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**INTERVENTION EFFECTIVENESS FOR POSTSECONDARY STUDENTS WITH
ATTENTION DEFICIT HYPERACTIVITY DISORDER**

A Thesis in

Special Education

by

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Abstract

This literature review was conducted to investigate the effects of interventions and accommodations on the academic achievement of post-secondary students diagnosed with Attention Deficit Hyperactivity Disorder (ADHD). An increasing number of students diagnosed with Attention Deficit Hyperactivity Disorder are enrolling in university settings. Surveys of students with ADHD have shown an increasing need for academic support at the higher education level. Higher education poses a unique and different environment for all students, but for those with ADHD who struggle with structure, organization, and time management, this setting heightens weaknesses which can lead to academic struggles. Therefore, it is important for researchers to analyze academic interventions at the post-secondary level in order to help this at-risk population achieve academic success. A literature review was employed to investigate the empirical research available on ADHD students in post-secondary educational settings. Studies were evaluated for intervention, implementation, utilization, and effectiveness. Results suggest that academic use of interventions and accommodations are effective in increasing end-of-term grades. Recommendations for practice and future research are discussed.

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Chapter 1

Introduction

Attention Deficit Hyperactivity Disorder is a chronic neurologically-based disorder whereby individuals exhibit developmentally inappropriate behaviors and levels of hyperactivity, impulsivity and inattention. According to Oliver and Steenkamp (2004), ADHD is characterized by a pattern of behaviors that appear in childhood and is more common in boys than girls, with boys outnumbering girls at a two to one ratio (Dupaul & Eckert 1998).

Attention Deficit Hyperactivity Disorder is a deficit in behavioral execution, often referred to as executive functioning (Barkley 2001). Brown (2006) states that executive functions “manage the brain’s cognitive functions; they provide the mechanism for self-regulation” (36). Attention Deficit Hyperactivity Disorder results in executive functioning difficulties which manifest in a decreased ability to organize, plan, lowers inhibitory control, and causes erratic attention levels (Pennington, 1991). Activities and behaviors that are affected by these functions are memory, organization, self-monitoring, planning, self-control, and strategic behaviors (Brown 2006). Pennington (1991) states that executive functioning abilities allow an individual the “ability to maintain an appropriate problem-solving set for attainment of a future goal” (p.13). Turnock, Rosen, and Kaminiski (1998) define effective coping as “a multifaceted and attention-demanding process of defining the problem, organization and initiating an appropriate strategy to cope with it, then carrying through on the new adapted behavior in a consistent fashion” (490).

An estimated 17 million people in the United States have Attention Deficit Hyperactivity Disorder (ADHD) (Wallace, WinsJer, & NeSmith, 1999; Amen, 1995). Attention Deficit Hyperactivity Disorder affects 3-5% of elementary children (Barkley, 1990) with a co-morbidity

rate of 20-30% also having a learning disability (DuPaul & Eckert, 1998). In addition 50 to 65% of children diagnosed with ADHD have symptoms that persist beyond childhood (Barkley, 1998). Two to six percent of the adult population is diagnosed with ADHD (Weiss & Murray, 2003). ADHD which was once considered a childhood disorder is now recognized as continuing into adolescence and later into adulthood. The childhood prevalence rate is estimated to be 3 to 5% (Heiligenstein, Guenther, Levy, Savino, & Fulwiler, 1999). According to Faraone, Sergeant, Gillberg, and Biederman (2003) the international childhood prevalence is statistically similar to the United States prevalence rate. Heiligenstein (1999) states that “30 to 70% of children with ADHD continue to experience symptoms and meet the DSM-IV’s diagnostic criteria as adolescents and adults” (3). Up to 90% of children diagnosed with ADHD continue to experience a persistence of disabling symptoms in adolescence and adulthood (Biederman, Mick & Faraone, 2000; Barkley 1990).

A growing number of students diagnosed with Attention Deficit Hyperactivity Disorder (ADHD) are enrolling in post-secondary educational settings (Baverstock & Finlay, 2003; Brinkerhoff, McGuire, & Shaw 2002; Quinn, Ratey, & Maitland, 2001; Turnock, 1998). One to four percent of post-secondary students have a documented diagnosis of ADHD (DuPaul, Schaughency, Weyandt, Tripp, Kiesner, Ota, et al., 2001) and may experience a difficult transition into higher education.

Surveys have shown that 78 % of non-ADHD individuals graduate from high school and enter college. In comparison, only 25% of students diagnosed with ADHD graduate from high school (Mannuzza, Klein, Bessler, & Malloy, 1993) and 22% of those enter college, with a graduation rate of only 11% (Farone and Biederman, 2005). To put this in more concrete terms, if 100 subjects with ADHD start high school only 25 will graduate and of those 25 that graduate,

5.5 will enter college and .61 will graduate. In addition, these students are more likely to be males and attend a two year institution (USDOE, 2002). Six percent of freshmen enrolled in higher education settings have academic disabilities (Henderson, 2001) and often graduate a year later than students without disabilities (Heiman & Precel, 2003). Academically, these students are often found to be on academic probation and have lower GPA's than their non-ADHD peers (Heiligenstein et al., 1999).

The purpose of this review was to analyze the empirical research on academic interventions and accommodations for post-secondary students diagnosed with Attention Deficit Hyperactivity Disorder (ADHD). More specifically, this analysis explored the effects of academic interventions and accommodations on student grades (GPA). Specifically these are: i) Do academic interventions and or accommodations (i.e. note takers, taped lectures, separate room for tests, etc.) improve the grades of university students diagnosed with ADHD? ii) What interventions and or accommodations improve academic grades of students diagnosed with ADHD? iii) Did the interventions address the problems they were intended to address? iv) If the interventions did address the problems they were intended to address, were they effective?

Chapter 2

Overview of Attention Deficit Hyperactivity Disorder

History

The identification and treatment of Attention Deficit Hyperactivity Disorder spans over 200 years. As early as 1798, physicians such as Alexander Crichton were attempting to treat mental inattentiveness or restlessness (Weyandt, Iwaszuk, Fulton, Ollerton, Beatty, Fouts, Schepman, & Greenlaw, 2003). In the 1950's Amsel hypothesized that a difficulty with task performance was due to an individual experiencing an arousal of frustration (Pelham, Walker, & Milich, 1986). In the 1970's mental restlessness was characterized as childhood psychopathology, later referred to as ADHD, and was first examined (Barkley 1990). Dr. Ben Feingold brought ADHD into the public light by working with, and researching, the cause of children's hyperactive symptoms. He referred to this phenomenon as a condition called minimal brain damage and determined that the symptoms were the direct result of an allergic reaction to ingesting foods with additives allergies and therefore, he recommended these children be placed on a special diet. While his theory would later be highly debated, and mostly scientifically discounted, Dr. Feingold was the first to give great attention to hyperactive symptoms (Barkley 1990). At the same time Douglas (Barkley 2001) was conducting experiments focusing on reinforcement schedules and how these schedules affect the task performance of individuals. She stated for individuals with ADHD, partial reinforcement compromises the effectiveness of their ability to initiate work and complete tasks (Pelham, Walker, & Milich, 1986). More recently, Barkley has theorized that ADHD is an inhibition disorder of executive self- control. His theory states that a disorder that effects inhibition directly compromises the ability to effectively

utilize an individual's working memory, problem solving abilities, and regulate emotions (Barkley 2001).

Diagnosis

Attention Deficit Hyperactivity Disorder is diagnosed using a multi-faceted diagnostic evaluation. This evaluation includes a detailed analysis of past and current symptoms, family history, neuropsychological testing, structured diagnostic interview and objective rating scales (i.e. Clinical ADHD interview, The Connor's ADHD Rating Scale, The Conners' Continuous Performance Test (CPT-II), computerized diagnostic interviews) (Ramsay and Rostain, 2006; Barkley 2001; DSMIV 1994). A clinical diagnosis of ADHD involves the patient experiencing multiple disabling pervasive symptoms that are present in multiple settings and appear before age seven (Barkley, Fischer, Edelbrock, & Smallish, 1990).

The Diagnostic and Statistical Manual of Mental Disorders, fourth edition (DSM-IV), classifies the aforementioned behaviors into 3 subtypes: a) inattentive, b) hyperactive-impulsive, and c) combined. These subtypes do not greatly differ in cognitive, social, or psychosomatic problems. However, those diagnosed with primarily inattentive subtype exhibit lower levels of delinquency, aggression and conduct disorder (Barkley 2001). Brown (1996) reports that this subtype is plagued by moodiness and sensitivity level difficulties, along with long term memory, task management, motivational and attention problems. Those diagnosed with the hyperactive and combined subtypes have greater difficulties with behavioral inhibition (Barkley 1998). Barkley (1997b) states those exhibiting hyperactive behaviors are "less internally guided, less purposeful, less goal directed, less governed by and oriented to time, and less likely to be aimed at maximizing net future outcomes in lieu of immediate ones" (277).

Etiology

There are many potential causes of Attention Deficit Hyperactivity Disorder. Attention Deficit Hyperactivity Disorder is widely believed to be a genetic disorder that is highly heritable (Barkley 2002). Researchers have determined that an insufficient level of the neurotransmitter dopamine may result in the manifestation of ADHD symptoms (Barkley, 2002). The use of stimulant medications increase dopamine levels and have been shown to reduce many of the difficulties associated with attention disorders (Barkley, 1997). Other researchers point to a dysfunction in cortical regulation or a disorder of the right hemisphere (Barkley, 1998).

Outcomes

Whatever the cause is, individuals diagnosed with ADHD experience difficulties in many facets of their lives. They often have problems with work productivity, have difficulty sustaining jobs, experience financial difficulties, report high rates of psychological difficulties, and have poor school retention rates (Barkley, 2002; Ramsay & Rostain, 2006). In addition, they experience problems in their personal lives (i.e. inability to maintain lasting relationships, lack of close friends) due to deficiencies in social skills, aggressiveness, and a lack of impulse control (Levine, 1990; Hallowell & Ratley, 1995; Kolberg & Nadeau, 2002; Hartman, 1993), these individuals also find academic demands challenging (Heiman & Precel, 2003), and are at risk for poor academic outcomes (DuPaul & Eckert, 1989). Students diagnosed with ADHD characteristically have problems monitoring their study habits (Wallace, Winsler, & NeSmith, 1999). Due to these characteristics, impairments are often experienced with working memory, ability to solve problems, self-efficacy and effective use of learning strategies (Biederman et al., 1996; Faraone, Biederman, Wozniak, Munday, Mennin, & O'Donnell, 1997). In addition, these individuals often have low academic engagement rates, inconsistent work productivity, lack

motivation to achieve, have poor study skills, and poor test taking skills (Oliver & Steenkamp, 2004). Many of these students request extended time on tests to compensate for slow reading speeds, comprehension, and ability to sustain attention (Ranseen & Parks, 2005). Wallace et al., claim that “the absence of self-regulation, learning and social skills often leads to failure to achieve academically” (4). In addition, Kaminski, Turnonck, Rosen and Laster (2006) state that there is a positive correlation between time management skills and academic success.

In addition, this population has been shown to often experience low self-esteem and a lack in achievement motivation (Weyandt et al., 2003). Shaw-Zirt, Popali-Lehane, Chaplin, and Bergman (2005) suggest that successful academic adjustment for individuals with ADHD is correlated with self-esteem. Due to a low tolerance for frustration and stress, students with ADHD may quit academic tasks they find difficult. Bandura (1993) states that goal achievement is associated with an individuals’ feeling of confidence. Therefore, if students have low self confidence with their academic work, this may result in a low attrition effect of impaired success (measured by grades). In addition to interpersonal relations, these individuals have difficulties that arise in educational settings. Symptoms can manifest as poor study habits, lack of effective time management, disorganization, substandard grades, and possibly academic failure. Learning processes and self-management tools enable individuals to achieve goal attainment that requires the ability to follow through. Therefore, because self-confidence is related to student GPA or academic success, teaching study strategies may increase students’ ability to follow through with academic goals (Wallace et al., 1999).

Treatment/Interventions

Behavioral. These often involve behavioral and/or contingency management programs which have been shown to increase academic performance in elementary school students

(Pelham & Fabiano, 2000). DuPaul and Eckert (1998) examined empirical studies that utilized treatment packages that yielded effective educational progress for primary and secondary grades. Their review found that peer tutoring, computer-assisted instruction, strategy training, and academic modifications increased academic performance.

Medications. Psycho-stimulants or stimulant medications are the most common form of pharmaceutical intervention. There is strong evidence of the effectiveness of psycho-stimulants ability to improve the executive functioning of individuals, making it possible for individuals to focus their attention effectively (Barkley, 2005). In addition, antidepressants or a combination of stimulants and antidepressants, are sometimes used. Medications that are used to treat ADHD are well tolerated with few side effects and typically the benefits of symptom relief outweigh these (Barkley, McMurray, Edelbrock, Robbins, 1990). However, for more than 50% of individuals with ADHD medication alone is not effective (Wilens, Spenser, & Biederman, 2001).

Multimodal treatments. Multimodal treatments are most commonly recommended for individuals, especially students, who suffer from ADHD symptoms (Ramsay & Rostain 2006). Multi-modal treatment packages are a combination of different support and therapeutic services. Interventions for individuals with ADHD are often multimodal, including pharmacotherapy, psychosocial treatments, behavioral or contingency management, psychotherapy or coaching, prostheses, behavioral therapy, educational remediation, academic supports and academic accommodations. This process is what Ramsay and Rostain (2006) refer to this process as “the common three-legged stool of treatment for college students with ADHD” (9).

Adaptations. Children are often put in separate educational settings where they have smaller class sizes, and one-on-one attention and guidance. Common academic accommodations for children with ADHD include taking tests in a separate room, extra time for tests, note takers,

readers, and modified work (i.e. math problems reduced from 40 questions to 20 questions) (Levine 1990).

Self management. Self management interventions are often used with children, but can also be used with adults. These interventions typically consist of teaching self-management and self-regulation skills. Individuals learn to monitor and control their physical reactions (i.e. verbal outbursts, keeping their hands to themselves) and managing their time effectively (i.e. keeping a daily planner).

There are many self-management methods and programs to learn adaptive coping strategies which are lacking in individuals with ADHD. Self-management tools such as voice recognition software and handheld PC's assist with organization, structure, assignment records, and managing long-range assignments (Hecker, 2003). These include: problems with study strategies, summarizing, outlining, note taking, and tests (Sparks, Javorsky, & Philips, 2004). Self-control activities for college students can be measured by assessing an individual's engagement in study activities and their ability to implement a self-directed plan.

To provide a theoretical basis for self-management, Bandura's (1977) self-regulation model can be defined as a multi-tiered process that the student is solely responsible for completing. This process usually consists of five steps: 1) setting goals, 2) development of time structure to meet goals, 3) actual adherence, 4) evaluation and 5) adjustment of future goals. For the purpose of this review study activities are defined as academic tasks such as reading, writing, note taking and any other activity that relates to learning subject material. Another measure of self-control is adherence (i.e. percentage of time the subject spends engaged in studying or study activities) to a study schedule.

Assistive technology has been shown to increase work completion and increase on-task time (DuPaul et al., 1989). In a survey of college students with ADHD, Wallace et al., (1999) found the ability to plan and follow a schedule was related to academic success. Students with ADHD identify self-control, goal orientation, adaptability, and social support as keys to academic success (Heiman & Precel, 2003). Studies suggest that college students with ADHD have significantly fewer academic coping strategies than students without ADHD (Turnock, Rosen, & Kaminski, 1998).

Coaching. Academic coaching, which provides personalized social support, focuses on organization, ability to prioritize assignments and skills, development of coping skills, encouragement, aids with academic skills, and helps increase academic achievement for those they assist (Turnock et al., 1998; Quinn, Roney, & Maitland, 2001). Coaching is a shared process that can increase an individual's self-efficacy (Bandura, 1982), giving them personal power and academic responsibility (Swartz, Prevat, & Proctor, 2005). The premise of coaching is for an individual to develop strategies that will allow them to obtain academic success. Often coaching is a collaborative process where together the client and coach identify academic and personal problems and find a way to address or compensate these areas. A study by Zwart and Kallemeyn (2001) found that peer-based coaching improved anxiety, test preparation, motivation and time management. Swartz, Prevat, and Proctor (2005) conducted a case study of coaching as an intervention for college students with ADHD. Examples of coaching interventions are teaching individuals to use mnemonic devices, using a day planner or organizer, teaching underlining and reading skills, and finding alternative places to study. They found that the subject achieved her grade goal as a direct result of the coaching intervention.

Structure Support

As specified by the Rehabilitation Act of 1973, Section 504, the federal government implemented laws to protect children who displayed educational difficulties and are classified as having a disability. The laws mandated their right to receive direct assessment, support services, and interventions in the public school system (Glutting, Monaghan, Adams, & Sheslow, 2002). Despite support from the federal government the increased number of ADHD students is straining disability service providers' ability to meet legally required accommodations (Latham, 1995). This dilemma most likely is also prevalent in post-secondary institutions; however there is currently little to no empirical data to support this claim. The number of students with ADHD in higher education is growing rapidly and is projected to exceed the number of students diagnosed with a learning disability (Glutting et al., 2002). In 1990, the Americans with Disabilities Act was implemented, giving students even more rights. By law, all post-secondary institutions must provide services that allow students full access to an education (Wallace, Winsler, & NeSmith, 1999). In fact, university counseling centers are experiencing more students seeking help for ADHD related problems than ever before (Ramsay & Rostain, 2006). Since there is an increasing number of post-secondary students diagnosed with ADHD, then the question arises as to whether post-secondary institutions are meeting their educational needs?

Post-secondary institutions currently offer many resources and accommodations for ADHD students. Examples of common college level accommodations are extended time on tests, change in test formats, voice recognition software, text-to speech software, computer software programs, note takers, taped lectures, and amended course assignments. A large literature base exists on school-age children with ADHD however; currently few studies have investigated the effectiveness of interventions and accommodations on ADHD college students' grades. However, many researchers suggest that adaptations that have been shown effective for

elementary and secondary students may also be effective in the university setting (Allsopp et al., 2005; Hecker et al., 2002; Trammel, 2003; DuPaul et al., 2001). In order to provide the best academic and social support more needs to be known and researched about the ADHD post-secondary population.

Study Strategy Measures

There are many measures used to determine an individual's study strategies or skill level. A commonly used measure is the LASSI (The Learning and Study Strategies Inventory, 2nd edition) (Winstein & Palmer, 2002). This is a self report assessment tool that was designed to identify post-secondary students that could be at risk for poor academic performance. The test utilizes diagnostic and prescriptive indicators to assess learning, studying behaviors and attributions. There are 10 scales consisting of 8 items each: 1) Time Management, 2) Test Strategies, 3) Self- Testing, 4) Study Aids, 5) Selecting Main Ideas, 6) Motivation, 7) Information Processing, 8) Concentration, 9) Attitude, and 10) Anxiety. Previous researchers have shown the LASSI to have high overall test-retest reliability and high predictive validity, resulting in a positive correlation between academic performance and student GPA (Reaser, Prevatt, Petscher, & Proctor, 2007). In addition, Turnock, Rosen and Kaminski (1998) found that individuals with ADHD who suffer from many symptoms frequently dropped classes and obtained significantly lower GPA's than students who were not dealing with ADHD symptoms. Students overall grade point average (GPA) is often collected, compared, and analyzed for changes in trend.

Post-secondary students diagnosed with ADHD experience multiple academic barriers and social difficulties; for the first time in their lives this population is confronted with the challenges of adult life. These individuals are in control of their schedule, must decide what

classes to take, how to spend their time, and how to accomplish day to day tasks (i.e. food shopping, laundry, cleaning, etc.). It is common for all students to experience difficulties when transitioning to college and accomplishing adult responsibilities. However, for those with ADHD this transition can heighten their deficiencies and lead to poor social and academic results (Ramsay & Rostain 2006).

The structure of the higher academic setting requires sustained attention, inhibition, and self-regulation and therefore may exacerbate problems that are considered core difficulties associated with ADHD. In fact, research has shown that ineffective self-regulation may lead to academic problems (Schunk & Zimmerman, 1998) and can be the difference between success and failure. Individuals with ADHD have difficulty with long-term, goal-oriented processes that have little or few short-term rewards, requiring them to sustain attention during studying periods and long lectures (Spinella & Miley, 2003). Overall, the college environment taxes executive functioning skills, (i.e. memory) lacks structure and contains a multitude of social and academic stimuli that students have never encountered before. Individuals with ADHD often have problems focusing on immediate tasks, have a tendency to overextend themselves with campus activities (McCormick, 1998), and seldom utilize coping skills to deal with the transition to the university setting (Shaw-Zirt et al., 2005).

Studies of college students with ADHD report they experience poor concentration during lectures (Weyandt et al., 2003) and have high rates of task unrelated thoughts (Shaw & Giambra, 1993). Often this population goes unrecognized in college due to a lack of behavior problems, yet they experience many difficulties associated with procrastination and lack of organization (Quinn, Ratey, & Maitland, 2000). A study by Young, Toone and Tyson (2003) found that participants with ADHD had a history of educational underachievement, antisocial adjustment

and relationship difficulties. In addition, Barkley (1998) states, that individuals with ADHD have difficulty developing and implementing coping strategies. Furthermore, a study by Turnock, Rosen, and Kaminski (1998) reported that college students with ADHD had a tendency to procrastinate, have difficulty with self-control, and approach studying in an unorganized manner. If this is true, then post-secondary students with ADHD have a great need for assistance with the skills required to adjust to academic life at the higher education level.

Interventions and accommodations. As a result of these social and academic difficulties students often are on stimulant medication known as methylphenidate (Baverstock et al., 2003) and/or receive academic support. Often students request extra time on tests to compensate for slow reading speeds, comprehension, and ability to sustain attention (Ranseen & Parks, 2005). Academic interventions and accommodations can help compensate for poor academic skills. Yeaton and Sechrest (1981) define an effective intervention as amending a system that leads to lasting change, are naturalistic and take place in the least restrictive environment as possible. Murray, Goldstein, Nourse, and Edgar (2000) suggest there is a great need for more support for postsecondary students. Reviews of elementary students with ADHD (DuPaul et al., 1989) indicate that academic interventions and accommodations improve grades. According to Quinn Ratey, and Maitland, (2001) academic accommodations are adjustments that are granted to students to insure they have an equal opportunity. Accommodations for students with ADHD, such as preferential seating, increased test time, copies of lectures, copies of notes, use of calculators, and assistive technology are all mechanisms that can maximize academic potential (Baverstock et al., 2003). Shaw-Zirt et al., (2005) used the Student Adaptation to College Questionnaire (SACQ- Baker & Siryk 1989) to assess ADHD student adjustment to university

life. The study reported that students with ADHD experience low self-esteem, social skills and overall lower levels of college adjustment compared to their non-ADHD peers.

A common and debilitating symptom of ADHD is impulsivity defined as the lack of ability to control one's impulses (Barkley 2001). Studies of children with ADHD suggest that educational achievement (i.e. grades, achievement scores) is reduced by impulsivity (Spinella & Miley, 2003). In addition, low grades have been correlated with impulsivity. Lack of impulse control can greatly affect an individual's motivation to achieve and educational performance. Impulsivity is defined as immediately reacting to immediate demands or stimuli without placing importance or considering the effect of their actions on future demands (Spinella & Miley, 2003). The higher education process requires an ability to effectively set and achieve long term goals and rewards. The higher education process is high marked by delayed goals and rewards (jobs, degree attainment, grades) making the academic environment especially aversive to those who suffer from ADHD.

There is a great deal of published literature that supports the effect of interventions for students at the elementary and secondary levels, however only three studies could be found that analyze interventions for college students with ADHD. College students must adapt to new academic challenges and demands. In summary, the purpose of this paper is to analyze the empirical research on academic intervention and accommodation for post-secondary students diagnosed with Attention Deficit Hyperactivity Disorder.

Chapter 3

Review, Methods and Results

Using ERIC and PSYCINFO databases, a thorough literature search was conducted. Both databases were searched for articles in peer reviewed journals with the keywords ADHD, ADD, attention deficit disorder, or attention deficit hyperactivity disorder and other keywords including: *college students, college, postsecondary students, postsecondary, self management, self evaluation, interventions, academic interventions, accommodations, grades, grade improvement, accommodations, or academic accommodations*. The ERIC database search yielded 11 articles and the PSYCINFO database search yielded 86 results. Overall, 97 articles were found. These articles were analyzed and included for this review if they met the following criteria: i) empirically based, ii) peer reviewed, iii) implemented an academic accommodation or intervention, iv) used GPA as the outcome measure, v) subjects were enrolled in an accredited college or university, and vi) subjects were clinically diagnosed as having an Attention Disorder (ADD or ADHD). Lastly, these remaining articles were examined, the reference lists were reviewed, and an ancestral search was conducted. This search yielded no additional articles. Three articles remained and were accepted for review (Allsopp, Minskoff & Bolt, 2005; Hecker, Burns, Elkind, Elkind, & Katz, 2002; Trammell, 2003).

Chapter 4

Results

Demographics and Settings

Interventions for students' Attention Deficit Hyperactivity Disorder were examined in a range of post-secondary settings. Settings included private and public four year accredited universities (Allsopp et al., 2005; Trammel, 2003), community colleges (Allsopp et al., 2005) and a two year college for students with learning disabilities and attention disorders (Hecker et al., 2002). See Table 1 for demographics, interventions and outcomes.

The number of participants in the three studies varied in number and disability. One study examined 20 participants (Hecker et al., 2002), one study examined 46 participants (Allsopp et al., 2005) and another examined 61 participants (Trammel, 2003). Two of the studies (Allsopp et al., 2005 & Hecker et al., 2002) reported participant's gender. In these studies there were more males than females. All participants were of college age; however chronological age was not mentioned. Participants in all three studies (Allsopp et al., 2005; Hecker et al., 2002; Trammel, 2003) were formally diagnosed with a disability, registered with the school's Office of Disability Services, and were eligible to receive academic accommodations. All studies examined college students diagnosed with ADHD however two studies (Allsopp et al., 2005; Trammel, 2003) also employed students with other disabilities. Allsopp et al., (2005) examined students with LD and/or ADHD and Trammell (2003) examined students with ADD, LD/ADD, and LD.

Only one study (Allsopp et al., 2005) reported participant academic standing. In this study, 46% of participants were on academic probation. Two of the three studies reported participants' IQ's to be average or above average (Allsopp et al., 2005; Hecker et al., 2002). Trammel (2003) did not mention participant IQ's but reported participants to have an average

verbal SAT score of 535.6. Hecker et al., (2002) was the only study that reported participant use of prescribed medication. In this study, 13 participants were prescribed medication for management of their attention disorder. In summary, interventions with college students diagnosed with ADHD occurred most often at a four year accredited university, contained more male than female participants, and had average IQ scores.

Characteristics of Interventions

A characteristic that was common across the three studies was the implementation of one or more academic interventions. One study (Hecker et al., 2002) reported the implementation of assistive reading software for participation in an English class. The software provided a visual and auditory presentation, and incorporated study skill tools for highlighting and note taking. Another (Trammel, 2003), employed multiple interventions based on student need. These included additional time on tests, taping of classes, separate rooms for tests, and providing books on tape. Lastly, Allsopp et al., (2005) used an individualized course-specific strategy instruction model.

In all three studies, interventions lasted at least one semester. However, Allsopp et al., (2005) employed the individualized course-specific strategy instruction model across two semesters for 14 of the 46 participants.

Dependent variables

All of the studies reported the use of dependent measures that targeted grade improvement. Allsopp et al. (2005) looked at the factors that contributed to academic improvement with an individualized course-specific strategy instruction model. Hecker et al. (2002) analyzed how assistive reading software affected reading performance, attention, reading

speed, reading comprehension, stress, and fatigue. Lastly, Trammel (2003) looked for a differential increase in end-of-term grades in comparison with participants verbal SAT scores.

While all the studies measured outcomes using end-of-term grades, only one (Trammel, 2003) did not use additional outcome measures. The remaining studies (Allsopp et al., 2005; Hecker et al., 2002) employed participant questionnaires to establish pre-intervention skills, participant session logs to record duration of task or assignment, and participant evaluations for opinions on their academic improvement. Additional measures included: the Nelson-Denny Reading Test which measured reading rate and comprehension (Hecker et al., 2002), instructor evaluation forms to evaluate student improvement (Allsopp et al., 2005), and a student maintained record of decreased attention (Hecker et al., 2002).

Outcomes

As shown in Table 1, findings from all three studies reported positive results. In Allsopp et al. (2005), significant improvement in grades at the end-of-the term were reported. The independent use of strategies and the supportive nature of the strategy instructor-student relationship predicted improvement. Factors related to non-improvement were reported to be academic/skill deficits and emotional/medication related issues.

In Hecker et al.'s (2002) study, students were better able to attend, experienced a reduction in distractibility, read with less stress and fatigue, read for longer periods of time, read quicker, and completed reading assignments in less time. There was not a significant increase in comprehension however; increased comprehension was affected by those who had very low comprehension scores before the intervention.

Trammel (2003) found that participants with ADD and ADD/LD experienced a significant increase in grades. Mixed results were found for students who were solely labeled

LD. For each additional accommodation added, LD students experienced a decrease in grades. Therefore, Trammel (2003) stated that in order to increase grades, the use of a single accommodation alone is most effective. Also, it was reported that high student verbal SAT scores, year in school, and increased length of the course by credit hour/week predicted higher end-of-term grades.

In 2 of the 3 studies (Allsopp et al., 2005; Hecker et al., 2002), participant questionnaires reported satisfaction with the intervention. Participants indicated their academic skills had improved. Instructors were also reported to be satisfied with the results of the intervention (Allsopp et al., 2005).

Only one of the three studies (Hecker et al., 2002) employed a follow-up measure. Hecker et al. (2002) interviewed participants and found that 70 percent continued to use the software after the study had concluded. Participants reported that the visual and auditory stimulation, highlighting techniques, and note taking skills, greatly helped them.

Chapter 5

Discussion

The purpose of this review was to examine academic interventions for post-secondary students with ADHD. Overall, academic interventions increased participant's end-of-term grades. Discussed are participant demographics, settings, intervention procedures, outcomes, contributions to future research, and limitations. While there were only three studies that examined the direct effect of post-secondary interventions on student grades, the research from K-12 may help to augment findings. More research is needed but some promising directions were found.

The higher education system uses an ordinal measure (i.e. grades) to document academic success or achievement. Few studies have looked at academic interventions and/or accommodations and the effects on grade improvement for college students' diagnosed with ADHD. For the purpose of this review academic success is define by a students GPA (or cumulative grade point average). In addition, end of term grades are defined as the overall GPA for the semester.

Three studies were found that used interventions that directly measured and targeted grade improvement. Allsopp et al. (2005) looked at the factors that contributed to academic improvement with an individualized course-specific strategy instruction model. Hecker et al. (2002) analyzed how assistive reading software affected reading performance, attention, reading speed, reading comprehension, stress, and fatigue. Lastly, Trammel (2003) looked for a differential increase in end-of-term grades in comparison with participants' verbal SAT scores.

Demographics and Settings

The three investigations found for this review were all conducted in accredited post-secondary educational settings utilizing interventions to measure grade improvement. However, there were differences; settings varied from community colleges to four year public institutions, number of participants ranged from 20 to 61, and educational disability labels varied from ADD to LD.

Based on this review, it is unclear if gender, setting, or academic standing, predicted intervention effectiveness for post-secondary students with ADHD. Therefore, the results may not generalize and few conclusions can be made due to the lack of empirical research analyzing college level interventions for ADHD students.

With the number of college students diagnosed with ADHD increasing, are higher education settings adjusting and meeting their academic needs? According to Rothstein (2003) very little is being done. Currently, institutions are only required to ensure that students with disabilities are provided reasonable accommodations and are not discriminated against. However, universities are not required to provide accommodations that are burdensome, lower university standards, or alter programs. This puts the burden on the student, requiring them to justify why they need accommodations and navigate the change in laws that govern educational disabilities (Hecker, 2003).

Future research needs to look closely at post-secondary settings for students with ADHD. Students with ADHD may have different educational needs and benefit from individualized programs which may not be available at all post-secondary institutions. Students with ADHD need to know the best academic placement, class structure, interventions, and accommodations

that will help them be successful. In addition, universities need to ensure that students are given the tools or opportunity to learn well-developed self-awareness and self-advocacy skills.

Characteristics of Interventions

Only two characteristics were consistent across studies. One was the implementation of academic interventions and the other was the duration of the intervention. Study results indicated that interventions improved grades. These findings lend credibility to findings of academic intervention success with primary and secondary students with ADHD (DuPaul et al., 1989). However, these studies did not examine one intervention compared to another. This is an important direction for future research. Post-secondary students with ADHD and those assisting them need to know the most effective and efficient interventions for academic success. It takes time to learn new skills and how to use resources. Without empirical data supporting intervention or accommodation use, students are unable to know if they are using the best means to combat their academic difficulties and achieve success.

All three studies employed interventions lasting at least a semester. One study (Hecker et al., 2002) also had some students participate for two semesters. However, this one study did not compare these two groups. This leaves a question unanswered; do some interventions work for short periods of time (i.e. one semester) but not work long term? Do the interventions employed have sustainability if used for more than one semester?

College students with ADHD represent a unique subset of the population. Individuals with ADHD adapt quickly, thrive on novelty, are easily distracted, and need cognitive stimulation (DuPaul et al., 1989). DuPaul et al. in 1989 stated that grade school ADHD students can show short-term academic improvements due to their ability to learn and apply new

strategies (i.e. behavioral inhibition or momentum). So, these students may need to change academic techniques after a set amount of time in order to maintain maximum benefit.

In the three studies reviewed, three different methods were employed, however two of the studies (Allsopp et al., 2005; Hecker et al., 2002) had similar measures to determine grade improvement. These studies not only looked at grades but also looked at duration improvement of assignments, intervention satisfaction, and reduction rates of distractibility. Allsopp et al. in 2005 and Hecker et al.'s in 2002 outcome measures of other than end-of-term grades suggest a more in-depth understanding of the difficulties of individuals with ADHD. Students may achieve better grades but are their academic skills increasing? By measuring reading rate, reduction in distractibility and length of time to complete assignments, more can be learned about how to better help ADHD students.

In a study by Heiman & Precel (2003) students with LD reported having difficulty concentrating, were concerned with a lack of time, and experienced stress, frustration, and helplessness during exams. They also preferred oral and visual explanations. Allsopp et al.'s (2005) study of assistive reading software looked at this issue by employing highlighting and note taking techniques which are skills that can reduce the anxiety that students with ADHD experience in academic environments. Therefore, future research should not only look at grade improvement but how academic skills, stress, and anxiety can be improved.

Efficacy Measures

Similar to reviews of elementary students with ADHD (DuPaul et al., 1989), this review indicates that academic interventions and accommodations improve grades and reiterates the importance for interventions for college students with ADHD. Research supports the effect of interventions for students at elementary and secondary levels, however only three studies could

be found that analyze interventions for college students with ADHD. College students must adapt to new academic challenges and demands. College poses a unique and different environment for all students but for those with ADHD who struggle with structure, organization, and time management, this setting heightens weaknesses which can lead to academic struggles. Therefore, it is important for future research to analyze academic interventions at the post-secondary level in order to help this struggling population achieve academic success.

All of the three studies examined, reported significant improvements in academic grades. Since this outcome suggests an increase in academic performance, this finding lends itself to the generalizability of academic interventions and accommodations for college students. However, this reported result should be interpreted with caution because this review only included three studies, all with different interventions and accommodations.

Limitations

Overall, this review highlights a need for in empirical research on post-secondary students with ADHD. With all the published literature on ADHD, it is somewhat surprising that only three empirical studies were found that address the use of an academic intervention and measure the effectiveness for ADHD students at the post-secondary level. However, these findings could be due to the inclusion criteria of the current review, which excluded dissertations and other unpublished empirical studies not located in peer review journals. That being said, few studies have analyzed interventions and accommodations to see if they are effective in post-secondary settings.

Implications

The lack of research on academic interventions or accommodations with post-secondary students diagnosed with ADHD leaves many questions unanswered, allowing for a wealth of

research opportunities. Directions for future research for post-secondary students with ADHD should include: determining differences based on educational settings, how to improving academic coping skills comparing interventions, and looking at accommodation effectiveness. Also, maintenance and follow-up measures need to be employed in order to determine the long range impact of academic interventions and accommodations for post-secondary students with ADHD.

Conclusion

Attention Deficit Hyperactivity Disorder is the second most common disorder that disables university students (Heath, Wright, & Batey, 1990). Surveys of students with ADHD highlight a need for academic support at the higher education level (Hecker, 2003). However, post-secondary institutions set their own rules and standards. Therefore, universities are not uniform in the kind of support and services they offer. In addition, studies have shown that individuals managing post-secondary students with ADHD are largely unfamiliar with the condition (Baverstock et al., 2003) and are not meeting their unique needs (Wallace et al., 1999). If this is true, then many questions arise in relation to how students with ADHD are coping in post-secondary settings and what is being done to help them.

In an attempt to analyze this gap in knowledge a literature review was conducted to further the overall understanding of post-secondary students with ADHD. This analysis explored the effects of academic interventions and accommodations on student grades (GPA). Specifically these are 1) Do academic interventions and or accommodations (i.e. note takers, taped lectures, separate room for tests, etc.) improve the grades of university students diagnosed with ADHD? 2) What interventions and or accommodations improve academic grades of students diagnosed

with ADHD? 3) Did the interventions address the problems they were intended to address? 4) If the interventions did address the problems they were intended to address, were they effective?

The results from the review suggest that academic use of interventions and accommodations are effective in increasing end-of-term grades for students with ADHD. This finding should be taken with caution due to the three articles able to be included and the lack of comparative methods utilized. However, the results do suggest many promising directions to explore. Combined with the many studies using young children these results provide a starting point for future research. Where each study utilized different interventions the outcome was the same, on average students' end-of-term grades increased. It is obvious that more research is needed in order to most effectively support post-secondary students diagnosed with ADHD. These studies lay a needed foundation and open up promising avenues for research in Special Education.

Appendix

Table 1: Summary Table

Study	Subjects	Setting	Independent Variable	Dependent Variable	Outcome/ Results
Allsopp, Minskoff, & Bolt, 2005.	46 college students with LD and/or ADHD -26 LD or other -10 ADD or ADD and other disability -8 LD and ADD -2 other disability	3 different postsecondary institutions -76%, public university -15%, private university -9%, community college	Individualized course-specific strategy instruction by graduate students. Of the 46 participants: -32 participated 1 semester -14 participated 2 semesters	What factors of the individualized strategy instruction model contribute to academic improvement or non-improvement? Measurement Instruments: -Learning Needs Questionnaire -Strategy Instructor evaluation form -participant evaluation form -strategy instruction session logs	Significant improvement in grades with sustained improvement over time. 2 factors predicted improvement: 1) independent use of strategies 2) supportive nature of the strategy instructor-student relationship 2 factors were related to non-improvement: 1) academic/ cognitive skill deficits 2) emotional/ medication-related issues
Hecker, Burns, Elkind, Elkind, & Katz, 2002.	20 college students with attention disorder (ADD/ ADHD) -15 ADD -5 ADD and reading disability	Landmark College (A two year special college for students with learning disabilities and attention disorders)	Assistive reading software used for one semester in an English class for reading, assignments, testing, and study skills. Software provided a synchronized visual and auditory presentation of the text, and incorporated study skills tools for highlighting and note taking	How assistive reading software affected reading performance, duration of reading, attention, stress, fatigue, and comprehension. Measurement Instruments: -Self assessment -Nelson-Denny Reading Test -Student logs -Attitude questionnaire	Students were able to better attend. Distractibility was reduced. While reading less stress and fatigue was reported. Participants read faster and for longer periods of time. Completed reading assignments quicker. Comprehension was not significantly affected. 70% of students after study continued to use software.
Trammel (2003)	61 college students total	Randolph Macon College	Academic accommodations: Additional time on	Differential increase in end-of-term grades.	Students with ADD and ADD plus LD showed a significant boost in grades. LD students

	<p>3 groups: 1)ADD 2)LD 3)ADD plus LD</p>		<p>tests, taping classes, testing in a separate room, and books on tape</p>	<p>Compared academic accommodations, verbal SAT scores and end-of term grades.</p>	<p>showed mixed results with a drop in scores with each additional accommodation.</p> <p>Higher verbal SAT scores predicted higher end-of-term grades.</p> <p>Year in school predicted higher end-of-term grades.</p> <p>Increased length of course by credit hour/ week predicted lower grades.</p>
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References

- Allsopp, D. H., Minskoff, E.H., & Bolt, L. (2005). Individualized course-specific strategy instruction for college students with learning disabilities and ADHD: Lessons learned from a model demonstration project. *Learning Disabilities Research & Practice, 20*, 103-118.
- Amen, D. G. (1995). Windows into the adult ADD mind: Understanding and treating ADD. *Paper presented at the preconference workshop of the 18th Annual Conference of the Association on Higher Education and Disability, San Jose, CA.*
- American Psychological Association (1994). Diagnostic and statistical manual of mental disorders (4th ed.) Washington, D.C.: Author.
- Bandura, A. (1982). Self-efficacy mechanisms in human agency. *American Psychologist, 37*, 122-147.
- Bandura, A. (1993). Perceived self-efficacy in cognitive development and functioning. *Educational Psychologist, 28* (2), 117-148.
- Barkley, R. (1990). *Attention deficit hyperactivity disorder: a handbook for diagnosis and treatment. New York, Guilford.*
- Barkley, R. A. (1998). *Attention-deficit hyperactivity disorder: A handbook of diagnosis and treatment (2nd ed.). New York: Guilford.*
- Barkley, R. A. (2001). Executive functions and self-regulation: An evolutionary neuropsychological perspective. *Neuropsychology Review, 11*, 1-29.
- Barkley, R. A. (2002). Psychosocial treatments for attention-deficit/hyperactivity disorder. *Journal of Clinical Psychiatry, 63* (suppl.), 36-43.

- Barkley, R. A., Fischer, M., Edelbrock, C. S., & Smallish, L. (1990). The adolescent outcome of hyperactive children diagnosed by research criteria: I. An 8-year prospective follow-up study. *Journal of the American Academy of Child and Adolescent Psychiatry, 29*, 546-557.
- Barkley, R. A., McMurray, M. B., Edelbrock, C. S. & Robbins, K. (1990). The side effects of Ritalin in ADHD children: A systematic, placebo controlled evaluation. *Pediatrics, 86*, 184-192.
- Baverstock, A. C., & Finlay, F. (2003). Who manages the care of students with attention deficit hyperactivity disorder (ADHD) in higher education? *Child: Care, Health & Development, 29*, 163-166.
- Biederman, J., Faraone, S. B., Milberger, S., Jetton, J.G., Chen, L., Mick, E., Green, R. W., & Russell, R. L. (1996). Is childhood oppositional defiant disorder a precursor to adolescent conduct disorder? Finding from a four-year-follow-up study of children with ADHD. *Journal of the American Academy of Child and Adolescent Psychiatry, 35*, 1193-1205.
- Biederman, J., Mick, E., & Faraone, S. V. (2000). Age dependent decline of ADHD symptoms revisited: Impact of remission definition and symptom subtype. *American journal of Psychiatry, 148*, 564-577.
- Brinkerhoff, L. D., McGuire, J. M., & Shaw, S. F. (2002). *Postsecondary education and transition for students with learning disabilities* (2nd ed.). Austin, TX: Pro-ed.
- Brown, T. E. (2006). Executive functions and attention deficit hyperactivity disorder; implications of two conflicting views. *International Journal of Disability, Development and Education, 53, 1*, 35-46.

- DuPaul, G. J., & Eckert, T. L. (1998). Academic interventions for students with attention-deficit/hyperactivity disorder: a review of the literature. *Reading & Writing Quarterly, 14*, 59-83.
- DuPaul, G. J., Schaughency, E., Weyandt, L. L., Tripp, G., Kiesner, J., Ota, K., et al. (2001). Self-report of attention-deficit/hyperactivity disorder symptoms in university students: Cross-national prevalence. *Journal of Learning Disabilities, 34*, 370-379.
- Faraone, S. B., & Biederman, J. (2005). Attention deficit-hyperactivity disorder. *The Lancet, 366* (9481), 237-248.
- Faraone, S. V., Biederman, J., Wozniak, J., Munday, E., Mennin, D., & O'Donnell, D. (1997). Is comorbidity with ADHD a marker for juvenile-onset mania? *Journal of the American Academy of Child and Adolescent Psychiatry, 36*, 1046-1056.
- Glutting, J. J., Monaghan, M. C., Adams, W., & Sheslow, D. (2002). Some psychometric properties of a system to measure ADHD among college students: factor pattern, reliability, and one-year predictive validity. *Measurement and Evaluation in Counseling and Development, 34*, 194-209.
- Gordon, M., Lewandowski, L., Murphy, K., & Dempsey, K. (2002). ADA-based accommodation in higher education: A survey of clinicians about documentation requirements and diagnostic standards. *Journal of Learning Disabilities, 35*, 357-363.
- Hallowell, E. & Ratley, J. (1995). *Driven to distraction: Recognizing and coping with attention deficit disorder from childhood through adulthood*. New York: Pantheon Books.
- Hartman, T. (1993). *Attention-deficit hyperactivity disorder: A different perception (2nd ed.)*. California: Underwood Books.
- Heath, C. T., Wright, H., & Batey, S. R. (1990). Attention Deficit Hyperactivity

- Disorder: Does it affect Adults too? *Southern Medical Journal*, 83 (12), 1396-1401.
- Hecker, L. (2003). Transitions to college for students with ADHD and/or learning disabilities. *Attention Research Update*, 78. Retrieved October 18, 2005, from <http://www.helpforadd.com/2003/april2.htm>
- Hecker, L., Burns, L., Elkind, J., Elkind, K., & Katz, L. (2002). Benefits of assistive reading software for students with attention disorders. *Annals of Dyslexia*, 52, 243-272.
- Heiligenstein, E., Guenther, G., Levy, A, Savino, F., & Fulwiler, J. (1999). Psychological and academic functioning in college students with attention deficit hyperactivity disorder. *Journal of American College Health*, 47, 181-185.
- Heiman, T., & Prechel, K. (2003). Students with learning disabilities in higher education. *Journal of Learning Disabilities*, 36, 248-259.
- Henerson, C. (2001). *College freshmen with disabilities: A biennial statistical profile*. Washington, DC: Health Resource Center, American Council on Education.
- Kaminski, P. L., Turnock, P. M., Rosen, L. A. & Laster, S. A. (2006). Predictors of academic success among college students with attention disorders. *Journal of College Counseling*, 9 (1), 60-72.
- Latham, P. H. (1995). Legal issues to the postsecondary student with ADD. *Journal of Postsecondary Education and Disability*, 11, 53-61.
- Lentz, Jr. F. F., Allen, S. J., & Ehrhardt, K. E. (1996). The conceptual elements of strong interventions in school settings. *School Psychology Quarterly*, 11, 118-136.
- Levine, M. (1990). *Keeping ahead in school*. Massachusetts: Educators Publishing Service.

- Mannuzza, S., Gittelman-Klein, R., Bessler, A., Malloy, P., & LaPadula, M. (1993). Adult outcome of hyperactive boys: Educational achievement, occupational rank, and psychiatric status. *Archives of General Psychiatry, 50*, 565-576.
- McCormick, A. (1998). *Retention interventions for college students with AD/HD. Rethinking ADD/HD: A guide to fostering success in students with AD/HD at the college level.* Maryland, Advantage Books.
- Murray, C., Goldstein, D. E., Nourse, S., & Edgar, E. (2000). The postsecondary school attendance and completion rates of high school graduates with learning disabilities. *Learning Disabilities Research and Practice, 15* (3), 119-127.
- Murray, C., & Wren, C. T. (2003). Cognitive, academic, and attitudinal predictors of the grade point averages of college students with learning disabilities. *Journal of Learning Disabilities, 36*, 407-415.
- Nadeau, K. G. (1995). Diagnosis and assessment of ADD in postsecondary students. *Journal of Postsecondary Education and Disability, 11*, 3-15.
- Oliver, M. A. J., & Steenkamp, D. S. (2004). Attention-deficit/hyperactivity disorder: Underlying deficits in achievement motivation. *International Journal for the Advancement of Counseling, 26*, 47-63.
- Pennington (1991). *Diagnosing learning disorders: A neuropsychological framework.* New York: Guilford Press.
- Pelham, W. E., & Fabiano, G. A. (2000). Behavior modification. *Child and adolescent psychiatric clinics of North America, 9*(3), 671-688

- Pelham, W. E., Milich, R., & Walker, J. L. (1986). Effects of continuous and partial reinforcement and methylphenidate on learning in children with attention deficit disorder. *Journal of Abnormal Psychology, 95*, 319-325.
- Proctor, B., Prevatt, F., Adams, K., Hurst, A., & Petscher, Y. (2006). Study skills profiles of normal-achieving and academically-struggling college students. *Journal of College Student Development, 47*(1), 37-51.
- Quinn, P. O., Ratey, N. A., & Maitland T. L. (2001). Working with and ADD coach. ADD and the student: A guide for high school and college students with attention deficit disorder. Washington, DC, Magination.
- Ranseen, J. D., & Parks, G. S. (2005). Test accommodations for postsecondary students: the quandary resulting from the ADA's disability definition. *Psychology, Public Policy, and Law, 11*, 83-108.
- Ramsay, A. L. & Rostain, R. (2006). A combined treatment approach for adults with adhd- Results of an open study of 43 patients. *Journal of attention disorders, 10*(2), 150-159.
- Reaser, A., Prevatt, F., Petscher, Y., & Proctor, B. (2007). The learning and study strategies of college students with ADHD. *Psychology in the Schools, 44*(6), 1-12.
- Rothstein, L. (2003). Disabilities and higher education: a crystal ball? - Academic institutions must plan to meet the needs of disabled students. *Change, May-June, 2003*. Retrieved November 10, 2005, from http://www.com/p/articles/mi_m1254/is_3_35/ai_101171911
- Schunk, D. H., & Zimmerman, B. J. (1998). Self regulated learning. From teaching to self reflective practice. New York: Guilford

- Shaw, G., & Giambra, L. (1993). Task unrelated thoughts of college students diagnosed as hyperactive in childhood. *Developmental Neuropsychology, 9*, 17-30.
- Shaw-Zirt, B., Popali-Lehane, L., Chaplin, W., & Bergman, A. (2005). Adjustment, social skills, and self-esteem in college students with symptoms of ADHD. *Journal of Attention Disorders, 8*, 109-120.
- Sparks, R.L., Javorsky, J., & Philips, L. (2004). College students classified with ADHD and the foreign language requirement. *Journal of Learning Disabilities, 37*, 169-178.
- Spinella, M., & Miley, W.M. (2003). Impulsivity and academia achievement in collage students. *College Student Journal, 37*, 545-549.
- Swartz, S. L., Prevatt, R., & Proctor, B.E. (2005). A coaching intervention for college students with Attention Deficit/Hyperactivity Disorder. *Psychology in the Schools, 43*, 647-656.
- Trammel, J. K. (2003). The impact of academic accommodation on final grades in a postsecondary setting. *Journal of College Reading and Learning, 34*, 76-90.
- Turnock, P., Rosen, L.A., & Kaminski, P.L. (1998). Differences in academic coping strategies of college students who self-report high and low symptoms of attention deficit hyperactivity disorder. *Journal of College Student Development, 39*, 484-491.
- USDOE, (2002). *No Child Left Behind: ESEA Reform*. Retrieved on December 19, 2007, from <http://www.NoChildLeftBehind.gov/next/overview/index.html>.
- Wallace, B.A., Winsler, A., & NeSmith, P. (1999, April 19-23). Factors associated with success for college students with ADHD: Are standard accommodations helping? Paper presented at the Annual Meeting of the American Educational Research Association, Montreal, Quebec, Canada.

- Weiss, M., & Murray, C. (2003). Assessment and management of attention-deficit hyperactivity disorder in adults. *Canadian Medical Association Journal*, *168* (6), 715-22.
- Weyandt, L.L., Iwaszuk, W., Fulton, K., Ollerton, M., Beatty, N., Fouts, H., Schepman, S., & Greenlaw, C. (2003). The internal restlessness scale: Performance of college students with and without ADHD. *Journal of Learning Disabilities*, *36*, 382-389.
- Wilens, T. E., Spenser, T. J., & Biederman, J. (2001). A review of the pharmacotherapy of adults with attention-deficit/ hyperactivity disorder. *Journal of Attention Disorders*, *5* (4), 189-202.
- Yeaton , W. H., & Sechrest, L. (1981). Critical dimensions in the choice and maintenance of successful treatments: strength, integrity and effectiveness. *Journal of Consulting and Clinical Psychology*, *49*(2), 156-164.
- Young, S., Toone, B., and Yyson, C. (2003). Comorbidity and psychosocial profile of adults with attention deficit hyperactivity disorder. *Personality and Individual Differences*, *35*(4), 743-755.
- Zwart, L. M. & Kallemeyn, L. M. (2001). Peer-based coaching for college students with ADHD and learning disabilities. *Journal of Postsecondary Education and Disability*, *15*, 1-15.