the learner setting as they find following instructions, paying attention and forming social bonds with peers, hence school-based interventions has potential to be most beneficial for students to overcome their neurological impairments associated with ADHD. Furthermore researchers exclaim that school-home communication is also extremely pivotal in providing a holistic and overall development of students with ADHD, Daily Behavior report card can help in observing and analyzing the dynamics between the progress at school and at home.

Positive home school collaboration is extremely significant however it is being observed that it can be elusive (Henderson, 1987). The DBRC is just not effective to record the observations and progress at school, but it also helps in promotion of effective homeschool communication by facilitating teacher feedback to students on how they can improve their classroom behavior. Researchers have demonstrated that DBRCs can be used by both special and general educators alike and it can be used for wide range of students having varying degree of disabilities and age groups.

DBRC has other advantages as it is quite user friendly does not involve complex calculations and can be adapted for both paper and digital forms. However, there might be certain caveat as the feasibility and utility can be compromised if the target student is dealing with other important issues other than ADHD, serious health problems, in appropriate dependence of drugs and intoxicating substances. It is highly recommended that parental support should comprise an integral part of DBRC behavioral intervention.

Response Dependent Fading System

The response-dependent fading system operates through the use of prompts aimed at reinforcing a certain wanted behavior. In the context of learners with ADHD and cognitive developmental delays, the system can be used to teach the students how to be attentive and minimize disruptive behaviors. In other words, the children with ADHD and developmental delays are taught new behaviors using prompts. However, the response dependent fading system requires the instructor to systematically fade or withdraw these prompts so that the learner can perform taught skills or behaviors independently. Learners with ADHD are often prone to distractions, impulsivity, and forgetfulness. Consequently, teachers can use verbal, visual, model, gestural, and physical response prompts and reinforcements to help learners stick to a task, acquire new behavior, and minimize destructive incidents. Therefore, the response-dependent fading system involves decreasing the level of assistance given to the learner to a less intrusive prompt to ensure that the student does not become overly dependent on response prompts. The steps in this system involve identifying the behavior that needs to be taught or minimized and the level of response or prompt required for the learner to complete tasks or behave in a certain way and identifying the fading process and a criterion that indicates a faded response. The response-dependent fading strategy is thus effective in decreasing levels of teacher prompts and providing independence in behavioral modification efforts (Williams, 2012).

The effectiveness of response-dependent fading system has been evaluated in different contexts among students with learning disabilities. For instance, 20th and 21st-century scholars such as Fox et al. (1986) and Gilbertson et al. (2007) used the fading strategy as an intervention for socially withdrawn preschoolers. Although the response-dependent fading system was

effective in decreasing the dependence on teacher prompts to form social interactions, it was unclear whether the response prompts and reinforcements were eliminated. A different study asserts that the response-independent fading system cannot, however, be used in isolation in cases related to learners with disabilities (Odom et al., 1992). Nevertheless, there are minimal studies that examine the effectiveness of the noted fading system within the confines of learners with ADHD, and the effectiveness of the system when combined with other interventions such as the daily behavior report cards. Therefore, there is a need for current studies on the effectiveness of the system among ADHD learners.

Furthermore, it is observed that in order to increase success during fading, it is vital to talk with parents, teachers and target students. At the same time, other opportunities & experiences should also be planned to allow student access adult attention. Small celebrations can also be held that further boosts the target student to help him get away with the fading process (Harris & Fox, 1990).

CHAPTER 3

METHODS

Participants

The target student of the study was a six-year-old male, Bobby, who had a diagnosis of Developmental Delay and was in the process of being evaluated for Attention-Deficit Hyperactivity Disorder (ADHD). Bobby was in the first grade of a rurally-located elementary school in northeast Tennessee. The criteria for selecting the target participant were: 1) the student should have been enrolled in and currently attending a public or private school classroom in grades kindergarten through 4th grade; 2) the teacher reported that the child had difficulty attending to/engaging in 1 or more academic tasks; 3) the target student attended school regularly; and, 4) that the student's parents must have also provided informed consent for participation. All of the preceding selection conditions were met.

Bobby was served primarily in a special education classroom and instructed by Ms. Larkin and typically assisted by 1 to 2 paraprofessionals. Because Ms. Larkin was serving as the intervention agent and the study involved collecting interview data about Bobby from her (see Measures section below), the East Tennessee State University Institutional Review Board determined that she be considered a participant in this study. Informed consent was therefore obtained also from Ms Larkin.

Ms. Larkin indicated that Bobby had exhibited several behavior challenges that interfered with his ability to receive instruction, participate in the learning activities and/or distracted the teacher and other students. These behaviors included the following: 1) frequently interrupting and intruding on others conversation, activities and possessions; 2) difficulty staying focused on a task and following directions; 3) extremely distracted by non-task stimuli

occurring in the environment; 4) frequently talking with other students; 5) drawing on his paper inappropriately, 6) refusal to follow instructions; 7) getting out of his seat frequently; and, 8) engaging in non-task activities in areas of the classroom that were off limits during reading instruction.

Setting

The study setting was a special education classroom located in a public school in rural, northeastern Tennessee. The classroom had a total of 10 first grade students, each of whom was approximately six years old. The class was supervised by the primary instructor Ms. Larkin and her paraprofessionals. The classroom consisted of a half round table at the front of the room along with six seated desks in the middle and back of the classroom. There were several other activity areas around the classroom such as a computer area for instruction and playing games. The study was conducted in the table/desk area during reading instruction. The instructional day was between 8:00 AM to 3:00 PM, however, the observation and intervention procedures were employed during the first instructional activity of the day, Reading, between 8:30 AM to 9:00 AM. To transition students from one activity to other activities, Ms. Larkin had a paper posted on the wall that had the names and roll numbers of each student. The number referred to the position of the line that students were to arrange themselves in moving to another activity or lunch during the day. Before an activity Ms. Larkin typically verbally stated the students' expectations in behavior and instruction and students were encouraged to raise their hands if they had any questions regarding the subject matter.

Materials

The primary material for the study consisted of the Daily Behavior Report Card (e.g., Vannest, Burke, Sauber, Davis, & Cole, 2011). Such report cards are tailored to the specific

student and activity context but typically consist of a list of one or more expected behaviors that are simply but clearly stated in behavioral terms, and some type of rating scale to indicate whether the student engaged in the specified behaviors, the degree to which he/she did so (some type of rating scale or pictorial code) during each relevant activity. In the current study, Bobby's behavior report card consisted of a card approximately 8.3 x 11.7 inches that listed identifying information at the top of the card including the student's name, the teacher's name, the date, and the classroom. The next section of the card listed three positive behaviors that Ms Larkin has identified as relevant to Bobby's engagement in the reading task: 1) Follow instruction; 2) Staying in seat; and, 3) Raise hand to speak or ask for help. Below each behavior was a 3 point rating scale that consisted of a frowning face, a neutral face, and a smiling face below which were the numbers 1, 2, and 3 a simple graphic figure illustrating each behavior. An actual example of Bobby's behavior report card is included in Appendix A.

Measures

Dependent variable – Academic Engaged Time

The dependent variable in this study was the amount of Academic Engaged Time or AET (Walker & Severson, 1992) exhibited by Bobby during the daily reading instructional activity. The definition and measurement of AET was that contained in the direct observation component of the *Systematic Screening for Behavior Disorders/SSBD* (Walker & Severson, 1992). Briefly the *SSBD* defines AET as the amount of actual time a student spends engaged, attending to, and working on relevant academic material. The student is: 1) appropriately engaged in working on assigned academic material that is geared to his/her ability & skill levels; 2) attending to material & task; 3) making appropriate motor responses (writing, computing); 4) asking for

assistance (where appropriate) in acceptable manner; 5) interacting with teacher or classmates about academic matters; or, 6) listening to teacher instructions & directions.

Examples of AET included performing the tasks, completing his worksheet, raising hand to ask for help or asking questions. Non-examples of AET included playing with his materials, scribbling or drawing on his desk or paper, not following classroom/activity rules such as not raising hands.

As specified in the *SSBD* direct observation manual, AET was measured using duration recording. Observers used the stopwatch function of their iPad or smartphone to record Bobby's AET each day. The observer(s) entered the classroom just prior to the reading activity and began recording AET once the teacher has signaled the beginning of the reading activity and began instruction. When Bobby's behavior alternately matched or deviated from the AET definition, the observers started and stopped their stopwatches, respectively, for the length of the reading activity or for a maximum of 20 minutes. At the end of the observation the observer(s) noted the total duration of AET on an observation summary form as well as the participant code number, date of the observation, the start and stop clock time of the observation (so as to determine the percentage of instructional time that Bobby engaged in AET), and the observer name(s) and inter-observer agreement information (when such checks occurred). Observations were recorded during the first instructional activity of the day, reading, that lasted between 8:30 AM to 9:30 AM.

Interobserver Agreement (IOA)

During this study the principal investigator served as the primary observer. At various times three other different observers assisted in collecting IOA data. The primary observer and each of the secondary observers trained on the AET observation definition and duration

recording procedure prior to any data collection. Training consisted of reading and reviewing the definition and examples and non-examples of AET and practicing by using the definition and recording procedure by observing the AET practice videos from the *SSBD* (Walker & Severson, 1992). Prior to actual data collection observers had to attain a minimum of 80% agreement with each other over three practice observations. Once baseline was begun, IOA was periodically assessed between the primary observer and one of the secondary observers by simultaneously but independently observing Bobby during the reading activity. Observers stood or sat several feet apart. The primary observer signaled the beginning and end of the observation by manually gesturing at the secondary observer. At the beginning and then the ending of the session, the observers noted the clock time (beginning and end) and the total number of minutes and seconds that they respectively recorded Bobby as being academically engaged. To calculate IOA, the observers converted the minutes and seconds to total seconds of AET, divided the smaller total of AET seconds by the larger total, and multiplied that dividend by 100 to yield a percentage of agreement.

Functional Analysis Screening Tool

To further define the child participant's characteristics the *Functional Analysis Screening Tool or FAST* (Iwata & DeLeon, 1995) was administered by the principal investigator to Ms Larkin to estimate the possible function(s) of the Bobby's behavior. The FAST is an instrument that helps determine the number of factors or variables that may trigger or maintain the occurrence of problem behaviors demonstrated by the target students. The *FAST* is composed of 2 major sections. The initial section seeks information about the role of the informant vis a vis the child (teacher, parent, caregiver etc.). The second portion is a series of 27 statements about the specific contextual features in which the challenging behavior might occur.

The informant is asked to give a Yes/No response to each of these statement in terms of whether the behavior occurs in that specific situation (e.g. the behavior often occurs when he/she has not had attention, the behavior occurs when you tell the child he/she cannot have a specific item, & he/she often engages in other annoying behavior that produce access to preferred items or activities). *FAST* scores are grouped into 5 behavior function clusters: 1) social reinforcement-attention; 2) social reinforcement – access to specific activities/items; 3) social reinforcement – escape; 4) automatic reinforcement – sensory stimulation; and, 5) automatic reinforcement – pain attenuation. The cluster of statements that receives the most “Yes” responses is predicted to be the primary function of the behavior challenge. For Bobby Ms. Larkin’s responses on the *FAST* indicated that “social reinforcement – attention and social reinforcement – access to specific activities/items were the most likely functions of his inattentive/off task behavior.

Social Validity

After the completion of the study, the social validity of the intervention and its effects were evaluated in two ways. The teacher, Ms. Larkin, was interviewed by the principal investigator and his thesis advisor, the interview was in two parts. First, the *Intervention Rating Profile or IRP* (Witt & Elliot, 1985) was administered to Ms Larkin by the principal investigator., The teacher version of the *IRP* scale consists of 15 positive statements about the intervention (e.g., “the DBRC is an acceptable intervention for the child’s problem behavior”, “Most teachers would find DBRC appropriate for behavior problems”, “the DBRC was effective in changing in the child’s problem behavior”).The teacher rates the statements on a 6-point scale of “Strongly Agree” (6) to “Strongly Disagree” (1).

Once the teacher completed the *IRP*, the principal investigator and faculty advisor informally interviewed Ms Larkin, asking her to expand on the feasibility, effectiveness and

appropriateness of the DBRC. Those responses were written down by the principal investigator and faculty advisor.

Procedures

Baseline. During baseline Ms Larkin was asked to simply engage in her typical instructional and behavior management procedures with Bobby and the other students. The reading instructional activity typically was begun at 8:20 am and ended at 9:30 am. No other intervention was applied at this time. Only AET observations and IOA were conducted during this time

Intervention – Daily Behavior Report Card/DBRC 1. Following the last baseline session, the principal investigator met with Ms Larkin to discuss and review the DBRC form and procedures. The DBRC was then implemented over the next eight sessions. Before the commencement of the session, Ms Larkin would review the card with Bobby, and explaining/reviewing the expected behaviors listed on the DBRC. Once this briefing was over, the card would be put on the table or desk in front of Bobby. As the lesson ended, Ms Larkin rated Bobby's performance during reading in terms of the behaviors listed on the DBRC marking the appropriate face (frowning, neutral, smiley face) on the card. She praised Bobby for instances of appropriate behavior and gave him corrective feedback on inappropriate behaviors. If Bobby did not have any frowning faces Ms Larking rewarded him with a ticket. When the ticket count reached 20, Bobby was awarded with a prize from the prize box, and when he reached half the target; he got candy. And if he collected 5 tickets he received additional free time for five minutes.

Withdrawal of DBRC: Following eight sessions of DBRC 1, the intervention was temporarily but completely withdrawn and only Baseline conditions and observations were implemented.

This withdrawal was limited to only 5 sessions for two reasons. First, five sessions are the minimum necessary to evaluate the stability/trend in a behavior. Second, Bobby's AET initially remained within intervention levels for the first two withdrawal sessions but then declined quickly and substantially, well below his original baseline levels. It was considered ethically more appropriate to re-instate the DBRC at this point since the minimum number of sessions for evaluation of behavior trend during withdrawal had been accomplished, Bobby's non-AET behaviors was becoming more frequent and problematic for Ms Larkin, and the DBRC intervention had appeared to have had very positive effects on Bobby during that first intervention phase.

DBRC 2. After five sessions of DBRC withdrawal, the DBRC intervention was re-implemented just as it had been done during DBRC 1.

Response-Dependent Fading of DBRC. During this phase, fading of the DBRC was begun.

Whereas during DBRC 1 and DBRC 2, the report card had been applied each school day, during the fading phase it was implemented less often, that is, every other day. It was originally planned that more extensive and successive phases of fading were to be accomplished (from every other day, to every two days, three days, and so on). The DBRC was to be further reduced in this stepwise fashion if Bobby maintained AET at 80% or better for three days in a row.

Unfortunately, because of various school schedule issues and changes (weather related closings of the school district, etc.), there was not sufficient time to conduct reductions beyond the every-other-day condition.

Experimental Design

The design of the study was a single subject reversal design or A-B-A-B (Kennedy, 2005). This design involves establishing an initial baseline (nonintervention) level of the target behavior over multiple observation sessions. Baseline is followed by successive phases of intervention followed by withdrawal of the intervention and then reapplication of the intervention over repeated observations during each of these phases. In this study this consisted of the following specific phases: 1) Baseline 1, 2) DBRC 1, 3) Withdrawal of DBRC, 4) DBRC 2, and finally, 5) Fading of DBRC (Brown, 2007).

CHAPTER 4

RESULTS

Interobserver Agreement

The Inter-observer Agreement (IOA) was calculated for 11 of the 34 sessions or 32 % of the entire observation series. Because the observation method involved duration recording, IOA was calculated by dividing the smaller number of minutes/ seconds of engagement recorded by one observer by the larger number of minutes/ seconds of engagement recorded by the second observer and then multiplying it by 100 to derive the total percentage of agreement. The overall mean and median IOA were 93% and 92% respectively, and the minimum and maximum were 87% and 100% respectively, a range of 13%.

The individual IOA results are enumerated as follows in Table 1:

Table 1.

Interobserver Agreement per Session

<i>Observation session</i>	<i>Primary Observer</i>	<i>Co-observer</i>	<i>IOA %</i>
2	18:01 mins	16:40 mins	92%
5	14:37 mins	15:53 mins	92%
13	18:30 mins	18:12 mins	98%
18	18:11 mins	19:32 mins	93%
20	12:08 mins	11:45 mins	96%
24	18:25 mins	18:25 mins	100%
26	17:49 mins	15:55 mins	89%
29	15:23 mins	13:25 mins	87%
31	20:00 mins	21:00 mins	95%
32	17:39 mins	20:43 mins	85%
34	16:20 mins	15:20 mins	93%
Median			93%
Range			87 to 100%

Academic Engaged Time

Bobby's Academic Engagement Time was calculated by dividing the total observed engagement time by the total observation time. Figure 1 shows the daily percentage of AET for each phase of the study. (The overall trend in AET was calculated by the quarter intersect method (Tawney and Gast, 1984) for each phase and is shown by the dashed arrows in each phase in Figure 1.

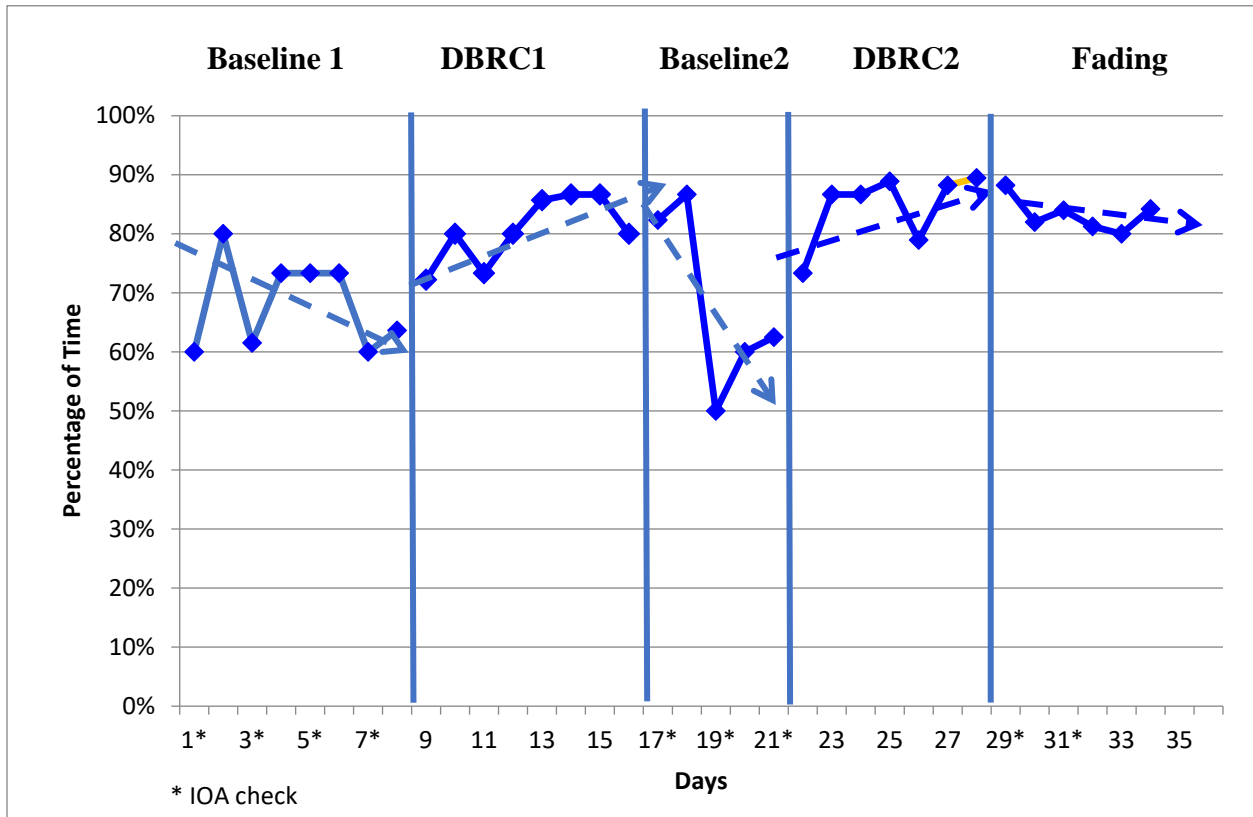


Figure 1. Daily Percentage of and Trend in Bobby's Academic Engaged Time per Phase

Looking at Fig. 1 it can be seen that during baseline Bobby's AET displayed an overall decreasing trend with a median of 68% and a range of 60 to 80% AET. After the first

application of the DBRC, Bobby’s AET exhibited an increasing trend with a median AET of 80% and the range was 72 to 97%. Withdrawal of the intervention during Baseline 2 was followed initially by a brief increase in AET during the first two days. However, there was an overall decreasing trend in AET during this phase with a median of 60% and a range of 50 to 80%. Re-application of the intervention during DBRC 2 showed an immediate increase in AET with an increasing trend, a median of 87 % and a range of 73 to 89%. When Fading of DBRC was begun there was a slight decreasing trend across that phase but both the median (83%) and range of AET (80 to 88%) remained above the targeted level of 80%.

Additional analyses were conducted to further evaluate Bobby’s AET under the Baseline, DBRC, and Fading conditions. These analyses included: 1) the Change in Mean Level calculated as the difference between the mean of one phase and the mean of the next adjacent phase; and, 2) the Percentage of Overlap in data points of one phase with those of the preceding phase. The greater the Mean Level Change and the less Overlap between phases indicate the strength and reliability of the behavior change. Table 2 shows the data for these indices.

Table 2.

Academic Engaged Time: Change in Mean Level, and Percentage of Overlap

	Change in Mean Level	Percentage Overlap
Baseline 1 to DBRC 1	+12%	63%
DBRC 1 to Baseline 2	-12%	40%
Baseline 2 to DBRC 2	+16%	57%
DBRC 2 to Fading	-2%	100%

Generally the data in Table 2 show the expected direction and magnitude in Mean Level Change per phase. AET Mean Level increased from Baseline 1 to DBRC 1 by 12% overall, decreased from DBRC to Baseline 2 by 12%, increased again by 16% from Baseline 2 to DBRC 2 and decreased only slightly, 2%, from DBRC2 to Fading. Overlap between phases was considerable varying from 64% between Baseline 1 and DBRC 1, 40% during DBRC 1 to Baseline 2, 57% during Baseline 2 to DBRC 2. Overlap between DBRC and Fading was 100%; however, this indicates that AET remained within targeted levels despite the lessened application of the DBRC intervention, i.e., maintenance of increased AET.

DBRC Target Behaviors

Recall that Bobby could earn points for each one of the target behaviors, following instructions, staying in his seat and raising his hand to speak or ask questions. Shown in Figure 2 are the percentage of points Bobby received for each target behavior during DBRC 1, DBRC 2 and Fading phases.

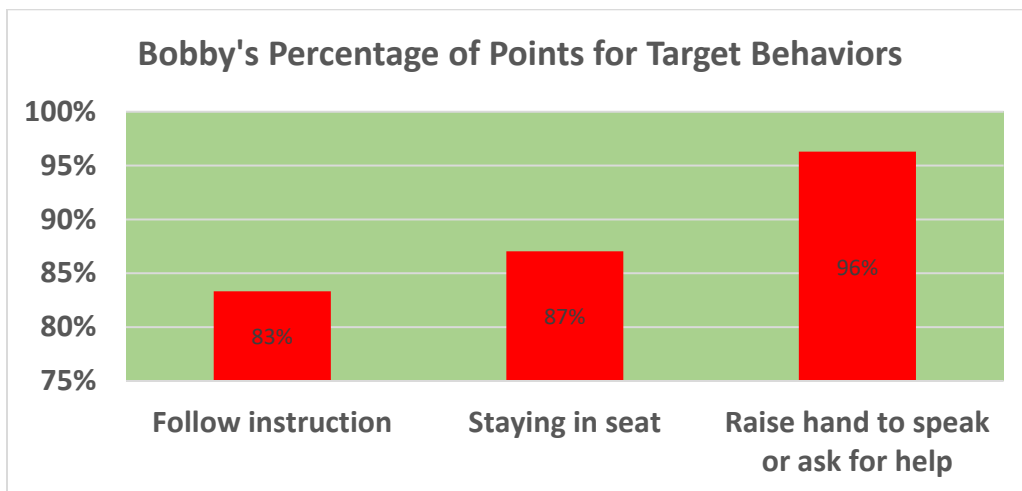


Figure 2. The Percentage of DBRC Behaviors for Which Bobby Received Points

These data show that Bobby engaged in the appropriate behaviors somewhat differentially but overall he engaged in each of the target behaviors at a relatively high level. Out of 54 points possible, Bobby scored 83%, 87%, 96% respectively in all three target behaviors. The total card collected by Bobby stood at 14 by the time this study was completed.

Social Validity

Teacher Intervention Rating Profile. The Intervention Rating Profile completed by Ms. Larkin as a measure of the perceived effectiveness, efficiency and acceptability of the DBRC. Overall, Ms Larkin rated the DBRC intervention very positively. Of the 15 positive statements on the profile, the overall mean score was 5.67, with a range 4 to 6, on a scale of 1 to 6 (1 Strongly Disagree to 6 Strongly Agree). All statements received positive ratings from Ms Larkin. Her lowest ratings were on 3 items: statement 1 (“DBRC is an acceptable intervention for the child’s problem behavior”) which was rated “5” (Agree), statement 3 (“DBRC was effective in changing in the child’s problem behavior”) and statement 15 (“Overall, DBRC was beneficial for the child”) which were both rated “4” (Slightly Agree).

Participant and Normative Data for AET. To provide an additional index of social validity we compared Bobby’s AET to that that might be expected of other students in a similar graded range. The Systematic Screening for Behavior Disorders (Walker & Severson, 1992) provides grade level normative data for Academic Engaged Time that is further broken down into percentages of AET for “Normal” and “Externalizes” and “Internalizes”, the latter two groups being those identified as potentially at risk for emotional-behavioral disorders. Table 3 presents the Mean AET for those three normative groups in Grades 1 through 3 (Walker & Severson, 1992 Systematic Screening for Behavior Disorders: Observer Training Manual, p. 131). The table also shows the mean percentage of AET for Bobby during each phase of the study. These data indicate that during non-intervention phases of the study (Baseline 1 and Baseline 2)

Bobby’s mean percentage of AET (68%) was below that of grade level norms and similar to that of internalizers and externalizers in the SSBD normative groups (69.71 and 62.72%, respectively). During the intervention phases DBRC 1, DBRC 2 and Fading, Bobby’s mean AET (81%, 85%, 83% respectively) exceeded that of the Normal, Externalizing and Internalizing groups (75.19, 62.72, and 69.71% respectively).

Table 3.

AET Normative Data and Bobby’s AET (Percentage of AET)

	Mean	Standard Deviation
Normal	75.19	14.98
Externalizers	62.72	20.37
Internalizers	69.71	17.30
Total	70.35	17.96
Bobby - Baseline	68%	0.077
Bobby – DBRC 1	81%	0.057
Bobby - Reversal	68%	0.156
Bobby – DBRC 2	85%	0.061
Bobby – Fading DBRC	83%	61

CHAPTER 5

DISCUSSION

The research study was aimed at better understanding the initial and maintenance effect of the use of Daily Behavior Report Card (DBRC) intervention and fading procedure on Academic Engaged Time (AET) of a 6 year-old boy with Developmental Delay and Attention Deficits were evaluated with a reversal design. The target student, Bobby, was an elementary school student identified as developmentally delayed who exhibited behavior challenges consistent with ADHD such as frequently interrupting others, difficulty staying on a task, refusing to follow instructions, getting out of his seat and engaging in non-task activities during reading instruction. After establishing a baseline level of academic engagement, a Daily Behavior Report Card was implemented with Bobby by his teacher and a reversal single subject design was used to evaluate its effects. Compared to baseline, the DBRC substantially increased academic engaged time (AET) to within normative levels for his age (Walker & Severson, 1992). Furthermore, complete and abrupt removal of the DBRC quickly decreased Bobby's AET whereas a phase in which the DBRC was gradually removed kept AET within the normative range. Social validity ratings by the teacher on the *Intervention Rating Profile* (Witt & Elliot, 1985) indicated that overall she found the DBRC intervention to be relatively effective, easy to use and appropriate for Bobby and his behavior.

In the previous research studies, it has been found that implementation of DBRC is associated with increased task engagement in the case of many target students since the first reported use of DBRC more than 40 years ago (Bailey, Wolf & Phillips, 1970). Meta analyses have consistently reported the positive, initial intervention effects of the DBRC (e.g., Owens et al., 2012; Pyle & Fabio, 2017). At the same time specific effects of DBRC itself are still

unclear as it has often been used as part of other intervention package that included additional components such as *Check in Check out* (e.g., Hawken, Bundock, Kladis, O'Keeffe, & Barret, 2014) and the results have sometimes been mixed. For example, Owens et al. (2012) in a meta-analysis reported that although 72% of the students to whom the DBRC had been applied were found to have significant behavioral improvement, 8% had actually experienced a decline in behavior. Hence, the specific effects noted in the current and other studies between the DBRC engaged academic time and enhanced learning needs further research. We are currently in the process of replicating the intervention with additional elementary aged students with attention and task engagement problem behaviors.

In our research study, the efforts were made to begin systematically fading out the DBRC intervention process with the purpose of reducing the student's reliance on the DBRC, i.e., producing more independent academic engagement, as well as reducing the teacher's time and effort to implement the intervention. We sought to minimize the implementation of DBRC by cutting down the frequency of Bobby's. Our plan was to reduce the daily use of DBRC if Bobby reached 80% AET for three days in a row, beginning with DBRC use every other day and gradually extending the days between use (i.e., every 2 days, every 3 days, once a week, etc.). It was observed that when the fading process was implemented the DBRC intervention was implemented every other day, Bobby's AET evidenced a slight decreasing trend but remained well within the range of his original intervention levels and within the normative AET level as reported in the *SSBD* norms (Walker & Severson, 1992), i.e., 80% and above. This was in contrast to the prior reversal phase when the DBRC was completely withdrawn and his AET quickly decreased well below the original intervention levels. Unfortunately, we ran out of time in the school year to continue the stepwise fading of DBRC and therefore we do not know what

the maintenance effects of further reductions in the DBRC would have been. Fading tactics have been successfully used in other experimental contexts to improve the maintenance of behavior change (e.g., Coleman, 1973; Fox, Shores, Lindeman, & Strain, 1986; Kagohora, 2011; Meyer, Hagopian, & Paclwaskyj, 1999) and in one instance to when teacher monitoring via Check In Check Out was faded to student self-monitoring (Miller, Dufrene, Olmi, Tingstrom & Filce, 2015). However, the brief fading phase in the present study in conjunction with prior studies does suggest that systematic response dependent fading might very well prove successful and future DBRC research should examine more fully this tactic

A meta-analytic study conducted by Vannest and colleagues (Vannest et al 2010), studied the impact of DBRC on 17 target students and found that the improvement rate difference (IRD) for all the students averaged at 0.61 with a range of -0.15 to 0.97. Though, the research suggested that DBRC was likely to improve the performance and increases the possibility of positive influence target behaviors of the students with trouble symptoms in general, however the large magnitude of the variation also suggested that the DBRC intervention cannot be deemed as an unqualified success and needs further investigation in terms of how it can be adjusted to be more broadly effective.

Crnic, Hoffman, Gaze, & Edelbrock (2004) suggested that young students with developmental delay have a tendency to show heightened challenges socially and behaviorally. In contrast with the typically developing students of their age, they show greater aggression, disobedience and defiant behavior (Ageranioti-Bélanger et al., 2012). Byrne (2015) concluded that the use of classroom intervention technique in extended school year settings can show positive influence on students. The students with repeated classroom interventions like DBRC demonstrated greater improvement and progress in social aspects of their lives like talking to

classroom teachers and peers, raising hands for help etc. Those findings, those of previous DBRC studies (e.g., Owens et al., 2012; Pyle & Fabio, 2017) and our findings in the current study our study resonate with the consistency of the previous research on DBRC implementation and its impact on AET as well as other academic aspects of students like enhanced learning potency (Hill & Flores, 2014).

The results of the current study support the notion that use of DBRC can be a sound intervention tool for teachers as well as students for improving and maintaining behaviors. The teacher advocated the use of the DBRC and expressed her fidelity to the proposed intervention program in future test studies as well. She rated the DBRC is a feasible and reliable method of improving student engagement time and in the past studies, similar sentiments were expressed by other teachers as well (who were primarily responsible for employment of DBRC at school) (Jonte'C et al., 2017). The teachers were generally competent enough to collect student-behavior data throughout the day and then evaluating it by the end of the day.

Furthermore, communication between teachers and parents/families is shown to have positive impact on the behavioral improvement of students by the previous studies. It increases the effectiveness of DBRC. On the similar line, it is imperative to note that BASC II is an effective tool for assessment and identification of school-age children with emotional disturbances and developmental issues. The basic rationale behind BASC is to gather pool of data about the child through wide variety of sources that could range from teachers, friends, families, historical reports and observations. Hence, prior employment of BASC is said to be beneficial in devising the right DBRC strategy.

Chafouleas (2007) investigated the social validity of the procedure by including the doctoral students in school psychology as independent observers and assess the feasibility of the

study. They were trained daily for 1.5 hours and were made to comprehensibly study the various aspects of DBRC intervention and were periodically consulted for reviews, suggestions and further recommendations. Furthermore, to help the teachers get better overview of the actual implementation of the DBRC implementation, analogue scenarios describing student classroom behavior were read and discussed. The teacher's consent was given due consideration while determining the timing and place of the intervention.

In addition to the social validity, several studies also studied the content validity. In order to assess the content validity of the DBRC, academic DBRC targets and IEP goals related to academic progress and functioning were studied (Fabiano et al., 2009; Dyke et al., 2014).

In many studies, though there has not been explicit mention of social validity, however teacher feedback was consistently taken in majority of the test studies on their DBRC performance. These feedbacks acted detrimental in establishing social validity as teachers were always prior consented before the implementation of DBRC (Chafouleas et al., 2007; Fabiano et al., 2009) Furthermore, in many of the case studies, home-school communication has also been given due consideration, so that parents can also engage in the DBRC implementation (Mires et al., 2008; Owens et al., 2012) Such measures increase the social validity of the tests, even if not explicitly stated.

Furthermore, in many cases, the students were also interviewed at the end of the study to get their feedbacks and to give them opportunity to express the things that they liked or disliked in the study. The students were generally asked if they felt more confident about themselves, upon the implementation of DBRC and if they wanted to continue using the DBRC implementation.

Fading is considered an essential phase when a child gradually learns to maintain high AET even without application or implementation of DBRC. In a comprehensive fading study, conducted by Rock and Thead (2007) the fading condition was divided into five distinct phases that were carried out for a period of two weeks. The goal of the fading process was to gradually reduce the students' use of DBRC intervention. The first four phases 1, 2, 3, and 4 lasted for three days each and the last phase lasted for only two days. Over the course of 14 days, the students were students were instructed to continuously and silently assess their performance until the end of the period to determine whether or not they had met their academic and behavioral goals.

The meta-analysis conducted by Pyle and Fabio (2017) presented the results that DBRC is an effective intervention tool for students with ADHD in single-study cases. The meta- study comprised of study data and results compiled from over 40 single-case test studies.

The research study purported the idea that DBRC is known to play detrimental role in changing student's target behaviors by a significant margin of 30 base points from baseline to intervention. The study acknowledges that quantification of effects across single-case studies in a meta-analysis is an evolving area within the field of intervention research. In order to gauge the effectiveness of DBRC as an intervention tool across the varying incidences of single-case studies, graphed time-series data is employed visually as well as quantitatively. The study argues that as of now there is no pertinent gold standard for the calculation of magnitude of effect in single-case research, however graphical analysis is still the most sought after methodology.

The meta-study ran parallel to our study as the participants who were carefully selected for inclusion in the study was already identified with ADHD. All the participants were lesser

than 18 years old; the studies used standardized ADHD rating scales, and employed DBRC as their primary intervention tool. Furthermore, the studies included in meta-analysis examined observation of disruptive or on task behavior as primary outcome, even in our case study; we examined the target behaviors displayed by Bobby as the primary observatory methodology of the assessment of his condition. The common outcome variables that were identified are percentage of time spent by target students actively engaged in their task, number of changes in activity, percentage of time children spent demonstrating hyperactive symptoms. In order to better understand the recorded observations, the results were converted to percentages. In addition to it, all activities were classified as on-task or off-task. On task activities in the metastudy as well as the case study included raising hands properly when one wants to ask questions, staying on desk and completing class assignments on time whereas the off-task activities included staying off the desks, staying distracted, and disturbing others. For the reliability, Interobserver agreement was used.

In a nutshell, the study supports the use of DBRC as the intervention tool, and our study also suggests the same that use of DBRC should be continued and should certainly be recommended for treating students with mild to aggressive ADHD. However, in case of the meta-study the effectiveness of DRC has been found to be very high, unlike our case study, where we managed to get only moderate success. However, in the light of the findings of the meta-study it is undeniable that DBRC has emerged to be one of the most sought after intervention tool and its implementation should be continued with adequate supervision to monitor the impact of different variables such as school settings, home-school communication etc.

Limitations and the Future Research

As it is previously stated, study of just one target population, is the first and foremost limitation of the research study. However, it is unclear how a different subject might have reacted to similar settings. Thus, it is imperative to increase the scale of this search study with greater target population to generalize the findings. The second limitation was the location and setting of the intervention. The use of DBRC was carried out in classes, where there used to be many compound variables like noise, visual distraction etc. The implications of these variables were not taken into consideration. It is possible that these compound variables might have affected the target behavior of the student in any form that went unnoticed. For instance, In the second Baseline period, there was a sharp downfall of AET on the third day from 80% to 63%. This could be attributed to any such factor.

The present literature review in the context of developmental delay and disorder is still very limited, and the use of DBRC as an effective intervention tool need to further assessed. In future, similar research studies should be conducted at a much larger scale to have an unbiased generalization of the viewpoint. Future research might also consider gender of the students as a primary research topic. It would be interesting to see if gender of students has a correlation with effectiveness of DBRC. Furthermore, most of the literature review about ADHD and other developmental delay is about younger populated who are aged 18 or below, further research should be done to study the effectiveness of DBRC for adults as well. The scope can be widened by conducting a longitudinal study where the same sample population would be studies over the years and how after receiving intervention methodologies at a younger age, they perform at later stages of their life. On the other hand, because the volume of literature is still

gaining momentum, a latitudinal study should be undertaken to see if the results of implementation of DBRC varies with age.

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Appendices

Appendix A

Student Daily Behavior Report Card

Student: _____
Teacher: _____

Date: _____
Classroom: _____

Directions: Please rate the student each day on the behavioral items below:

Follow instruction



Staying in seat



Raise hand to speak or ask for help



Teacher Feedback:

Student have been reward: Yes No

Systematic Screening for Behavior Disorders (SSBD)

Academic Engaged Time

AET refers to the amount of actual time a student spends actively engaged, attending to, and working on relevant academic material.

DEFINITION of Academic Engaged Time (AE)

The student is:

1. appropriately engaged in working on assigned academic material that is geared to his/her ability & skill levels.
2. attending to material & task
3. making appropriate motor responses (writing, computing),
4. asking for assistance (where appropriate) in acceptable manner,
5. interacting with teacher or classmates about academic matters, or
6. listening to teacher instructions & directions

NON EXAMPLES of Academic Engaged Time (NOT)

Non-examples of AET include:

1. not attending to task
2. breaking classroom rules (out of seat, talking out, disturbing others, etc.), OR
3. daydreaming

When AET is to be observed:

AET is observed and recorded during 15 – 20 minute independent seatwork periods wherein the student is expected to be working on assigned academic material(s).

RECORDING INSTRUCTIONS (paper form version)

1. Select a seatwork period in which at least 15 – 20 minutes of class time has been allocated for independent seatwork on an assigned academic task.
2. Note the hour and minute that you begin observing and record it on the AET form.
3. Record the amount of time the pupil displays behavior consistent with the definition. Let the stopwatch run when the pupil is academically engaged and turn it off when he/she is not. Restart it when the pupil is again academically engaged. Repeat this procedure throughout the recording interval.
4. Record the time you stop on the AET form.
5. Compute percent AET by dividing the time on the stopwatch by the total time observed (e.g., 15 minutes) and multiplying by 100. Convert time observed and time on the stopwatch to seconds (15 minutes = 900 seconds). Note: The two classroom observations of a single student should not be scheduled in the same week. However, if

it is necessary to do so, schedule the observations as far apart as possible (e.g., Monday and Friday).

6. Record the data from the two classroom observations on the AET recording form.
7. Average the two AET observation sessions to obtain an overall AET score. You can do this by averaging the two AET times or by adding the stopwatch times together for the two sessions and dividing by the total time of the two observation sessions.

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Academic Engaged Time (AET) Summary Form

Student: _____ Teacher: _____ Observer 1:
**(Use Codes for Student & Teacher)* Observer 2:

Activity: _____ Time Begin: _____ Time End: _____

Was this an Inter-observer Agreement Session? _____ Yes _____ No

Primary Observer

Minutes:Seconds Recorded that student was AET
Minutes Observed (Time Ended – Time Began)
% Time Student AET: (# Minutes AET/#Minutes Observed) x 100

2nd Observer

Minutes:Seconds Recorded that student was AET
Minutes Observed (Time Ended – Time Began)
% Time Student AET: (# Minutes AET/#Minutes Observed) x 100

Example of AET summary & % AET calculation:

AET Summary

Observation began at 10:00 & Ended at 10:20 = 20 minutes (1200 seconds)

Observer 1 records 10 minutes: 30 seconds of AET (or 630 seconds)
Observation time was 20 minutes (or 1200 seconds)
Observer 1 % Time AET = $630/1200 = 0.525 \times 100$ or 52.5 % AET

Observer 2 records 12 minutes: 15 seconds of AET (or 735 seconds)
Observation time was 20 minutes (or 1200 seconds)
Observer 2 % Time AET = $735/1200 = 0.6125 \times 100$ or 61.3% AET

Interobserver agreement (IOA)

Divide smaller recorded time in AET by larger recorded time in AET
Smaller time in AET = 630 seconds
Larger Time in AET = 735
 $630/735 = 0.857 \times 100 = 85.7\%$ agreement (IOA)

Appendix C

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 tool 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 |
| 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 crowded. | 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: _____

Appendix D

Intervention Rating Profile – Teacher version

The purpose of this questionnaire is to obtain information that will aid in the selection of classroom interventions. Teachers of children with behavior problems will use these interventions. Please circle the number which best describes your agreement or disagreement with each statement.

	Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
1. This would be an acceptable intervention for the child's problem behavior.						
2. Most teachers would find this intervention appropriate for behavior problems in addition to the one described.						
3. This intervention should prove effective in changing in the child's problem behavior.						
4. I would suggest the use of this intervention to other teachers.						
5. The child's behavior problem is severe enough to warrant use of this intervention.						
6. Most teachers would find this intervention suitable for the behavior problem described.						
7. I would be willing to use this intervention in the classroom setting.						
8. This intervention would not result in negative side effects for the student.						
9. This intervention would be appropriate for a variety of children.						
10. This intervention is consistent with those I have used in classroom settings.						
11. The intervention was a fair way to handle the child's problem behavior.						
12. This intervention is reasonable for the problem behavior described.						
13. I like the procedures used in this intervention.						
14. This intervention was a good way to handle this child's behavior problem.						
15. Overall, this intervention would be beneficial for the child.						

Adapted from: Witt, J. C. and Elliott, S. N. (1985). Acceptability of classroom intervention strategies. In T. R. Kratochwill (Ed.), Advances in School Psychology, 4, 251-288. Mahwah, NJ: Erlbaum.

Appendix E

Institutional Review Board Approval Letter



EAST TENNESSEE STATE
UNIVERSITY

Office for the Protection of Human Research Subjects • Box 70565 • Johnson City, Tennessee 37614-1707
Phone: (423) 439-6053

IRB APPROVAL – Initial Exempt

January 25, 2018

Ziyad Alrumayh

RE: Effectiveness of a Daily Behavior Report Card (DBRC) and Response Dependent Fading to Increase Academic Engagement and Reduce Behavior Challenges in Elementary Students with Attentive Deficit Hyperactive Disorder (ADHD): Initial Effects, Maintenance and Social Validity.

IRB#: c1217.3e

ORSPA#:

On **January 24, 2018**, an exempt approval was granted in accordance with 45 CFR 46. 101(b)(1). It is understood this project will be conducted in full accordance with all applicable sections of the IRB Policies. No continuing review is required. The exempt approval will be reported to the convened board on the next agenda.

- New Protocol Submission xForm; CV; Parent Consent; Teacher Consent; Child Assent; Student Daily Behavior Report Card; Academic Engaged Time Summary Sheet; Academic Engaged Time Definitions; Children's Intervention Rating Profile; Social Validity-teacher; FUNCTIONAL ASSESSMENT SCREENING TOOL (FAST)

Projects involving Mountain States Health Alliance must also be approved by MSHA following IRB approval prior to initiating the study.

Unanticipated Problems Involving Risks to Subjects or Others must be reported to the IRB (and VA R&D if applicable) within 10 working days.

Proposed changes in approved research cannot be initiated without IRB review and approval. The only exception to this rule is that a change can be made prior to IRB approval when necessary to eliminate apparent immediate hazards to the research subjects [21 CFR 56.108 (a)(4)]. In such a case, the IRB must be promptly informed of the change following its implementation (within 10 working days) on Form 109 (www.etsu.edu/irb). The IRB will review the change to determine that it is consistent with ensuring the subject's continued welfare.

Sincerely,
Stacey Williams, Chair
ETSU Campus IRB



Accredited since December 2005

VITA

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