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Classroom Strategies For Elementary Students With Attention Deficit Hyperactivity Disorder

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This starred paper submitted by Jennifer Downing in partial fulfillment of the requirements for the Degree of Master of Science at St. Cloud State University is hereby approved by the final evaluation committee.

ATTENTION DEFICIT HYPERACTIVITY DISORDER

by

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in Partial Fulfillment of the Requirements

for the Degree

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**CLASSROOM STRATEGIES FOR ELEMENTARY STUDENTS WITH
ATTENTION DEFICIT HYPERACTIVITY DISORDER**

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Chapter I

History of Attention Deficit Hyperactivity Disorder

INTRODUCTION

Background of Attention Deficit Hyperactivity Disorder

Attention Deficit Hyperactivity Disorder (ADHD) is one of the most common and commonly diagnosed mental disorders among children. ADHD is characterized by four common symptoms: hyperactivity, inattention, impulsivity and socially inappropriate behavior. ADHD is a disorder apparent worldwide including but not limited to Germany, Brazil, China, Canada, New Zealand, Japan, Netherlands, and Colombia (Sefa, 2005). There are more than 2 million children in the United States who are diagnosed with ADHD. ADHD affects approximately 3-5% of school-aged children and can be as high as 20%, with males having a higher incidence to females of 3:1 (McAllister, 2012). ADHD is likely caused by genetic and environmental factors; it also tends to run in families. If one person in the family is diagnosed with ADHD, there is a 25-35% probability another family member also has ADHD compared to the general population of 4-6% probability (Cook, 2005). The most common treatment of ADHD is a stimulant medication such as Ritalin, Adderall, and Dexedrine (Cook, 2005). The most effective support for children with ADHD is

medication in combination with teaching children coping skills, behavior management, and awareness.

History of Attention Deficit Hyperactivity Disorder

Characteristics of ADHD have been observed and recorded in children as far back as the 1700s. In 1798, Sir Alexander Crichton, a Scottish physician, studied cases of insanity and mental illness. One of the books he wrote on attention describes abnormal attention and diseases where a person is incapable of attending to an object with consistency; the person may either be born with the disease or may be the effect of an accidental disease (Lange, Reichel, Lange, Tucha, & Tucha, 2010).

In 1844, Heinrich Hoffman, a German physician, wrote a children's storybook called "Struwwelpeter," which included stories about "Fidgety Phil," and "Johnny Look-in-the-air." Fidgety Phil and Johnny Look-in-the-air are boys whose characteristics described in the story book are thought to describe the current disorder of ADHD. Fidgety Phil is describe as appearing not to listen when spoken to, fidgeting, squirming and being unable to sit still for an extended amount of time (Lange et al., 2010). Johnny Look-in-the-air is described as inattentive, daydreaming and easily distracted (Lange et al., 2010).

In 1902, George Still, a British pediatrician, described a disease where children have the inability to internalize rules and limits, are restless, inattentive, and show impulsivity, hyperactivity and easy arousal (Lange et al., 2010). The disorder was originally thought to be associated with brain damage caused by an epidemic of

influenza with encephalitis, but when cases appeared with similar characteristics without brain damage the disorder was changed to Minimal Cerebral/Brain Dysfunction/Damage (Wolraich, 2006).

From 1917-1925, the Encephalitis Lethargica epidemic spread around the world; the survivors were permanently affected by physical and mental problems. The residual symptoms were labeled as Post Encephalitic Behavior Disorder. Children diagnosed with Post Encephalitic Behavior Disorder were described as hyperactive, distractible, irritable, antisocial, destructive, and unruly, along with being unmanageable in school and having sleep difficulties (Lange et al., 2010). Children who never experienced Encephalitis Lethargica were observed having similar characteristics as children who were affected and were similarly diagnosed with having brain damage. Later, the diagnosis was changed to Brain Damage, Minimal Cerebral Dysfunction, and Hyperactivity which is thought to be similar to the current ADHD diagnosis (Lange et al., 2010).

In 1932, Franz Kramer and Hans Pollnow, both German physicians, described the disease Hyperkinetic Disease of Infancy. This disease has similar symptoms to other disorders such as Encephalitis Lethargica epidemic but with sleep difficulties and without the prior illness. The main characteristics of Hyperkinetic Disease of Infancy are motor restlessness, motor impulsivity, inability to complete a task, lack of focus, and inability to concentrate on difficult tasks. These characteristics are similar to the current ADHD diagnosis of hyperactivity, impulsivity, and inattentiveness.

In 1969, Hyperkinetic Reaction of Childhood was recognized as an official mental disorder and was included in the second edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-II) (Lange et al., 2010). The Hyperkinetic Reaction of Childhood focused on the hyperactivity in children and claimed it was caused by some biological difficulty (Lange et al., 2010).

In 1980, the third edition of the DSM (DSM-III) was published and the name of Hyperkinetic Reaction of Childhood changed to Attention Deficit Disorder: with and without hyperactivity. The definition was changed to include the difficulties in sustained attention and impulse control.

In 1987, the disorder was renamed in the revision of the DSM-III (DSM-III-R) to Attention Deficit Hyperactivity Disorder where the two subtypes of Attention Deficit Disorder--with or without hyperactivity were combined and symptoms were combined into one list including inattention, impulsivity, and hyperactivity (Lange et al., 2010). Since the DSM-III-R, the disorder has remained named Attention Deficit Hyperactivity Disorder throughout multiple editions of the DSM. The definition and criteria have changed over the years. The current definition from the *DSM* (American Psychiatric Association, 2013) is "A persistent pattern of Inattention and/or hyperactivity-impulsivity that interferes with functioning or development, as characterized by [inattention] and/or [hyperactivity and impulsivity]" (p. 59). Those diagnosed with ADHD are specified by one of three types of ADHD: combined presentation, meeting criteria for both inattention and hyperactivity-impulsivity; predominantly inattentive presentation; or predominantly hyperactive/impulsive

presentation (American Psychiatric Association, 2013). The DSM-V (American Psychiatric Association, 2013) also specifies the severity of the ADHD diagnosis by stating whether it is mild, moderate or severe.

Definitions

The DSM-V (American Psychiatric Association, 2013) defines the following terms:

Inattention--wondering off task, lacking persistence, having difficulty sustaining focus, and being disorganized and is not due to defiance or lack of comprehension.

Hyperactivity--excessive motor activity when it is not appropriate, or excessive fidgeting, tapping, or talkativeness.

Impulsivity--hasty actions that occur in the moment without forethought and that have high potential for harm to the individual.

Common Classroom Accommodations and Supports

People diagnosed with ADHD display their symptoms and responds to the environment in their own unique manner. This can make assisting children with ADHD difficult in the classroom because accommodations and supports effectiveness may differ greatly among students. One common modification shown to assist students with ADHD is preferential seating arrangements. Students can be placed near the teacher to easily assist with refocusing, sitting away from distractions such as the

doors, windows, and noisy areas, using privacy boards to block out distractions, being allowed seat breaks, being given the option of sitting or standing to complete tasks, and being placed next to good role models to model expected behavior (Cook, 2005; Sefa, 2005). Teachers can also assist students with ADHD by adjusting their teaching styles to better accommodate all their students' needs by teaching for shorter durations, moving at a steady pace, and allowing wait time for students to think and answer questions (Cook, 2005; Sefa, 2005). Teachers can also include a variety of different types of learning tasks into their lessons such as activities with physical movement, written activities, active listening, and independent and group/partner work. When teachers include combination of teaching styles and learning tasks in their lessons, students are more likely to stay on task, and sustain attention. Also, the extra movement assists with motor needs. These modifications and supports help many students with and without ADHD be successful in the general education classroom; however, for many students with ADHD need more or different strategies for them to reach their fullest potential within the general education classroom.

Research Question

One question guides this literature review: What are effective strategies for assisting elementary school students with Attention Deficit Hyperactivity Disorder (ADHD) in the general education classroom?

Focus of Paper

I identified 12 studies for the Chapter II literature review. Given the broad range of this topic, I chose to narrow it by focusing mainly on the inattention form of ADHD and elementary students in grades Kindergarten through sixth grade. The studies in Chapter II were conducted in both educational and clinical settings.

The Academic Search Premier and Google Scholar database I used to locate studies focus on a variety of keywords and keyword combinations: *Attention Deficit Hyperactivity disorder, Attention Deficit Disorder, special education, inattention, elementary, teaching strategies, learning strategies, therapy ball, stability ball, multimodal therapy, and self-monitoring*. To locate studies, I also conducted a search of The American Journal of Occupational Therapy.

Importance of Topic

As a licensed Developmental Disabilities (DD) special education teacher, I work with a variety of students with a variety of disabilities and diagnosis at the elementary level. I work with many students who are easily distracted and struggle with focusing their attention in the general education classroom which causes low understanding of academics, poor grades, classroom distractions, student, teacher and parent frustrations, and struggles with peers. General education teachers often implement a few modifications for students who struggle with attention problems such as preferred seating arrangements, occasional movement breaks, shortened assignments, shortened teacher instructions, and reminders to stay focused and on-

task. These strategies to help students with attention difficulties are beneficial because students often need more individualized support. I have also observed many teachers only providing supports and modification after a student demonstrates undesired behavior rather than providing supports continuously to promote desired behavior constantly. Students diagnosed with ADHD do not automatically qualify for special education services. Students with ADHD who also demonstrate an academic need in reading, math, or written language may qualify for special education services under the category of Other Health Disabilities (OHD). Students with ADHD may also have a co-diagnosis of either behavioral disorders or learning disorders qualifying them to receive special education services under Emotional Behavioral Disorder (EBD) or Learning Disability (LD) programs.

Strategies of Students with ADHD in the General Education Classroom Studies

Nowacek and Mamin (2007) conducted two studies on modifications students with ADHD receive from their general education teachers. Students with ADHD often have significant academic and behavior difficulties at school, and general education teachers are often unaware of appropriate interventions and modifications. The first study was conducted on four general education teachers, teaching grades 2-6, who were identified by their principal as being effective teachers. Each teacher in the study had 10 or more years of teaching experiences (three had 20 years or more) and were currently teaching students with ADHD. These teachers had between 1-5

students with ADHD in their classrooms with a total of 37-25 students in their classrooms.

Researchers examined the prevalence of characteristics of students with ADHD and modifications used for academics and behaviors to assist students in the classroom. Teachers in the study were interviewed on their knowledge, and their

Chapter II

REVIEW OF LITERATURE

The purpose of this chapter was to review 12 studies that examine struggles of students with ADHD and three classroom strategies assisting students in the general education classroom to increase focusing and academic performance. Studies are divided into four categories: struggles of students with ADHD in the general education classroom, therapy ball, self-monitoring, and a reading comprehension strategy.

Struggles of Students with ADHD in the General Education Classroom Studies

Nowacek and Mamlin (2007) conducted two studies on modifications students with ADHD receive from their general education teachers. Students with ADHD often have significant academic and behavior difficulties at school, and general education teachers are often unaware of appropriate interventions and modifications. The first study was conducted on four general education teachers, teaching grades 2-6, who were identified by their principal as being effective teachers. Each teacher in the study had 10 or more years of teaching experiences (three had 20 years or more) and were currently teaching students with ADHD. These teachers had between 1-5

The second study by conducted Nowacek and Mamlin (2007) was on four middle school teachers, grades 6-8, with 8-37 years teaching science.

students with ADHD in their classrooms with a total of 17-25 students in their classrooms.

Researchers assessed the teachers understanding of characteristics of students with ADHD and modifications used for academics and behaviors to assist students in the classroom. Teachers in the study were interviewed on their knowledge, and then researchers observed their classrooms. The results concluded all teachers in the study were knowledgeable about characteristics of students with ADHD. The general education teachers in the study reported academic modifications in the classroom. Most reported to make whole class modifications rather than individual modification such as utilizing volunteers to enable small group learning, having a structured schedule, helping all students with time management and making notes available for students to copy. The few individual modifications included shortening assignments, modifying spelling lists, adding supplemental reading program, using a scribe for long written assignments, copying math work pages so students did not have to copy problems, and allowing preferred seating choices. Teachers in the study reported behavioral modifications made in the classroom were seating students away from others who distract them, ignoring inappropriate behavior, allowing more movement, and having specific group arrangements. During researcher observations of the classroom, they found these teachers were inconsistent with providing modifications to students with ADHD.

The second study by conducted Nowacek and Mamlin (2007) was on four middle school teachers, grades 6-8, with 8-27 years experiences teaching science,

social studies, math, and language arts. All teachers in the study had two or more students with ADHD in their classrooms. The teachers in the study were interviewed and observed regarding their knowledge and practice with characteristics of ADHD and modifications for academic and behavioral support. Results from the interviews concluded these middle school teachers were knowledgeable about the characteristics of ADHD; however, the middle school teachers in the study reported using far less modification for their students with ADHD. These teachers reported modifications were unnecessary for their students with ADHD. The modifications that were reported used by middle school teachers in the study were modifications to assignments, modifications to environment and the use of others to assist with academics. Behavioral modifications reported were grouping students to assist with focusing attention, and allowing students to get up and move more (turning on/off lights, passing out papers). These teachers reported most students with ADHD are on medication and do not need many modifications and with changing classes frequently students do not need extra movement breaks during class. The teachers in the study also reported utilizing professional resources to assist students. Some of the resources mentioned were professional library for academic assistance, previous teachers, parents, guidance counselors, and special education teachers. Observations determined that middle school teachers in this study made more academic than behavioral modifications.

Both elementary and middle school teachers were familiar and knowledgeable of characteristics of students with ADHD. They all mentioned high distractibility,

impulsivity and inability to stay focused on tasks. Although the teachers in the study were knowledgeable of characteristics, most of these teachers made very few individual modifications for the students. Most teachers in the study had a set of modifications they routinely used for all students, rather than providing individual modification to students with extra needs. Researchers concluded the teachers in the study were knowledgeable of characteristics of students with ADHD but needed additional training to support individual modification for academics and behaviors to support students with ADHD in the general education classroom to be successful.

McConaughy, Volpe, Antshel, Gordon, and Eiraldi (2011) conducted a study about the academic and social impairments of elementary aged children with ADHD. Participants in the study were 178 children (125 boys and 53 girls) ages 6-11 years old, not taking medication for ADHD. The children were placed into three groups: 101 students (73 boys, 28 girls) with a diagnosis of ADHD (ADHD group), 53 students (37 boys, 16 girls) referred for characteristics of ADHD but without diagnosis (non-ADHD Referred group), and 24 students (15 boys, 9 girls) without ADHD (control group). Students within the ADHD group met criteria for different sub groups of ADHD: 76 combined ADHD (inattentive, and hyperactive-impulsive), 23 predominantly inattentive and two predominantly hyperactive-impulsive. There were no significant differences in the three groups in the areas of age.

Students were tested on their academic performance using six different measures. The first measure was the Child Behavior Checklist for Ages 6-18 (CBCL), a rating scale for parents regarding their child's activities, social, school, and total

competence. Academic performance only used the school scale. The second was the Social Skills Rating System (SSRS) where teachers rate the student's social skills, problem behaviors and academic competence. The third measure was the Achenbach System of Empirically Based Assessment Teacher's Report Form (TFR) where teachers list student's academic subjects and rate academic performance. The Wechsler Individual Achievement Test-II (WIAT-II) was used to measure scores for students in the areas of Reading/Language, Mathematics and Written Language. The Tukey's Honest Significant Difference (HSD) test was used to compare multiple procedure and statistical tests. The Tukey's HSD tests showed the ADHD and Non-ADHD Referred groups had significantly lower scores than the control group in all six measures. The ADHD group scored significantly lower on the SSRS Academic competence, TRF Academic Performance and the WIAT-II Mathematics composite score compared to the Non-ADHD Referred group. There were no significant difference between the ADHD group and Non-ADHD Referred group on the CBCL School scale or the WIAT-II Reading/language and Written Language composite scores.

Students were assessed on their Social Behavior using six different measures. The first, second, and third measures were the CBCL: Activities, Social and Total Competence scales. The fourth and fifth measures were the SSRS Social Skills Parent Rating and Teacher Rating Scales. The final measure was the TRF Adaptive Functional report. The Tukey's HSD tests showed the ADHD group scored significantly lower on all six measures than both the non-ADHD Referred and Control

groups. The Non-ADHD Referred group scored significantly lower on five of the six measures compared to the control group.

The overall results of the study determined students with ADHD showed significant academic and social impairments compared to children without ADHD. The effects of the academic and social impairments were medium to large. Students with ADHD also showed significant academic and social behavior impairments compared to students who showed some characteristics of ADHD. Students with ADHD often fell within the average/normal limits on the WIAT-II. Researcher's hypothesis this may be due to students with ADHD having greater struggles with inattention and poor productivity than deficits in their actual academic skills, which is consistent with other research findings.

Table 1 (continued)

Table 1

**Summary of Chapter II Findings on Struggles of Students with
ADHD in the General Education Classroom**

AUTHORS	STUDY DESIGN	PARTICIPANTS	PROCEDURE	FINDINGS
Nowacek & Mamlin (2007)	Qualitative	Study 1: Two primary (grades 1-3) teachers and two upper elementary (grades 4-6) teachers with 5 or more years of experience Study 2: Four middle school (grades 6-8) teachers with 5 or more years of experience.	Study 1 and 2: Teacher interviews and classroom observations on knowledge of academics and behavioral modifications for students with ADHD, then analyzed results	Study 1: Teachers were knowledgeable about ADHD. Implemented whole class modifications for academics and behaviors. Individual modifications were few and inconsistently implemented. Study 2: Middle school teachers were knowledgeable about ADHD, but implemented very few modifications for academics and behaviors.

Therapy Ball Studies

Schilling, Washington, Billingsley, and Deitz (2003) conducted a study on the effects of using therapy balls versus chairs with children with ADHD. Many students with ADHD experience academic and sensory deficits, which can make routine activities within the general education classroom challenging, such as sitting and paying attention during lessons and assignments. The therapy ball was used to help students with ADHD and attention issues focus on lessons and assignments in the use

Table 1 (continued)

AUTHORS	STUDY DESIGN	PARTICIPANTS	PROCEDURE	FINDINGS
McConaughy, Volpe, Antshel, Gordon, & Eiraldi (2011)	Quantitative	One hundred seventy-eight children split into three groups with age range of 6-11, 125 boys and 53 girls. -ADHD group=101 participants -Non-ADHD Referred group= 52 participants -Control group= 24 participants	Participants were administered the WISC-IV(Wechsler Intelligence Scale for Children-Fourth Edition), WIAT-II(Wechsler Individual Achievement Test- Second Edition), and a computerized continuous performance test all in a three hour session with 15 minute breaks, some children were tested over two days instead of 1. Upon completion of each test the child's behavior was rated on test observation form.	WIAT-II: ADHD group scored significantly higher in reading, math and written language compared to Non-ADHD Ref. Group and control group. Non-ADHD group scored significantly lower than control group in reading, math and written language.

Therapy Ball Studies

Schilling, Washington, Billingsley, and Deitz (2003) conducted a study on the effects of using therapy balls versus chairs with children with ADHD. Many students with ADHD experience academic and sensory deficits, which can make routine activities within the general education classroom challenging, such as sitting and paying attention during lessons and assignments. One strategy hypothesized to help students with ADHD and attention issues focus on lessons and assignments is the use

of therapy balls for seating instead of the traditional chairs. Therapy balls are hypothesized to promote improved attention, sustained sitting, increase classroom performance and help calm bodies. Schilling et al. (2003) used a single subject ABAB interrupted time series design (chair, ball, chair, ball) with three students diagnosed with ADHD. All three students were in one fourth-grade classroom with a total of 24 students. Of the three students, one was female and two were male; the two male students also had behavior diagnosis and all three students were taking medication related to their ADHD. All 24 students in the classroom also used the therapy balls instead of chairs for the duration of the study. Therapy balls were fitted for each student, and balls had molded feet that would extend when ball was not in use to prevent rolling around.

Students were observed for 12 weeks for 40 minutes during the mid-portion of their language arts class that included writing, which took place at the same time daily, immediately following lunch and recess. Students were observed for in-seat behavior and legible word production. In-seat behavior was defined as "behavior that occurred when any portion of a participant's buttocks was in contact with the seat portion of the chair/ball and four legs of the chair/ball was in contact with the floor and a minimum of one foot of the participant was in contact with the floor." A 3-week baseline was conducted and a 1-week novelty effects period where no data collection was allowed. Two pediatric therapists were the data collectors during the study, and both therapists observed the same student at the same time to promote inter-observer reliability. Each participant was observed for five 2-minute periods and recorded behavior every 10

seconds for in-seat behavior. For legible word productivity, five writing samples were randomly selected during each phase of the study.

All students showed an increase of in-seat behavior while using the therapy balls. Two of the three students, while using a chair, were in-seat between 40-60% of the time, while using the therapy balls there were in-seat between 80-100% of the time. The third student had much more variability of in-seat with chair behavior between 40-100% of the time but while using the ball was increased to 80-100% of the time. For legible word productivity on written assignments, all students showed an increase in legible word production while using therapy balls than while using chairs. The increase varied greatly between all three students; however, all students' legible word productivity increased to near or higher than the classroom mean.

All 24 students reported they preferred the balls to the chairs for comfort, improved writing, increased listening ability and classroom work productivity. The teacher in the study reported noise level decrease; students were more focused and even with bouncing students appeared to remain calmer.

Fedewa and Erwin (2011) conducted a study on the effectiveness of using stability balls with students with attention and hyperactivity concerns. The study was conducted in an elementary school with four classrooms being assessed: grades 3-5. Seventy-six students within the four classrooms were assessed using the Attention-Deficit/Hyperactivity Disorder Test (ADHDT); students scoring in the 92nd percentile or higher were targeted for the study. Out of the original 76 students, eight were chosen to be observed for the study for on-task and in-seat behaviors. The eight

students being observed had a mean age of 9 years, 11 months, with six boys and two girls. None of the children were on medication.

Fedewa and Erwin (2011) focused their study on in-seat and on-task behaviors. They gathered a baseline data for 2 weeks observing each of the eight students for 3 days per week for 30 minutes rotating times of day and subjects (math, language arts, and social studies), scoring them every 30 seconds for on/off task behavior and in/out of seat behavior. Baseline data showed for all students the average on-task behaviors observed was 10% of the time and in-seat behavior of 45% of the time. Stability balls were fitted and given to all students in all four of the classrooms, but observations for on-task and in-seat behaviors were only observed for the targeted eight students. After implementing the stability balls for 12 weeks of intervention, the average for the eight students' on-task behaviors increased from 10% to 80% of the time, and in-seat behaviors increased from 45% to 94% of the time.

After the 12 weeks of intervention, all students were again assessed using the ADHDT. Both groups of students (students in the study and the general classroom) showed an average drop in scores for hyperactivity and inattention. These teachers reported they noticed the stability balls helped their students calm their bodies, provided natural activity breaks and decreased the overall noise level in the rooms. These teacher's original concerns of constant movement and fidgeting on the ball were removed when the teachers realized the natural movement of the ball replaced the amount of movement and fidgeting typically displayed by students. The main disadvantage teachers reported was the cost of replacing balls when broken. The use

of stability balls in elementary classrooms was shown to improve student on-task and in-seat behavior for students with attention and hyperactivity concerns.

Wu, Wang, Chen, Lai, Yang, and Guo (2012) conducted a study on the effects of using therapy balls versus chairs in a controlled testing setting for reaction time and accuracy. Fifteen students participated in the study, ages 6 to 10, 11 boys and four girls, diagnosed with ADHD with and without co-diagnosis. None of the students took medication during the study. Fourteen aged matched children, seven boys and seven girls, were used as the control group. Students used a therapy ball where their feet sit flat on the ground and legs are at a 90 degree angle. The chair used was a general wooden classroom chair without armrests. When students heard the target sound, they were directed to press the button on the radio telemetry handheld trigger to record reaction time. Three different testing sessions were held with different tone frequencies for each seating condition ball and chair. Students were directed to push the button when they heard the higher frequency sound (target tone) and do nothing when they heard the lower frequency sound (non-target tone).

The results of the study showed that students with ADHD had significantly faster reaction time while using the ball versus the chair. The control group, without ADHD, also had a faster reaction time while using the ball versus the chair; however, results were non-significant. When comparing reaction time with ADHD students and control group results for reaction time are non-significant between the two groups. Both groups, students with ADHD and the control group, demonstrated similar results

for accuracy with being slightly more accurate when using the chair, but results were non-significant within and across groups.

Table 2

Summary of Chapter II Findings on Therapy Balls

AUTHORS	STUDY DESIGN	PARTICIPANTS	PROCEDURE	FINDINGS
Schilling, Washington, Billingsley, & Deitz (2003)	Quantitative	Three students (two boys and one girl) 9 years old with ADHD diagnosis. Twenty-one additional students in the same fourth grade class without ADHD diagnosis.	Each student in the classroom was individually fit for his/her own therapy ball. Students were observed during language arts class. A single subject A-B-A-B interrupted time series design was used students were recorded on their in-seat behavior and legible word production. Intervention was used in the general education classroom.	The use of therapy ball increased in-seat behavior and legible word productivity for all students with ADHD

Table 2 (continued)

AUTHORS	STUDY DESIGN	PARTICIPANTS	PROCEDURE	FINDINGS
Fedewa & Erwin (2011) Yang, & Guo (2012)	Quantitative	Eight students (six boys and two girls) in fourth and fifth grade mean age of 10 who scored in the 92 nd percentile on the Attention-Deficit/Hyperactivity Disorder Test (ADHDT)	Four fourth and fifth grade classrooms were given the ADHDT. Students scoring in the 92 nd percentile or higher were chosen to use Therapy balls instead of chairs in the classroom. Momentary Time Sampling (MTS) was used to collect data every 30 seconds for 30 minute periods of time for on and off task behaviors for 14 weeks using an A-B continuous time series design including 2 weeks of baseline. Intervention was used in the general education classroom.	Students using the therapy balls began with a baseline of an average of 10% time on task and after 12 weeks of data collection increased to an average of 80% time on task.

Self-Monitoring Studies

Mathes and Bowler (1977) conducted a study on the effects of self-monitoring with students with ADHD who also are receiving medication. Self-monitoring can help control symptoms in approximately 70% of students with ADHD. Students with ADHD using medication to help control symptoms plus use other types of

Table 2 (continued)

AUTHORS	STUDY DESIGN	PARTICIPANTS	PROCEDURE	FINDINGS
Wu, Wang, Chen, Lai, Yang, & Guo (2012)	Quantitative	Fifteen children (11 boys and four girls) diagnosed with ADHD. Age range of 6-10. Control group: 14 age matched children (seven boys and seven girls) with no diagnosis.	Each participant was given a 48-cm diameter therapy ball fitted individually to sit with feet flat on floor, loop pipe was used for ball stability. A standard wooden classroom chair was also used. And EEG system was used to record Student's reaction time to stimulus was recorded while sitting on either the therapy ball or wooden chair. A radio telemetry handheld trigger was used by children to record responses. Intervention was performed in a clinical setting.	Children without a diagnosis showed faster reaction time in the chair condition compared to the children with ADHD. Children with ADHD had significantly difference faster reaction times using the therapy ball than a chair. Students with no diagnosis showed no significant differences between chair and ball.

Self-Monitoring Studies

Mathes and Bender (1997) conducted a study on the effects of self-monitoring with students with ADHD who also are receiving medication. Medication can help control symptoms in approximately 70% of students with ADHD. Students with ADHD using medication to help control symptoms often also need further types of

positively to medication. Self-monitoring is a cognitive-behavioral strategy that is hypothesized to improve attention in students with ADHD even while taking medication for ADHD symptoms.

Mathes and Bender (1997) focused their study on monitoring on-task behavior in three elementary boys, ages 8-11, in grades 3, 4, and 5, diagnosed with ADHD with a co-diagnosis of a Behavioral Disorder (BD) which qualified them to receive special education services. All three students were on medication for their ADHD symptoms but also displayed problem behavior in both general and special education classrooms for disruptive behavior, not completing tasks, frequent talking out in class, not following directions and daydreaming during class.

During the study, students would be observed for 10 minutes during their seat work in their special education classroom. Students would be taught to monitor their on-task behavior and record a + for on-task or - for off task behavior when they heard the tone from the cuing tape on their monitoring chart. Inter-observer agreement was used to measure accuracy throughout the study, by a primary observer and a secondary observer, agreement was 92-100% during the study.

The results of the study showed on-task behavior improved significantly for all three students. During baseline, student's on-task behavior was at 40%, 38% and 37%. During the intervention, on-task behavior increased to 97%, 87%, and 94% on-task behavior. On task behavior continued to be high for students during fading phase 1 where students no longer used cuing tapes but continued to use self-monitoring sheets, and fading phase 2 where students no longer used cuing tapes or self-

sheets, and fading phase 2 where students no longer used cuing tapes or self-monitoring sheets but their teacher verbally reminded students to self-monitor. About a month into the study, a second baseline was conducted on students 1 and 2 where students did not use cueing tape, self-monitoring sheet or teacher reminders to self-monitor. Students' on-task behavior decreased to an average of 60% and 46% on-task behavior during second baseline, which was higher than original baseline. The intervention was again put into place with fading phase 1, where students used the self-monitoring sheets with teacher reminders. Students' on-task behavior again increased to 92% and 97% accuracy for fading phase 1. During fading phase 2, students no longer used the self-monitoring sheets but still had teacher reminders to self-monitor, students on-task behavior continued to remain high with 99% and 97% accuracy. Self-monitoring of on-task behavior significantly increased on-task behavior in students with ADHD who also received medication for ADHD symptoms.

Harris, Friedlander, Saddler, Frizzelle, and Graham (2005) conducted a study on the effects of self-monitoring of attention and self-monitoring of academic performance. The study took place in an elementary school with approximately 420 students ranging from Head Start program to fifth grade. Six students with ADHD in grades 3 to 5 were selected to participate in the study. All students were on medication for ADHD, received special education services, and continued to have difficulties with attention and academic performance in the classroom.

Harris et al. (2005) focused their study on on-task performance and academic performance, specifically on spelling words correctly. Students were observed every

morning, Monday through Thursday, for 10 minutes during their daily spelling period. Observers used momentary time sampling procedures to measure on-task behavior. Each student was observed individually and was scored at 3-second intervals for on/off-task behavior when the observer heard a tone over his/her headphones. The observer also recorded the number of words spelled correctly during the spelling time. Each student was observed 50 times each session. Inter-scorer agreements were used to ensure accuracy. Baseline data were collected for 6-17 weeks depending upon when student demonstrated stability or decreasing trend in ability to stay on-task. Students were taught self-monitoring in pairs, and the order in which the interventions were taught were alternated.

Students used the self-monitoring techniques during the same days and times as during baseline and used the same procedures as the observers. Students were taught to record on/off-task behavior on monitoring sheet when they heard the tone sound in their headphones. Students were also instructed to record the amount of words spelled correctly at the end of their spelling time and place number on their graph. Students used each self-monitoring technique for 6-7 weeks.

Results from the study showed an increase of on-task behavior and academic performance for all students participating in the study. Baseline results for on-task behavior averaged 55%, and after self-monitoring of attention intervention, students increased their average on-task behavior to 92% and after self-monitoring performance intervention on-task behavior increased to an average of 87%. Baseline results for academic performance averaged 38 words spelled correctly and after self-

monitoring of attention intervention students increased their average academic performance to 114 words spelled correctly and after self-monitoring performance intervention on-task behavior increased to an average of 83 words spelled correctly. Both self-monitoring of attention and self-monitoring of academic performance significantly increased student with ADHD's on-task behavior and academic performance. (Rock, 2005, p. 7). Characteristics by groups 1 and 2 (see table)

Rock (2005) conducted a study on the effects of self-monitoring to increase academic engagement, productivity, and accuracy of students with and without ADHD. Nine students participated in the study whose teachers recommended them for the study based on problematic behavior and difficulty with focusing. The nine students ranged in age from 7 to 3. Seven of the nine students had various diagnosis, one was identified as gifted, one Aspergers syndrome, one Floating Harbor syndrome with speech and language impairment, one learning disability and ADHD, one learning disability, one developmentally delayed with speech and language impairment, and one with ADHD. The study was conducted within the student's general education classrooms. Six students were in one multiage classroom, grades fourth and fifth with 22 total students. Three students were in another multiage classroom, second and third grade with 21 students total. Both classrooms had one general education teacher and one teacher assistant. The researchers used a multiple baseline across subject design for the study. During the study, students used a graphic organizer, timing device, self-monitoring sheet or booklet, recording interment and instructional materials necessary for assignments (Accelerated Math worksheet, scan

card and Accelerated Reader book). Academic disengagement (time off-task) was collected for group 1 and Academic engagement (time on-task) was collected for groups 2 and 3. Academic disengagement was defined as "a student not participating in math-related independent seatwork assignments" (Rock, 2005, p. 7). Academic engagement was defined as "a student participating in reading or math related assignments" (Rock, 2005, p. 7). Observations for groups 1 and 2 were conducted during math or reading period from 1:30-2:15 p.m. and 11:00-12:00 p.m. for group 3. Four observers were used for all observations and to ensure inter-observer agreement and baseline data was collected.

During the intervention, students were taught the steps for a strategic self-monitoring intervention, called ACT-REACT [Articulate your goals, Create a work plan, Take pictures, Reflect using self-talk, Evaluate your Progress, and ACT (Articulate your goals, Create a work plan, Take pictures) again] strategy. Using the ACT-REACT strategy students were taught to do a combination of Self-Monitoring Attention (SMA) and Self-Monitoring Performance (SMP).

The results of the Rock (2005) study are displayed in Table 3. Group 1 data is average rate per minute of student disengagement; groups 2 and 3 data is percentage of student engagement.

disengagement and increased their percentage of engagement while using self-monitoring.

Table 3
Self-Monitoring Results

Groups	Students	Baseline	Intervention 1 ACT-REACT	Return to Baseline	Intervention 2 Reinstatement ACT-REACT
Group 1 average rate per minute of disengagement	Student #1	0.66	0.17	0.49	0.16
Group 1 average rate per minute of disengagement	Student #2	0.81	0.10	0.66	0.07
Group 1 average rate per minute of disengagement	Student #3	0.75	0.26	0.55	0.10
Group 2 Percentage of student engagement	Student #4 ADHD	4.60	84.44	47.60	86.30
Group 2 Percentage of student engagement	Student #5	4.27	84.63	34.38	81.50
Group 2 Percentage of student engagement	Student #6	47.42	94.70	51.40	90.18
Group 3 Percentage of student engagement	Student #7	37.40	88.10	57.81	91.00
Group 3 Percentage of student engagement	Student #8 ADHD	34.19	86.74	46.40	89.80
Group 3 Percentage of student engagement	Student #9	54.46	88.10	46.80	90.65

The results from the Rock (2005) study showed that students with problematic behavior and attention focusing issues decreased their average rate per minute of

disengagement and increased their percentage of engagement while using self-monitoring.

Table 4

Summary of Chapter II Findings on Self-Monitoring

AUTHORS	STUDY DESIGN	PARTICIPANTS	PROCEDURE	FINDINGS
Mathes & Bender (1997)	Quantitative	Three male students with ADHD ages range from 9-11 already receiving medication for ADHD.	An interval observation system was use daily to measure on-task behavior during 10 minute observation sessions. Baseline data was collected and students were taught self-monitoring procedures. After students were trained in self- monitoring and on-task expectations, students were asked to record on/off-task behaviors when they heard the designated tone from cueing tape. After 10 days of interventions, the cueing tape tones were removed and students were asked to record on/off task behaviors independently and finally asked to monitor on/off-task behaviors without cueing tape tones or recording on/off-task behaviors. Observer was also recording on/off task to measure inter-observer agreement.	Self-monitoring of on-task behaviors significantly improved all 3 student's on-task behavior. Students had a baseline average 38% on-task behavior. With self-monitoring student's on-task behavior increase to 92%. Self-monitoring was determined to be an effective procedure for increasing on-task behavior beyond effects of medication.
Rock (2015)		Elementary boys and girls age range from 7-11 in classroom		Increased student engagement, productivity, and accuracy in relation with self without diagnosed disabilities in the general education classroom.

Table 4 (continued)

AUTHORS	STUDY DESIGN	PARTICIPANTS	PROCEDURE	FINDINGS
Harris, Friedlander, Saddler, Frizzelle, & Graham (2005)	Quantitative	Six elementary students in third, fourth, and fifth grade with ADHD. All students received medication for their ADHD.	A counterbalanced, multiple-baseline design was used during this study. Students were taught the self-monitoring interventions of self-monitoring attention (SMA) and self-monitoring performance (SMP) in groups of 2 while alternating the order of interventions being taught. Interventions were used in the general education classroom	Self-monitoring of on-task behaviors using SMA increased students on-task behavior by an average of 39% and SMP increased student's on-task behavior by an average of 36%. Self-monitoring of academic performance using SMA increased students correctly practicing a spelling word by an average of 66 words and SMP increased student correctly practicing a spelling word by an average of 45 words during the study phase.
Rock (2005)		Seven boys and two girls' age range from 7-13 in inclusive classrooms. 2 students had no diagnosis, 2 students had ADHD diagnosis, and 5 students had other diagnosis, all students were identified as having off-task behavioral concerns.	A multiple-baseline-across-subjects design with an embedded reversal was used to measure the success of SMA +SMP self-monitoring intervention strategy (ACT-REACT strategy) with academic engagement, productivity and accuracy.	The strategic ACT-REACT self-monitoring intervention increased academic engagement, productivity, and accuracy in students with and without diagnosed disabilities in the general education classroom.

Reading Comprehension Strategy Studies

Cain and Bignell (2014) conducted two studies on reading and listening comprehension related to students inattention and hyperactivity. Study 1 focused on whether reading comprehension was correlated with teacher ratings of attention and/or hyperactivity. In study 1 there were 66 participants (44 boys and 22 girls) ages 7-11 years old. All students were rated by teachers and parents using the Conners Rating Scales-Revised, and teachers completed two subscales of the ADD-H Comprehensive Teacher Rating Scale relating to attention and hyperactive behavior. Thirty-three of the students were rated by their teachers and parents as having one of the three subtypes of ADHD. None of the children had a formal diagnosis of ADHD. The other 33 students were matched with the ADHD group with age and gender but received developmentally appropriate scores for inattention, hyperactivity, and impulsivity. Six groups were created with 11 students in each; high hyperactivity, high hyperactivity control, poor attention, poor attention control, combined (high hyperactivity and poor attention), and combined control. Students were also rated on their receptive vocabulary using the British Picture Vocabulary Scale=II, non-verbal ability using the Matrix Analogies Test-Short Form, and word reading accuracy and reading comprehension using the Neale Analysis of Reading Ability-Revised British Edition.

The results of study 1 showed the hyperactive-only group did not have a significant difference from the control group in any of the areas of receptive vocabulary, non-verbal ability, or word reading accuracy and reading comprehension. The inattention-only group did differ significantly from the control group in the areas

of receptive vocabulary, word reading accuracy, and reading comprehension. The combined group also differed significantly from the control group in the area of word reading accuracy and reading comprehension.

Study 2 by Cain and Bignell (2014) focused on the performance of students with symptoms of inattention and/or hyperactivity on listening comprehension. This was completed by comparing reading and listening comprehension performance to student's demonstration characterizes of ADHD subtypes: attention only, hyperactive only, combined (attention and hyperactivity), and a control group. There were 64 participants in the study (different participants from study 1) aged 7-11 years old, none receiving medication for ADHD. There were four groups each containing 16 participants in each group. The control group was matched for chronological age, non-verbal ability and receptive vocabulary.

Students were also rated on their non-verbal ability using the Matrix Analogies Test-Short Form, receptive vocabulary using the British Picture Vocabulary Scale=II, word reading in context and reading and listening comprehension using the Neale Analysis of Reading Ability-Revised British Edition, and single word reading using the British Ability Scales-Second Edition.

The results of the Cain and Bignell (2014) study 2 showed for word reading that poor attention and combined groups scored significantly different from the high hyperactivity and control group. Results for reading and listening comprehension showed high hyperactivity, poor attention, and combined groups all scored higher on reading comprehension than listening comprehension, none of the scores were

significantly different from each other or the control group. The control group results showed higher scores in listening comprehension than reading comprehension, scores were not significant.

Cain and Bignell (2014) determined word reading difficulties and inattention were associated with each other. Students with poor attention also had low word level, which was associated with difficulties with reading comprehension, while students with high hyperactivity did not show significant difficulties with word reading or reading comprehension. Students with difficulties with attention were at higher risk for having reading difficulties.

Rogevich and Perin (2008) conducted a study on the effects of science summarization and reading comprehension using the comprehension strategies Think Before Reading, Think While Reading, and Think After Reading with Written Summarization (TWA-WS) with adolescents with behavior and attention disorders. TWA is a reading strategy where students learn to set goals during their reading and self-monitor themselves during reading to help with comprehension. There are three phases of TWA: Before Reading, During Reading and After Reading. The first step, Before Reading, students are taught to activate prior knowledge of the subject they will be reading. They do this by thinking about the author's purpose, what they know about the subject, and what they want to learn. The second step, During Reading, students learn how to monitor their understanding of the what they read and reread if necessary, make connections to their past knowledge and monitor their speed by slowing down during areas of less understanding. The third step, After Reading,

students think about the main ideas, summarize the information and then state what they have learned.

The purpose of the study was to determine if TWA-WS was an effective comprehension strategy for students with behavioral disorders and ADHD.

Participants were 63 male students' ages 13-18 years old staying at a self-contained residential treatment facility, length of stay varied from 1 to 2 years. All participants had diagnosis of behavioral disorders (conduct disorder, oppositional defiant disorder, or both) and ADHD; 32 students had behavioral disorders only (BD-only) and 31 students had behavioral disorder and ADHD (BD+ADHD). On the formal reading assessments, students scored an average of a fifth grade reading level. Students attended special education classes at the treatment facility in small class sizes of about 15 and instruction in small groups within classes.

Students were separated into four groups for the study: Behavioral Disorder (BD) students receiving intervention (BD/intervention), students with co-diagnosis BD and ADHD receiving intervention (BD+ADHD/intervention), BD students not receiving intervention (BD/practice), and participants with BD and ADHD not receiving intervention (BD+ADHD/practice). All students were given the same science reading and written summarization pretest. Instructors saw all students receiving interventions in small groups of 3-4 over eight different sessions. Students were given a science reading assessment with written summarization post-test after intervention was complete, then near transfer assessment after intervention students were given a social studies reading assessment and written summarization of passage,

far assessment students read two science passages and were given a reading assessment and asked to write a summary, and 3 weeks after instruction students were given a maintenance science reading passages, assessment, and asked to write a written summary.

The reading comprehension pretest averages showed no significant differences between the four groups with IQ or reading ability. The BD/intervention scored on the reading comprehension pretest an average of 21.2, the BD+ADHD/intervention scored an average of 25.6, the BD/practice scored an average of 26.6, and the BD+ADHD/practice scored an average of 28.4. The posttest showed significant increased average performance of reading comprehension for both intervention groups; the BD/intervention scored an average of 67.9, and BD+ADHD/intervention scored an average of 64.0. Students who did not receive intervention did not show significant gains in performance on posttest. The BD/practice scored a reading comprehension average of 29.6, and the BD+ADHD/practice group scored an average 31.9. On the near transfer assessment the BD/Intervention group scored an average of 59.0, the BD+ADHD/Intervention group scored an average of 53.0, the BD/practice group scored an average of 27.7, and the BD+ADHD/practice group scored an average of 31.9. On the far transfer assessment, the BD/intervention group scored an average of 57.0, the BD+ADHD/Intervention group scored an average of 44.0, the BD/practice group scored an average of 20.3, and the BD+ADHD/practice group scored an average of 22.2. The maintenance assessment the BD/intervention group scored an average of 55.9, the BD+ADHD/Intervention group scored an average of 44.5, the BD/practice

group scored an average of 28.1, and the BD+ADHD/practice group scored an average of 30.6. The BD/Intervention group showed significantly greater gains than BD+ADHD/intervention group on near transfer, far transfer, and maintenance. Both intervention groups; BD-only and BD+ADHD, showed regression in their reading comprehension ability and written summaries during near transfer, far transfer, and maintenance, but did not drop as far as the original pretest averages.

Students reported enjoying and benefiting from the reading comprehension and writing intervention. Students reported the strategy helping with monitoring reading speed, thinking about what they already know, and figuring out what is important in the passages. Researchers suggest students may need added intervention sessions to help students with transfer and maintenance of reading and writing strategy.

Hedin, Mason, and Gaffney (2011) conducted a study on the effects of the comprehension strategy Think Before Reading, Think While Reading, and Think After Reading (TWA) on students with attention disabilities. Students with ADHD are at higher risk for academic failure especially in the areas of reading and reading comprehension.

Hedin et al.'s (2011) study focused on two male students one in fourth grade and one in fifth grade, both with ADHD diagnosis. Both students received special education services and had goals for reading comprehension on their Individual Education Plans (IEP). One student took medication for ADHD. Their teacher taught each student how to use TWA during 10 one-on-one lessons using an AB design. Each student completed three to four comprehension probes prior to instruction. After

each of the 10 lessons, students completed one reading probe, one post instruction probe immediate after instruction, one 5-day delay post-instruction probe, one 5-day delay generalization probe with an unknown tester, and finally one 4-week and one 8-week probe post-instruction.

The results of the Hedin et al. (2011) study showed the fourth grade student, not on medication, was able to identify main ideas with a baseline average score of .33 out of a possible six main ideas. During instruction, the student scored varied with identifying two to four of the main ideas, post-instruction he was able to identify three main ideas, 5-day delay post-instruction he was able to identify four main ideas, 5-day delay generalization with an unknown tester he was able to identify two main ideas, 4-week post-instruction he was able to identify two main ideas, and 8-week post-instruction he was able to identify one main idea. The fourth grade student was able to retell the passages using main idea with supporting details beginning with a quality score baseline average score of one out of a possible seven. During instruction the fourth grade student increased his quality score of retelling to a varying score ranging from three to five, post-instruction score of four, a 5-day delay post-instruction score of a five, a 5-day delay generalization with an unknown tester score of a three, a 4-week post-instruction score of a 3 and an 8-week post-instruction score of a two.

The results for the fifth grade student on medication where he was able to identify main ideas with a baseline average score of .25 out of a possible six. During instruction the fifth grade student increased his ability to identify main ideas to two to five, post-instruction he was able to identify four, 5-day delay post-instruction he was

able to identify one, 5-day delay generalization with an unknown tester he was able to identify two, and 4-week post-instruction he was able to identify one. The fifth grade student was able to retell the passages using main idea with supporting details beginning with a baseline average quality score of one out of a possible seven. During instruction the fifth grade student was able to increase his quality score varying from a three to a six, a three to five, post-instruction score of a six, a 5-day delay post-instruction score of three, 5-day delay generalization with an unknown tester with a score of three, and a 4-week post-instruction score of one.

Both students showed significant increase in their abilities to identify main ideas and retell the passages while receiving instruction on using TWA. Once instruction was removed, both students' comprehension on the passages eventually decreased back to baseline. Showing the students were unable to maintain and generalize their learning of the strategy TWA. Authors suggest students may need more time learning and practicing the comprehension strategy TWA in order to maintain and generalize. Both students reported the strategy helped them become better readers by remembering to reread and monitor their speed during reading.

Mason, Meadan-Kaplansky, Hedin, and Taft (2013) conducted a study on low achieving students with and without disabilities using the comprehension strategy Think Before Reading, Think While Reading, Think After Reading (TWA). Seventy-seven fourth-grade students, 26 males and 33 females, struggling with informational reading comprehension participated in the study. Nineteen of the 77 students were identified with a learning disability. The students' reading comprehension abilities

were two to three grade levels below their same grade peers. Students were randomly divided into three different groups: 29 students in the TWA group, 30 students in the TWA+ written instruction, and 18 students in the no-treatment control group. Prior to instruction, students were also required to complete a learning contract to establish long-term general goals for the TWA strategy. Students received 12-15 30-minute lessons of TWA instruction over a 2-month period, where they were instructed on how to use and practiced the nine steps of TWA. During TWA lessons, students developed and reviewed self-instructions of what strategies to use before, during and after reading. After the 2-month period of instruction was complete students completed an interview about the TWA instructional strategy regarding how the TWA strategy helped or did not help the student become a better reader and student opinions regarding the TWA strategy in effectiveness.

Results of the study were based on student post-instruction interviews of participants. Fifty-six of the 59 students who received the TWA instruction reported the comprehension strategy helped them become better readers. Thirty-three of the 56 students reported specific steps used before, while, and after reading that benefited their comprehension of the text. Twenty-three students reported the strategy as a whole helped them become better readers and understand what they read better, 29 students specifically reported engaging in self-monitoring and 18 students reported goal setting as helping them become better readers. Students were asked which of the nine steps of TWA they found to be the most beneficial; 39 students reported rereading, 29 reported adjusting reading speed, 25 reported thinking about the main

idea, and 21 reported thinking about the author's purpose. Overall, students reported they found the most benefits of the three steps in the second phase of the TWA strategy, Think While Reading, as helping them become better readers and increasing their reading comprehension. Students with and without learning disabilities reported benefitting from and enjoy using the TWA comprehension reading strategy in assist them with increasing their reading and reading comprehension abilities.

Table 5

Summary of Chapter II Findings on Reading Comprehension Strategies

AUTHORS	STUDY DESIGN	PARTICIPANTS	PROCEDURE	FINDINGS
Cain & Bignell (2014)	Quantitative	<p>Study 1: 66 children half were diagnosed with ADHD without receiving medication (44 boys and 22 girls) aged 7-11 years</p> <p>Study 2: 64 children diagnosed with ADHD without receiving medication, ages 7-11 matched for age, non-verbal ability and different to study 1</p>	<p>Study 1: Teachers completed ADD-H Comprehensive Teacher Rating Scale. Children were divided into 6 groups: High hyperactivity, Poor attention, Combined and three Control groups were matched to each group for age and gender but scored within normal limits for attention and hyperactivity. Receptive vocabulary was measured using the British Pictures Vocabulary Scale-II (BPVS-II). Non-verbal reasoning ability was measured using the Matrix analogies Test-Short Form (MAT-SF) Word reading accuracy and reading comprehension were measured by the Neale Analysis of Reading Ability-Revised</p>	<p>Study1: Hyperactive-only group did not differ from controls on any measures. Inattention -only group differed significantly from controls on receptive vocabulary and word reading accuracy and reading comprehension. Combined group differed from control group on word reading and reading comprehension.</p> <p>Study 2: Hyperactive-only group did not differ from controls on any measures. Inattention -only</p>

Table 5 (continued) AUTHORS	STUDY DESIGN	PARTICIPANTS	PROCEDURE	RESULTS
Rogevich & Perin (2008)	Quantitative	Sixty-three boys age range of 13-16, diagnosed with behavioral disorder, conduct disorder, oppositional defiant disorder or ADHD. 35 Caucasian, 41% African American, 24% Hispanic	<p>British Edition (NARA-II)</p> <p>Study 2: Teachers completed ADD-H Comprehensive Teacher Rating Scale. Children were divided into 4 groups: High hyperactivity, Poor attention, Combined and 1 Control group were matched to each group for age and gender but scored within normal limits for attention and hyperactivity. Receptive vocabulary was measured using BPVS-II. Non-verbal reasoning ability was measured using the MAT-SF. Word reading in content was measured using NARA-II Single word reading was measured using the British Ability Scales-II.</p>	group and combined group differed significantly from control word reading. There was not a significant difference in reading or listening comprehension for any of the groups but the reading and listening comprehension was lower for the attention-only and combination group compared to the hyperactive-only and control.
			<p>posttest, near transfer test, and far transfer test.</p> <p>Session 8: Occurred 3 weeks later and were given the maintenance and social validity measures.</p>	

Table 5 (continued)

AUTHORS	STUDY DESIGN	PARTICIPANTS	PROCEDURE	FINDINGS
Rogevich & Perin (2008)	Quantitative	Sixty-three boys age range of 13-16, diagnosed with behavioral disorder, conduct disorder, oppositional defiant disorder or ADHD. 35 Caucasian, 41% African American, 24% Hispanic	Students were grouping into 2 groups: Intervention group or comparison group (matched for IQ and reading level.) Instructors saw students in groups of 3-4 over eight sessions. Session 1: Students were given the Gates-MacGinitie Reading Tests and a written summarization pretest Sessions 2-6: students received lessons in groups and were taught the reading strategy Think Before Reading, Think While Reading, Think After reading With Written Summarization (TWS-WS). Session 7: Students were administered written summarization on reading passages: posttest, near transfer test, and far transfer test. Session 8: Occurred 3 weeks later and were given the maintenance and social validity measures.	The study showed students taught the TWS-WS reading strategy were found to produce statistically significant improvements in their reading comprehension compared to the comparison group not receiving the strategy instruction.
Mason, Meador-Kaplan, Bedin, & Taff (2013)	Qualitative	Seventy-seven fourth-grade students with and without disabilities	Session 8: Occurred 3 weeks later and were given the maintenance and social validity measures.	Fifty-six out of 57 students reported that the TWA reading comprehension strategy helped them to become better readers, understood what they read more, and enjoyed using the strategy.
			Session 8: Occurred 3 weeks later and were given the maintenance and social validity measures.	

Table 5 (continued)

AUTHORS	STUDY DESIGN	PARTICIPANTS	PROCEDURE	FINDINGS
Hedin, Mason, & Gaffney (2011)	Quantitative	2 male students diagnosed with ADHD ages range 10-11	Teacher taught students the Think Before Reading, Think While Reading, Think After reading (TWA) reading comprehension strategy in 10 one-on-one sessions using an AB design. 3-4 baseline probes were collected, probe prior to each lesson, 1 probe post instruction, 5 day delay post instruction, 5 day delay generalization and maintenance at 4 and 8 weeks post instruction	All students significantly increased their reading comprehension skills of identifying main ideas, supporting details, and retelling. Post intervention student's reading comprehension decreased causing students to fail to maintain or generalize the comprehension strategy. Author suggested more time was needed in teaching strategy to increase skills of maintenance and generalization.
Mason, Meadan-Kaplansky, Hedin, & Taft (2013)	Qualitative	Seventy-seven fourth-grade students with and without disabilities	Students created learning contracts, teacher taught students the Think Before Reading, Think While Reading, Think After reading (TWA) reading comprehension strategy, and students were interviewed regarding benefits, likes and dislikes of using TWA reading comprehension strategy.	Fifty-six out of 59 students reported that the TWA reading comprehension strategy helped them to become better readers, understand what they read more and enjoyed using the strategy.

Chapter II Summary

In this chapter, I reviewed 12 studies that examined the struggles of student with ADHD and three classroom strategies proven to assist students increase their ability to focus and increase their academic performance. Studies are divided into four categories; struggles of students with ADHD in the general education classroom, therapy ball, self-monitoring, and a comprehension strategy. Tables 1, 2, 4, and 5 presents a summary of these findings. Tables 3 presents a summary of individual study results within the self-monitoring category.

CONCLUSIONS AND RECOMMENDATIONS

Due to being highly distractible along with an inability to stay focused during lessons and classroom work. The purpose of this research paper was to review the literature to establish effective teaching strategies to assist elementary school students with ADHD succeed in the general education classroom. Chapter I provided background information on the topic, and Chapter II presented a review of the research literature. In this chapter, I discuss conclusions, recommendations and implications from the research findings.

Conclusions

I reviewed nine studies that examine three classroom strategies used to assist students with ADHD in the general education classroom to increase their ability to focus, attend, and improve academic performance. I also reviewed two studies which evaluated the general modifications and accommodations that are used with students with ADHD in the general education classroom, as well as academic and social

Chapter III

CONCLUSIONS AND RECOMMENDATIONS

Students with Attention Deficit Hyperactivity Disorder (ADHD) often have difficulties in the classroom focusing on lessons, group work, and independent work. These students also tend to have a lower understanding of academics and poor grades due to being highly distractible along with an inability to stay focused during lessons and classroom work. The purpose of this research paper was to review the literature to establish effective teaching strategies to assist elementary school students with ADHD succeed in the general education classroom. Chapter I provided background information on the topic, and Chapter II presented a review of the research literature. In this chapter, I discuss conclusions, recommendations and implications from the research findings.

Conclusions

I reviewed nine studies that examine three classroom strategies used to assist students with ADHD in the general education classroom to increase their ability to focus, attend, and improve academic performance. I also reviewed two studies which evaluated the general modifications and accommodations that are used with students with ADHD in the general education classroom, as well as academic and social

impairments of students with ADHD (McConaughy et al., 2011). Three studies reviewed were on the effects of the use of therapy balls versus chairs (Fedewa & Erwin, 2011; Schilling et al., 2003; Wu et al., 2012). Three studies were on the effects of self-monitoring with students with ADHD (Harris et al., 2005; Mathes & Bender, 1997; Rock, 2005). Four of the studies researched comprehension difficulties of students with and without ADHD. Three of the four researched the use of the comprehension strategy Think Before Reading, Think While Reading and Think After Reading (TWA) with students struggling with reading comprehension with and without ADHD (Cain & Bignell, 2014; Hedin et al., 2011; Mason et al., 2013; Rogevich & Perin, 2008).

Therapy balls. Three studies evaluated elementary school children with ADHD and the effects of using therapy balls instead of chairs. The Schilling et al. (2003) and Fedewa and Erwin (2011) studies both studied the use of therapy balls versus chairs in the general education classroom. Both studies focused on the amount of in-seat behavior as one factor in determining if the use of therapy balls benefitted students with ADHD. Schilling et al. also studied the use of therapy balls on how many words each student could spell correctly during their written language lesson. Fedewa and Erwin also studied the use of therapy balls on on-task behavior during lessons and seat work. Both Schilling et al. and Fedewa and Erwin used trained observers to take data on targeted behaviors. Schilling et al. used a single subject, A-B-A-B interrupted time series design and Fedewa and Erwin used a single subject, A-B continuous time-series design. Wu et al. (2012) conducted their study on the use

of therapy balls instead of chairs in a controlled research lab setting. Wu et al.'s study focused on the use of therapy balls instead of chairs with reaction time and accuracy. Wu et al. used a sound operating system to provided stimulus times to the participants; EEG system to record data, and a radio telemetry hand held trigger was used to signal the responds to measure reaction time and accuracy of the targeted stimulus. All three studies showed an increase in desired behaviors, and a decrease in undesired behaviors. Schilling et al. had an increase of in-seat behavior and legible word production. Fedewa and Erwin had an increase of in-seat behavior and on-task behavior. Wu et al. had an increase of reaction time and accuracy while using a therapy balls versus a standard school chairs. All three studies had low numbers of participants. Schilling et al. had three participants, all were on medication to assist with controlling symptoms of ADHD, and two had co-diagnosis. Fedewa and Erwin had eight participants, none of the students were on any medication nor had co-diagnosis. Wu et al. had 15 participants, none of the students were on any medication nor had co-diagnosis. Schilling et al. and Fedewa and Erwin studies were both 12 weeks in length, while Wu et al. study was broken into three testing sessions. All three studies results showed an increase in desired behaviors for students with ADHD while using therapy balls.

Self-monitoring. I reviewed three studies that examined the effects of self-monitoring on elementary school students with and without ADHD. All three studies had low number of participants. Mathes and Bender (1997) had three male participants who had co-diagnosis of behavioral disorders, and all took medication for

their ADHD. Harris et al. (2005) had six participants, two of the students had co-diagnosis, and all took medication for their ADHD. Rock (2005) had nine participants with various diagnoses; two of the participants had ADHD diagnosis. The two students with ADHD diagnosis, one had a co-diagnosis and did not take medication; the other student did not have a co-diagnosis but did take medication for ADHD. All students, regardless of taking medication or not showed an increase in on-task performance while using self-monitoring. All three studies were conducted within a classroom setting; Mathes and Bender conducted their study within the special education resource setting and Harris et al. and Rock both conducted their studies within the student's general education classroom. All three studies obtained a baseline obtained by trained observers using inter-observer agreement; baseline data was collected for a wide range of days and varied for each student in all three studies ranging from 5-26 days. The variation in baseline was due to researchers wanting a stable baseline before proceeding with the intervention portion of their study. The entire length of the research studies varied from 22 days to 50 days. During the intervention portion of the study each student was taught individually or in a small group setting, three to five students, to monitor their on-task behavior. Each study used a self-monitoring data sheet for students to record their on/off-task behavior when they heard the cueing tape signal. All three studies also used trained observers to ensure students were self-monitoring correctly and accurately. Mathes and Bender used a design that consisted of a baseline, intervention, fading 1 and fading 2. During fading 1 researchers removed the cueing tape but allowed students to keep their self-

monitoring data sheets. During fading 2 researchers removed the self-monitoring sheets along with the cueing tape, students were expected to self-monitor independently periodically through lessons and think about if they were on or off-task. All three studies showed that student's on-task behavior increased significantly while using the self-monitoring technique for both attention and academic performance.

Reading comprehension strategy. I reviewed three studies that evaluated the effects of the reading comprehension self-monitoring strategy: Think Before Reading, Think While Reading, and Think After Reading (TWA). All three studies' results showed students' reading comprehension increased while using the TWA strategy. All three studies had a low number of participants with ADHD. Rogevich and Perin (2008) had a total of 63 students participate in their study, 31 students diagnosed with ADHD in addition to a Behavioral Disorder (BD), no participants had ADHD alone. It was not stated if any of the students were on medication for their BD or ADHD. Hedin et al. (2011) had two students in their study and both students had ADHD, one student was also diagnosed with a speech and language impairment and the other with a learning disorder. Both were on medication for their ADHD. Mason et al. (2013) had 77 students with and without disabilities participate within their study. All of the participants were identified as struggling with reading comprehension. Neither Rogevich and Perin, nor Mason et al. studies had participants who were identified as having strictly ADHD symptoms. With this knowledge it is difficult to determine if students with ADHD alone would have similar results and if students with ADHD alone would benefit more or less from the use of the TWA reading strategy. Students

in Rogevich and Perin with ADHD and BD demonstrated comparable results to those with BD only. It could be hypothesized that students with ADHD alone would also benefit from the strategy. All three studies were short in duration ranging from eight sessions to 2 months. All three studies taught their students how to use the TWA study in small group settings. It was not researched how students proficient in the use of TWA in small group setting generalized their knowledge in the general education classroom. All students increased their reading comprehension while being taught the TWA strategy; however, once instruction was removed, all students showed a decrease in their reading comprehension. Due to the short duration of the studies it is not researched if students needed more time to learn and become proficient with the TWA strategy or if there is another reason for the decrease in reading comprehension. All three studies measured reading comprehension by giving students a short passage to read and answering comprehension questions. None of the studies provided examples of the types of questions asked. Both Rogevich and Perin, and Hedin et al. collected baseline data, taught students the TWA reading comprehension strategy, then collected data for maintenance and generalization of the strategy within a small group setting. Both studies students showed a decline in reading comprehension during the maintenance and generalization phases of their studies. Mason et al.'s study was a qualitative study; they discussed results but did not provide actual data from their study. All three studies discussed student's opinions of the TWA strategy, with the majority of students reporting they found the strategy improved their reading

comprehension and reported liking the strategy. The TWA strategy increased student reading comprehension during intervention lessons, in small group settings.

Recommendations for Future Research

Therapy balls. All three studies had relatively short duration and small sample sizes which does not give information on long term effects of using therapy balls or the information of having a larger sample sizes to generalize results. Schilling et al. (2003) mentioned another limitation was the students' quality of written work was not formally assessed only the amount of words spelled correctly. Teachers from the Fedewa and Erwin (2011) study thought the bouncing on the balls would distract the participants and other students. Distraction to other students were not assessed nor accounted for during the study. The bouncing was determined to help students with ADHD increase their in-seat and on-task behavior. Fedewa and Erwin (2011) noted in their study all students in the classroom used therapy balls, if only students with ADHD used the therapy balls in class it may increase the amount of misuse, playing with balls, and increase distractions. Wu et al. (2012) had determined during their study students with ADHD had faster reaction times and were more accurate while using a therapy ball but the difference was not significantly larger than the control group's reaction time and accuracy. Since the study was conducted in a laboratory setting, it is unclear if the results would generalize to a classroom setting. Future research is suggested to include longer studies to determine long-term effects, students with other disabilities, the amount of classroom noise, classroom behaviors (raising hand, verbal outbursts), relationships with peers, academic performance in all subject

areas, students with sensory issues, and student perception of benefits of the use of therapy balls instead of chairs in the classroom.

Self-monitoring. All three studies had relatively short duration and small sample sizes which does not give information on long term effects of using self-monitoring or the generalization of results by having larger sample sizes. The majority of students in all three studies were on medication for their ADHD. It is difficult to determine if results would generalize to students with ADHD not using medication. More research is recommended to include the effects of fading the supports of the self-monitoring (cueing tape, data sheets) and maintenance of the use of self-monitoring as well as generalization to all academics. Some students had higher percentages of on-task behaviors than other students, researchers suggest some students may need more time and support to learn and use the self-monitoring technique. Some researchers suggest incorporating self-modeling of behavior in addition to self-monitoring to further assist students desired and on-task behaviors. Two of the studies used at least one of the authors as one of the observers, which could account for a possible bias to the results of the study. It is suggested future research utilized nonbiased observers to avoid potential bias of results. Student's general education teachers should also be trained in the process and procedure of self-monitoring to ensure students are properly and accurately self-monitoring, as well as assisting students with questions and concerns regarding the self-monitoring process. Future research is suggested to include using external reinforcers to motivate students

to continue to use self-monitoring, students with other diagnosis, and self-monitoring in multiple subject areas.

Comprehension strategy. All three studies had small sample sizes of students with ADHD. Larger sample sizes would allow for researchers to create more groups to compare different aspects of the TWA strategy. Rogevich and Perin's (2008) study mentioned that they had the same researcher, Rogevich, teach both the intervention and comparison conditions. This may have caused a bias with the results of the research. Rogevich and Perin also noted that they did not conduct blind scoring which may have also caused limitations and bias. They also mentioned that students were given multiple tests within a single session; even with including breaks students may have experienced fatigue, causing inaccurate data. Future studies should include longer length studies to provide information about long term effects of student usage or lack of usage. Researchers encourage continuing instruction for students using TWA to ensure ongoing use and on-task benefits. The majority of the participants in all studies were male, future studies should include female participants to determine if there is a gender difference in the effectiveness of using TWA. More research should include the use of TWA in the special education and general education classrooms to determine and ensure generalization of the strategy. Hedin et al. (2011) suggested teaching TWA in a variety of settings and with different subject matters to ensure generalization. Future research is suggested to include comparing the effectiveness of TWA to other research supported reading comprehension strategies and on students with and without disabilities.

Implications for Current Practice

As a licensed special education teacher I work students with various disabilities and diagnosis at the elementary level. Many of the students I work with are easily distracted and struggle with focusing their attention in the general education classroom; this leads to low understanding of academics, poor grades, classroom distractions, and student, parent, and teacher frustrations. I chose to focus my topic on effective strategies for assisting elementary school students with Attention Deficit Hyperactivity Disorder (ADHD) in the general education classroom.

I researched three different types of strategies, to help students with ADHD focus their attention during classroom lessons and assignments. I have found therapy balls have improved student ability to focus, attend and participate during classroom lessons and assignments. Many of the students I work with need to take daily motor breaks to help them stay focused in the classroom. Without these motor breaks, students are unable to focus during lessons, have difficulties staying on-task to complete assignments and distract others around them due to their constant movement. Students also leave the classroom to take these motor breaks where they may be missing important lessons, instructions, working with peers and time to complete assignments. With implementing the use of therapy balls, students would no longer need to leave the classroom for daily motor breaks. Students' motor breaks would be built into their daily schedule allowing them to stay in the classroom more while increasing their ability to focus on lessons and assignments. Allowing students with and without ADHD who have difficulty focusing and attending to classroom lessons and assignments would benefit from using therapy balls in replacement of their

classroom chair. I would like to try to use therapy balls with my students with focusing attention issues to determine if therapy balls would also improve their attention and improve their academics.

Students who were taught and used self-monitoring improved their engagement in lessons and assignments, and on-task behavior. The biggest benefit to students with attention issues is the awareness of the student to realize they often are not on-task and need to improve their attention. Once students are aware they are having difficulties focusing and staying on-task, self-monitoring is helpful for them to independently check and redirect themselves back on-task. All adults working with students who are self-monitoring need to be involved in the process to ensure students are using the strategy properly, and generalizing the strategy throughout their day. The studies I reviewed found that students who were taught to self-monitor, began to decrease their on-task attention and behavior as supports are removed. It appears students need more time to learn how to self-monitor and supports need to stay in place until students have mastered the technique. Students need the support of all adults and teachers working with them to continue to self-monitor. Self-monitoring is a strategy beneficial for students with attention difficulties.

The third strategy I researched was the reading comprehension strategy TWA. This strategy has been shown to benefit students by increasing their reading comprehension of short passages. TWA is a self-monitoring reading strategy that works by students answering a few questions about the passages before reading, during reading and after reading. Students are taught to divide their knowledge about

the text into short manageable chunks to help keep their attention on the passage in order for students to comprehend what they are reading. I have noticed many students with difficulties in focusing their attention, need specific directions of what and how to complete task. When given too many or too broad of directions or instructions, students tend to forget the first few directions or do not understand how to begin or what to do next. The reading comprehension strategy TWA gives students a few specific questions to ask prior to beginning their reading, another set of specific questions to ask while they are reading and then another set of questions to ask themselves after they have finished reading. By giving students the specific question they know exactly what to be thinking about before, during and after. Students are taught to think about what they are reading and not to just read the words. Students are also taught to go back and reread if they are unable to answer any of the questions. This technique gives students specific directions, broken up into manageable pieces, which is important for students with ADHD and other students with reading comprehension difficulties. Research has shown that the strategy increased students with and without ADHD's reading comprehension while being taught the strategy but after the strategy was done being directly taught, students reading comprehension began to decline. Students need more time than the studies allowed to become proficient with this or any reading comprehension strategy prior to removing supports. Once students have become proficient with the strategy in one area of academics, students then can begin to generalize the strategy into other aspects of their academics. Once they have generalized and become proficient in all areas with the strategy then, supports can

slowly be removed. Removing supports too early causes students to either stop using or use the strategy improperly. Students with ADHD and others with attention difficulties would benefit from the use of the reading comprehension strategy TWA or another similar strategy to increase their attention and comprehension abilities while reading.

Summary

As a special education teacher I have worked with many elementary students with and without ADHD who have difficulties focusing and staying on-task during their school day. Teachers, parents and students themselves often become frustrated with the constant reminders to stay focused, listen, and low understanding of academics. The three strategies I have researched, therapy balls, self-monitoring, and the reading comprehension strategy TWA, all have been shown to increase student's on-task behaviors. As a special education teacher we are taught to look at the whole child in finding ways to help and support our students. The strategies I have researched take into consideration the whole child. The therapy balls allow students to incorporate natural motor breaks into their day while they are continuing to listen and participate in lessons and seat work. Self-monitoring encourages students to become aware of their inattention and off-task behavior to allow students to change their behavior. Students with attention deficits often have difficulties with reading comprehension and by teaching students to use a reading comprehension strategy such as TWA; it will help students improve their reading comprehension; necessary to succeed in most academic areas. Implementing any or all three strategies, allows

teachers to support elementary school students with Attention Deficit Hyperactivity Disorder succeed in school.

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