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The Association of Cognitive Distortions, Problems with Self-Concept, Gender, and Age in Adults Diagnosed with Attention-Deficit/ Hyperactivity Disorder (ADHD)

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The Association of Cognitive Distortions, Problems with Self-Concept, Gender, and

Age in Adults Diagnosed with Attention-Deficit/Hyperactivity Disorder (ADHD)

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Dissertation Approval

This is to certify that the thesis presented to us by _Danielle O'Brien_

on the _16_ day of _MAY_, 20_16_, in partial fulfillment of the

requirements for the degree of Doctor of Psychology, has been examined and is

acceptable in both scholarship and literary quality.

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Abstract

Attention-Deficit/Hyperactivity Disorder (ADHD) is a neurocognitive condition, which can cause a variety of functional impairments that can result in the development of negative self-perceptions. These maladaptive beliefs often lead to the development of maladaptive thoughts or cognitive distortions. Research suggests that cognitive behavioral therapy (CBT) is an efficacious treatment for adults with ADHD. Yet data on the association between cognitive distortions in adult ADHD is limited, particularly, regarding self-concept. The aim of this study is to evaluate the impact that cognitive distortions, problems with self-concept, gender and age have on symptoms of ADHD in a group of adults (N = 130), who presented to a university-based outpatient clinic, specializing in the assessment and treatment of ADHD. Results suggest that problems with self-concept significantly and positively predicted ADHD symptom severity. Additionally, cognitive distortions significantly, positively predicted problems with self-concept, whereas gender was not significantly predictive, in this regard. However, gender, age, and cognitive distortions were not significantly predictive of ADHD symptoms.

Keywords: cognitive distortions, problems with self-concept, Attention-Deficit/Hyperactivity Disorder, adult ADHD

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Chapter One

Introduction

Statement of the Problem

Attention-Deficit/Hyperactivity Disorder (ADHD) is a neurodevelopmental disorder, characterized by a persistent pattern of inattention and/or hyperactivity and/or impulsivity (American Psychiatric Association [APA], 2013) that presents in approximately 5% of children, in most cultures (Polanczyk, de Lima, Horta, Biederman, & Rohde, 2007) and 2.5% of adults (Simon, Czobor, Bálint, Mészáros, & Bitter, 2009).

Early in the field of study on the topic, ADHD was considered to be a disorder solely of childhood, one which children would eventually outgrow (Weiss, Murray, & Weiss, 2002; Wender, 1998). This largely erroneous assumption was likely due to the fact that youth with ADHD are more likely to evince the most noticeable symptoms of ADHD: hyperactivity, (Harpin, 2005; Kumperscak, 2013), and that this symptom frequently abates with age. Thus, observers may have overlooked the evidence that this disorder evolves at different stages of development; rather than remits. Adults with ADHD are likely to experience issues that are less obvious and were overlooked by early researchers; these include deficits in executive functioning, time-management, procrastination, disorganization, and impairments in inhibition associated with self-control (Barkley, 1997; Barkley, 2006; De Quiros & Kinsbourne, 2001; Solanto et al., 2010; Wender, Wolf, & Wasserstein, 2001). When considering the demands that are placed on an adult in society today, these issues appear much more impairing than simply being overly active.

Other than the core symptoms previously mentioned, secondary issues often present along with ADHD, such as poor social skills or low self-concept (Realmuto et al., 2009; Richman, Hope, & Michalas, 2010; Stormont, 2001). Furthermore, adult presentations may be reflected differently in each individual, depending on gender and age differences (Fedele, Lefler, Hartung, & Canu, 2012; Quinn, 2008; Wilens et al., 2009). Because there has been more research on the effects of ADHD in children as well as diagnosis and treatment thereof, many clinicians, psychiatrists, and primary care physicians do not have the proper training to identify accurately and to treat adults with ADHD (Andrews & Grevin, 2012). Thus, further investigation is needed for clinicians to ensure that interventions are being tailored to treat the specific needs of adults with ADHD who have grown up with such a complex disorder impacting multiple areas in functioning, including the development of beliefs surrounding the self.

More recent research suggests that symptoms of ADHD do not typically diminish, but rather, change throughout different stages in development and typically persist into adulthood (Harpin, 2005; Kumperscak, 2013). Yet this point continues to be controversial because most research in this field has previously indicated that many symptoms of ADHD decrease in severity with age (Hart, Lahey, Loeber, Applegate, & Frick, 1995; Hinshaw, Owens, Sami, & Fargeon, 2006; Ramtekkar, Reiersen, Todorov, & Todd, 2010). Researchers argue that the decline in diagnosis with increased chronological age may be due to the overrepresentation of childhood symptoms in the criterion, making it harder to identify ADHD accurately in adults (Barkley, Fischer, Smallish, & Fletcher, 2002; Faraone, Biederman, & Mick, 2006).

Moreover, evidence has shown that the decline in ADHD symptoms is higher in

males than in females (Cohen et al., 1993). Contradictory evidence exists regarding

gender differences in symptom duration. For example, some report that symptoms of

ADHD appear to be more persistent in males than in females (Bauermeister et al.,

2011), whereas others have demonstrated no significant differences across genders

regarding the persistence of symptoms (Lahey et al., 2007; Monuteaux, Mick,

Faraone, & Biederman, 2010). Ultimately, clarification on such mixed findings is

needed in order to establish a mutual understanding regarding symptom presentation

throughout the course of later developmental stages and between sexes.

Despite advances in many areas of the literature, important questions

regarding the true nature of ADHD are left unanswered. For example, why is there is

no biological marker for ADHD? This question has raised concerns among the more

biologically minded theorists regarding the validity of whether or not ADHD is a true

neurodevelopmental disorder (Asherson et al., 2010; Geissler & Lesch, 2011;

Moncrieff & Timimi, 2010). As a result, symptoms may be discounted or minimized,

especially internal issues, which are less obvious. Such minimization of distress and

impairment can be invalidating for individuals experiencing these difficulties first

hand.

Despite many misconceptions surrounding this disorder, symptoms of ADHD

have been consistently identified (Asherson et al., 2010), and follow-up studies

indicate that about 15% of children still meet full symptom criteria 25 years later

(Faraone, Biederman, & Mick, 2005). Furthermore, twin studies have demonstrated a

clear pattern both of genetic and of environmental influences (Thapar, Harrington, &

McGuffin, 2001). Overall, the consensus on the prevailing research is that ADHD is a valid disorder, which is relatively stable over time and which is associated with a number of significant impairments in multiple areas of functioning (Asherson et al., 2010).

In adulthood, issues surrounding academic failure, unemployment, financial concerns, poor relationships, health risks, and legal issues are more frequent among this population (Barkley, Murphy, & Fischer, 2008; Harpin, 2005; Ramsay & Rostain, 2008). Due to the wide range of functional impairments associated with adult ADHD, it is considered one of the most debilitating disorders in outpatient clinical psychology (Ramsay, 2011; Ramsay, 2015). In sum, when considering the longstanding impairments in several areas of functioning throughout the day-to-day lives of these individuals, it is clear that this is a very real, clinically relevant, and highly complex disorder (Barkley, et al., 2002; Barkley, Murphy et al., 2008).

Because many individuals with ADHD experience unrelenting failures, reaction to the disorder can affect how they perceive themselves, particularly in comparison with others who do not experience such difficulties. Throughout child development, individuals with ADHD often receive negative feedback from others surrounding their abilities (Young, Bramham, Gray, & Rose, 2007); this appears to cause negative feelings about the self by adulthood (Cook, Knight, Hume, & Qureshi, 2014). These unconstructive views often lead to the development of negative thoughts, which worsen problems by lowering motivation and promoting avoidance behaviors, thereby producing a self-perpetuating cycle of difficulties (Knouse & Safren, 2010).

Adults who have gone undiagnosed throughout their lives may hold inaccurate interpretations of their symptoms (Rucklidge, 2010; Young, Bramham, Gray, & Rose, 2007) and attribute their problems to their personalities or to a moral flaw within themselves, which in turn can lead to feelings of shame and negative self-evaluations (Cook, Knight, Hume, & Qureshi, 2014; Kelley, English, Schwallie-Giddis, & Jones, 2007; Young, Bramham, Gray, & Rose, 2007). Thus, adults presenting to treatment for the first time need to be better informed about their diagnoses in order to clarify these misconceptions and to recognize the impact that this may have had on the overall view of the self (Quinn, 2008). Consequently, low self-concept and low self-esteem are common secondary characteristics of adults with ADHD (Jackson & Farrugia, 1997; Realmuto et al., 2009; Richman, Hope, & Michalas, 2010; Stormont, 2001) that may begin to develop earlier in life. Students with ADHD perceive their competency as lower, when comparing themselves with their peers (Mazzone et al., 2013). Adolescents with ADHD experience a distorted sense of self (Kreuger, & Kendall, 2001), whereas adults with ADHD display higher levels of pessimism and negative self-views (Biederman, 2004; Biederman et al., 2006). By early adulthood, ADHD is associated with increased risk of suicide attempts (Agosti, Chen, & Levin, 2011). When considering the severity of these risks, it is imperative for researchers and clinicians to better identify the negative impacts that can come along with this disorder.

Pharmacotherapy remains the first-line treatment for ADHD, yet evidence shows that it is more effective when combined with behavioral interventions (Root & Resnick, 2003; Sudak, 2011; Safren, Sprich, Chulvick, & Otto, 2004; Safren et al.,

2005). Additionally, about 20-50% of adults with ADHD may have unfavorable

reactions to medication or do not respond to it (Wender, 1998; Wilens et al., 2002;

Wilens, Spencer, & Biederman, 2001). Therefore, non-pharmacological interventions

are necessary in order to help a substantial portion of this population achieve

adequate response. In general, research suggests that cognitive behavioral therapy

(CBT) in conjunction with pharmacotherapy, is the most efficacious treatment

package for adults with ADHD because cognitive behavioral interventions target the

symptoms that are less likely to show a response from medication (Ramsay &

Rostain, 2008; Safren et al., 2005; Sudak, 2011). For example, pharmacological

treatment is effective in reducing the core symptoms of ADHD, such as inattention,

hyperactivity, and impulsivity (Safren et al., 2004). Yet, medication has shown

limited treatment effects on the functional impairments of those with ADHD,

including procrastination, time management, organization, planning, and self-esteem

(Safren et al., 2004; Solanto et al., 2010; Weiss, Hechtman, & Weiss, 1999). In order

to treat such impairments effectively, behavioral techniques are essential because

these strategies utilize active problem-solving and skill-building approaches, which

support progress and maintenance (Safren et al., 2005).

CBT interventions for adult ADHD target distorted cognition, maladaptive

behavior, and related emotions that maintain or exacerbate issues; though, the overall

goal is to alter the connection between ADHD symptoms and learned beliefs of

failure (Knouse & Safren, 2010). Although modifying maladaptive cognition is

considered to be a valuable strategy in the treatment of adults with ADHD (Barkley,

2006; Ramsay & Rostain, 2008), research has only recently begun to explore the

nature of the association between cognitive distortions and ADHD (Ambrovowitch & Schweiger, 2009; Knouse & Mitchell, 2015; Mitchell, Benson, Knouse, Kimbrel, & Anastopoulos, 2013; Strohmeier, 2013; Torrente et al., 2012). Despite the known differences that can occur throughout and between genders, research evaluating cognitive distortions among adults with ADHD has not investigated the potential influence of these demographic variables. Finally, poor self-concept is a common secondary characteristic of ADHD (Realmuto et al., 2009; Richman, Hope, & Michalas, 2010; Stormont, 2001). Yet little is known about the potential relationship between self-concept and cognitive distortions among adults with ADHD, and also about the potential influence of gender and age on the presentation of this disorder.

 Purpose of the Study

        The object of the present study is to examine the association of cognitive distortions, problems with self-concept, gender, and age in adults diagnosed with ADHD. Cognitive distortions have shown to be significantly related to ADHD severity, but other variables such as depression and anxiety do not appear to mediate this relationship (Ambrovowitch & Schweiger, 2009; Mitchell et al., 2013; Strohmeier, 2013; Torrente et al., 2012). Despite the relevance of cognitive distortions being a major focus in cognitive behavioral treatments for this population, research on cognitive distortions among individuals with ADHD is still limited (Ambrovowitch et al., 2009; Knouse, Zvorsky, & Safren, 2013; Mitchell et al., 2013; Strohmeier, 2013; Torrente et al., 2012).

        Moreover, poor self-concept often presents with ADHD (Realmuto et al., 2009; Richman, Hope, & Michalas, 2010; Stormont, 2001), yet research evaluating

cognitive distortions as it may relate to self-concept is also extremely limited and has

not focused exclusively on adults. Furthermore, presentations of ADHD may be

reflected differently in each individual, depending on gender and age differences

(Fedele, Lefler, Hartung, & Canu, 2012; Quinn, 2008; Wilens et al., 2009). Symptom

severity throughout stages of development in youth (e.g., child development into

adolescence and young adulthood) has been studied extensively (Bauermeister et al.,

2011; Faraone, Biederman, & Mick, 2006; Harpin, 2005). Yet little research has

examined the changes in symptom severity exclusively throughout adulthood (i.e.,

younger adult vs. older adult symptom severity). Additionally, although gender

differences have been extensively studied in youth, research among adults with

ADHD is much more limited. Consequently, the primary aim of this study is to

evaluate the impact of cognitive distortions, problems with self-concept, gender and

age on ADHD symptomology in adults.

Chapter Two

Literature Review

History

Over the past century, there have been many terms used to describe the characteristics and symptoms of ADHD. Diagnostic criteria for ADHD has evolved with each revision of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM). To understand the evolution of ADHD further, a review throughout each DSM is provided.

In 1952, The American Psychiatric Association (APA) published the *Diagnostic and Statistical Manual of Mental Disorders* (APA, 1952). However, the first edition did not include psychological characteristics for the disorder that we now consider ADHD. The second edition of the DSM was published in 1968, which was the first time that a condition similar to what is now known as ADHD was proposed (APA, 1968). This condition was termed *Hyperkinetic Reaction* and was listed within the category of behavioral disorders of childhood and adolescence; it was defined as a disorder "characterized by overactivity, restlessness, distractibility, and short attention span, especially in young children" and it was noted that the problematic behavior typically diminished in adolescence (p. 49-50). Additionally, if this condition was considered to be result of brain damage, it was specified in the diagnosis. DSM-II did not include a specific age of onset; instead, it simply provided a broad description that this condition could easily be observed in many young children. The third edition (DSM-III) changed the term from Hyperkinetic Syndrome to *Attention Deficit Disorder* (ADD) (APA, 1980). DSM-III included a detailed

description of the disorder, a set of diagnostic criteria, or other features to help

distinguish this condition from other psychiatric issues. Criteria suggested that

children must display at least three symptoms of inattention (e.g., often doesn't seem

to listen) and at least two symptoms of impulsivity (e.g., often acts before thinking)

and hyperactivity (e.g., runs about or climbs on things excessively). To receive a

diagnosis, a child must have displayed symptoms for at least six months prior to age

seven. Further, if the person no longer displayed symptoms, it was recommended that

the "residual type" should be noted. This suggested that "the individual once met

criteria" for ADD and that this information could come from another source, such as

a family member (APA, 1980, p. 41).

　　　　After much controversy regarding the significance of hyperactivity in this

condition, the publication of DSM-III-R renamed the diagnosis Attention-Deficit

Hyperactivity Disorder (ADHD), reflecting a more comprehensive understanding of

the disorder (APA, 1987). Two other major revisions were introduced with this

publication. First, it was noted that this disorder is no longer seen only in children or

adolescents and that adults can also be diagnosed with ADHD. Second, this edition

acknowledged different levels of severity by adding mild, moderate, and severe

modifiers. Today, it is still well known that this disorder impacts all ages with

varying degrees of inattention, impulsivity, and hyperactivity (Greydanus, Pratt, &

Patel, 2007). Therefore, DSM-III-R made substantial contributions in the recognition

of adult ADHD.

　　　　The DSM-IV (APA, 1994) modified the term from DSM-III-R to what is still

the currently accepted nomenclature, Attention-Deficit/Hyperactivity Disorder

(ADHD). The criteria for DSM-IV required at least six symptoms for a diagnosis of

ADHD (Barkley, Fischer, Smallish, & Fletcher, 2002; Faraone, Biederman, & Mick,

2006). Similar to DSM-III, DSM-IV reiterated the point that children or adults can be

diagnosed with ADHD even in the absence of hyperactivity because this symptom is

no longer a defining factor in the criterion. However, further corrections to this

edition were made, leading to the publication of the DSM-IV-Text Revision (DSM-

IV-TR) in 2000. Although, the criteria and definitions did not change from DSM-IV,

the DSM-IV-TR updated the statistics to reflect the current prevalence rates in 2000

and synchronized the criteria with the updated ICD codes (APA, 2000).

Given that four of the symptoms in the DSM-IV criteria reflect childhood

presentations (e.g., hyperactivity), it has been challenging for adults to meet the

diagnostic requirement of at least six symptoms. Taking this into account, the recent

publication of DSM-5 has further revised the criteria, suggesting that older

adolescents or adults (ages 17 or older) need only five symptoms for diagnostic

criteria to be met and symptoms were revised to better relate to adult presentations

(APA, 2013). Age-of-onset is another obstacle in meeting criteria for ADHD.

Currently, in order for a diagnosis of ADHD to be made, symptoms are required to be

present before the age of 12 years (APA, 2013), although others have argued for the

age-of-onset criterion to be raised to 14-16-years of age (Barkley & Biederman, 1997;

Barkley, Murphy, & Fisher, 2008).

ADHD

The DSM-5 defines ADHD as a persistent pattern of inattention and/or

hyperactivity-impulsivity that interferes with functioning or development (APA,

2013). At least six symptoms (five symptoms for individuals 17 and older) are

required for a diagnosis of ADHD to be established either in the predominantly

inattentive and/or in predominantly hyperactive/impulsive presentations. If both the

inattentive and hyperactive criteria are met, the clinician should specify that the

individual is displaying the combined presentation. It is important to note that the

DSM-5 has adapted exemplars to better represent the adolescent or adult

presentations of symptoms. For example, one of the symptom criteria for

hyperactivity states that the individual "often runs about or climbs in situations where

it is inappropriate" (APA, 2013, p. 60). Because the wording in this symptom

criterion is more relevant to a child, it has been noted that in adolescents and adults,

this may be limited to feeling restless. Additionally, several inattentive or

hyperactive/impulsive symptoms must be present in two or more settings (e.g., at

home, school, or work). It is also noted that there must be clear evidence that

symptoms interfere with social, academic, and/or occupational functioning. Finally,

in order for a diagnosis to be made, symptoms cannot occur exclusively during the

course of schizophrenia or another psychotic disorder and cannot be better explained

by another mental disorder (e.g., mood disorder, anxiety disorder) (APA, 2013).

      Presentation in children. Although parents often initially observe that a

young child appears hyperactive, this is often considered to be normal behavior

during this stage of development. Consequently, such behavior may initially be

ignored. Furthermore, it can be difficult to observe inattention at this stage because

most tasks at this developmental level do not require sustained attention, which might

be challenging for most young children in general. Youth exhibiting disruptive

behavior are more likely to be referred for treatment because others (e.g., teachers or parents) view these behaviors as bothersome or even intolerable (Weiss, Worling, & Wasdell, 2003). Later, parents or teachers typically observe the consequences of inattention when children attend elementary school. In the classroom, children with ADHD may demonstrate poor social skills (Realmuto et al., 2009; Stormont, 2001), which may be a result of their inattention, impulsivity, and/or hyperactivity. Another common childhood symptom is forgetfulness. This can typically present when parents notice that their child has not followed through on tasks (e.g., failing to clean the bedroom or turn out a light), even after directions have been repeated several times and they have insured that the child was aware of the task at hand. Because children with ADHD are often impulsive and/or defiant, they can elicit negative responses from their parents (e.g., "You never remember to turn out the light"), which can impact the child's beliefs about himself or herself (e.g., "I'm just not good at remembering things") (Ostrander & Herman, 2006).

Environmental factors can influence the presentation and trajectory of this disorder. For instance, parental support is crucial because inconsistent or hectic family environments can exacerbate symptoms of ADHD, possibly leading to the development of depression even in young children (Ostrander & Herman, 2006). Therefore, psychoeducation for both the parent and child can be beneficial in facilitating awareness, support, and better communication and understanding between the parent and child. Interventions that target dysfunctional parenting styles can be helpful in preventing the exacerbation of symptoms for children with ADHD (Ostrander et al, 2006). Children with ADHD respond well to supportive role

models, including parents and teachers, to facilitate healthy development.

      Presentation in adults. Throughout development and maturity, increasing

demands are placed on individuals, which can be stressful for anyone. However, for

those with ADHD, additional responsibilities may be more challenging due to their

difficulties with inattention (e.g., time management) and/or impulsivity (e.g.,

following through on tasks until completion). As a result, adults with ADHD are

more likely to experience difficulties with time management, disorganization, and the

ability to follow through on necessary tasks, which is in some ways similar to

developing children, who often struggle with these tasks, regardless of whether or not

there is a presence of ADHD. For example, in adults with ADHD, forgetfulness

might hinder the ability of following through on necessary tasks, such as returning

calls, paying bills, and keeping appointments. If these tasks are left incomplete, the

consequences for an adult are much more severe than for a child who, for instance,

merely forgets to complete a chore at home and is scolded by his or her parents.

Adults with ADHD have poorer occupational outcomes, including unemployment,

which significantly predicts depression (Halmoy, Fasmer, Gillberg, & Haavik, 2009;

Reynolds, 2008) and can cause financial stress.

      Adults with ADHD are more likely to have poorer relationships and

experience divorce in comparison with their counterparts without this diagnosis

(Barkley, 2008; Barkley, Murphy, & Fisher, 2008; Reynolds, 2008). Furthermore,

adults with ADHD who are living on their own may not have support from others,

which they previously may have taken for granted and have relied upon, for example

from their parents. At the same time, adults who have lived with ADHD may have

learned to manage their symptoms, or may even compensate for their difficulties

(e.g., setting an alarm as a reminder to complete a task they would otherwise forget).

Adults with ADHD more commonly have issues with driving, as well as with

substance abuse (Barkley, 2008; Barkley, Murphy, & Fisher, 2008; Biederman et al.,

1994). Finally, issues related to symptoms often create other problems, such as

relationship problems (e.g., boss, friend, family member, or spouse) or other areas of

functioning, creating additional barriers toward success.

ADHD and Associated Features

Many associated factors frequently co-occur with the major symptoms (i.e.,

inattention and impulsivity) of adult ADHD, such as financial, emotional, and social

problems (Barkley, Murphy, & Fisher, 2008; Harpin, 2005; Ramsay & Rostain,

2008). Individuals with ADHD commonly experience social rejection and

interpersonal relationship problems as a result of their symptoms. Furthermore, poor

social skills and low self-concept are common secondary factors associated with

ADHD (Realmuto et al., 2009; Richman, Hope, & Michalas, 2010; Stormont, 2001).

Given the fact that poor self-concept can lead to distress and maladaptive functioning,

improving self-concept is especially important for this population.

Poor self-concept. Self-concept is understood as a complex cognitive

structure (Cantor & Kihlstrom, 1987; Greenwald & Pratkanis, 1984; Markus & Wurf,

1987), including beliefs about who one is today and what one fears or desires to

become in the future (Cantor, 1990; Markus et al., 1987; Stein, 1995). According to

the schema model, self-concept can be described as a " person's total collection of

cognitions about the self including current self-schemas that focus on body image and

future-oriented possible selves including the desired or ideal selves" (Stein, 1995, p.

190). Ultimately, self-concept is highly related to thoughts and beliefs regarding the

self, which may or may not be accurate. Therefore, further research is needed to

identify whether or not poor self-concept is related to more frequent cognitive

distortions in general.

     Self-concept and related concepts. Terms such as self-esteem, self-efficacy,

and self-concept are often used interchangeably to describe and evaluate the various

aspects of the self (Edbom, Granlund, Lichtenstein, & Larsson, 200). More

specifically, *self-esteem* is a more abstract cognitive and emotional concept of an

individual's idea and values of the self, including the self-image (Johnson, 2003;

Ouvienen-Birgerstam, 1985; as cited in Edbom, Granlund, Lichtenstein, & Larson,

2008). On the other hand, the term self-concept is defined as one's description of

oneself, whereas self-esteem reflects a more general evaluation of oneself (Harter,

1990; Rosenberg, 1986; Willoughby, King, Polatajko, 1995). Rosenberg (1979)

described *self-concept* as the entirety of an individual's thoughts and feelings in

reference to the self as an object. The self-concept is shaped by experiences in the

environment and is influenced particularly through reinforcement (Shavelson,

Hubner, & Stanton, 1976). Self-concept is similar to self-efficacy because both

"explain and predict one's thought, emotion, and action" (Bong & Skaalvik, 2003, p.

5) (See below for further elucidation of self-efficacy). In sum, these constructs are

distinct and separate, although both appear to play a vital role in the development and

maintenance of thoughts, evaluations, and overall beliefs about the self.

Lowered sense of self in youth. Research on self-evaluation suggests that children diagnosed with ADHD recognize their problematic behavior as issues over which they have little control (Kaidar, Weiner, & Tannock, 2003). A wealth of research has demonstrated lowered self-concept, poor self-efficacy, and low self-esteem in youth with ADHD (Major, Martinussen, & Weiner, 2013; Rucklidge, 2010; Rucklidge & Tannock, 2001). In children, these issues appear to develop at a young age, which can impact the development of the perception of self and the future self.

Self-concept. Among youth with ADHD, a positive correlation among poor self-concept and ADHD symptom severity has been established (Edbom, Granlund, Lichenstein, & Larson, 2008). In adolescents, those diagnosed with ADHD are more likely to compare their social competence with that of their peers, which increases the likelihood of (unfavorable) upward social comparison and the development of a negative self-concept (Richman, Hope, & Michalas, 2010). Further, intellectually gifted students without ADHD reported higher levels of self-concept in comparison with their equally achieving peers with ADHD (Foley-Nicpon, Rickels, Assouline, & Richards, 2012). Thus, students with ADHD appear to have lowered self-concept in comparison with their peers without ADHD, even when they perform at the same level.

Self-efficacy. Self-efficacy is defined as a person's belief in his or her ability to perform a task (Gist, 1987). Bandura (1997) asserts that self-efficacy is the leading cause for motivating behavior. Many individuals with ADHD have low self-confidence and hold negative assumptions about the future, which, in turn, negatively impacts their level of motivation (Ramsay, 2010; Ramsay & Rostain, 2008). A recent

study examined self-efficacy related to self-regulated learning beliefs in adolescents

(Major, Martinussen, & Weiner, 2013). Overall, the results suggest that both male

and female adolescents with ADHD demonstrated significantly lowered self-efficacy

beliefs when compared with their counterparts without ADHD (Major et al., 2013).

Moreover, females with ADHD show significantly lowered self-efficacy beliefs than

females without ADHD as well as with males with and without ADHD (Major et al.,

2013).

     Self-esteem. Self-esteem has been described as a component of the self-

concept that is more exclusively focused on self-evaluation (Ziegler-Hill & Jordan,

2010). Research suggests that self-esteem is lower in children with ADHD compared

with their peers who do not meet criteria for this diagnosis (Ren, Qian, Wang, & Gu,

2002). Moreover, research has demonstrated that girls with ADHD are more likely to

report greater feelings of ineffectiveness, lower self-esteem, and poorer coping skills,

when compared with boys with ADHD (Rucklidge, 2010; Rucklidge & Tannock,

2001). Yet the *positive illusory bias*, commonly associated with ADHD, suggests

that children with ADHD appear to overestimate their abilities and can display high

levels of self-esteem, especially in regard to academic achievement (Hoza et al.,

2004). However, the positive illusory bias pertains primarily to boys, who exhibit a

combination of inattention and hyperactive/impulsive symptoms in addition to

presenting with aggression or disruptive behaviors (Hoza et al., 2004). Parents and

teachers have recognized issues in self-esteem among children with ADHD (Fabiano

et al., 2006). Further, gifted students with ADHD show lowered satisfaction with

their lives in comparison with their peers without ADHD (Foley-Nicpon, Rickels,

Assouline, & Richards, 2012). In sum, there is evidence that self-concept, self-efficacy, and self-esteem appear to be significantly reduced in youth with ADHD, which potentially can create greater issues later on, in adulthood.

   Lowered sense of self in adults. The majority of the research that suggests individuals with ADHD have a poor sense of self is focused on younger adults or college students. Limited studies have extended findings into middle aged or older adults. Self-esteem has been evaluated in adults, but limited research exists on self-concept and self-efficacy beliefs among those with ADHD. Although one study examining hypersexual issues in men with ADHD (ages ranging from 19-56), found that low self-concept was a highly significant issue secondary to the condition (Reid, Carpenter, Gilliland, & Karim, 2011). Another study evaluated young adults with ADHD and found that college students who reported a greater severity in symptoms exhibited lower levels of self-efficacy in their ability to make career decisions (Norwalk, Norvilitis, & MacLean, 2008).

   Self-esteem in adults. In individuals with ADHD, issues with self-esteem appear to extend into adulthood and across genders (Canu & Carlson, 2007; Rucklidge, Brown, Crawford, & Kaplan, 2007). Among college students, symptoms of ADHD are correlated with lower social skills and lower self-esteem (Dooling-Liftin & Rosen, 1997; Shaw-Zirt, Popali-Lehane, Chaplin, & Bergman, 2005). Furthermore, gifted students with ADHD may display high cognitive skills in college, yet their future performance may continue to be negatively influenced by low self-esteem (Shaw-Zirt et al., 2005). Although the positive illusory bias suggests that children with ADHD appear to overestimate their abilities and display high levels of

self-esteem (Hoza et al., 2004), this process does not appear to hold true for adults

diagnosed with ADHD (Rucklidge et al., 2007). For example, women with ADHD

attribute their problems to deficits in their characters and consequently, they

experience a sense of shame and lowered self-esteem (Kelley, English, Schwallie-

Giddis, & Jones, 2007). Overall, children with ADHD are more likely present with

inflated self-perceptions, whereas adults with ADHD are more likely to hold negative

views regarding their abilities.

Research investigating the association of self-concept and symptoms of

ADHD, has primarily targeted children, adolescents, and young adults (i.e., college

students). More research is needed to identify the impact that self-concept has on

middle-aged and older adults with ADHD. Although some studies have demonstrated

lowered levels of self-concept among adults with ADHD, research in this area is

limited. Finally, studies have not evaluated how gender differences might influence

self-concept in adults.

Age and symptom progression. ADHD appears to present differently at

various points in development (Bresnahan, Anderson, & Barry, 1999; Hinshaw,

Owens, Sami, & Fargeon, 2006; Ramtekkar, Reiersen, Todorov, & Todd, 2010).

Early-onset has been associated with higher severity and persistence of symptoms

when left untreated until adulthood (Karam et al., 2009). Evidence suggests that

some symptoms of ADHD appear to persist throughout adulthood (Bauermeister et

al., 2011; Harpin, 2005; Turgay et al., 2012). Yet in terms of overall symptom

severity, research has demonstrated that there appears to be a decline in many

symptoms as a person ages (Faraone, Biederman, & Mick, 2006; Turgay et al., 2012).

Overt hyperactivity typically diminishes and becomes less problematic by adolescence (Kumperscak, 2013; Turgay et al., 2012). In adults, this symptom is much more manageable and less noticeable by others (Kumperscak, 2013; Turgay et al., 2012). Consequently, this reduction in overt hyperactivity is often interpreted by others as progress, simply because it is less noticeable. Yet other evidence suggests that this decline is merely a change in presentation (e.g., hyperactivity can be manifested as restlessness), rather than remission (Volkow & Swanson, 2013; Weiss & Weiss, 2004; Wender, 1998; Wilens & Dodson, 2004). Similarly, impulsivity is a major issue throughout childhood and typically lessens in intensity by adulthood (Kumperscak, 2013). Generally, symptoms of inattention persist throughout development (Biederman, Mick, & Faraone, 2000; Hart, Lahey, Loeber, Applegate, & Frick, 1995; Todd et al., 2008) and tend to be highly prominent in adults (Wilens et al., 2009). Overall, further clarification is needed because some of the main symptoms of ADHD appear to diminish through maturity, yet there is great heterogeneity of presentation and progression.

Gender and ADHD. In the general population, prevalence estimates suggest that ADHD occurs more frequently in males than in females (Kessler et al., 2006; Polanczyk et al., 2007). In childhood, males are two times more likely to be diagnosed with ADHD than females (Polanczyk et al., 2007). In adults, a diagnosis of ADHD is slightly more common among men, with a ratio of 1.6:1, as compared with women (Kessler et al., 2006). Possible explanations for gender differences in prevalence rates are important to note. First, it should be considered that among youth, males are more likely than females to be referred for treatment because of a

higher prevalence of observable and disruptive symptoms in boys (Faraone &

Biederman, 2009; Monuteaux, Mick, Faraone, & Biederman, 2010; Novik et al.,

2006). In addition, evidence suggests that females report more problems with

inattention than males (Fedele, Lefler, Hartung, & Canu, 2012), with females more

often being diagnosed with the predominantly inattentive type (Kessler et al., 2006;

Weiss, Worling, & Wasdell, 2003). Thus, the more common symptoms experienced

by females are less easily observed by others, which in turn, reduces the probability

of referrals being made for this population. Also, parent and teacher reports are

needed to determine if symptoms of ADHD occur in multiple settings (Barkley,

Fischer, Smallish, & Fletcher, 2002). Given the fact that the criteria require an onset

before age 12, it is more challenging for women to obtain reports from others

acknowledging that the symptoms were present throughout childhood. Finally, by

adulthood, women are more likely than males to refer themselves for treatment

(Biederman et al., 2004). Given that females with ADHD are less likely to be

referred for treatment during their childhood, the chances of receiving treatment early

on is far less common than for males. Ultimately, these factors could potentially

explain the substantial differences in reported rates of ADHD between children and

adults according to gender.

  Gender differences among youth. Research has suggested that girls with

ADHD are most likely to exhibit issues with inattention and internalizing behaviors

(Gershon, 2002; Quinn, 2008; Weiss, Worling, & Wasdell, 2003). Boys with ADHD

are more likely to exhibit a combination of inattention, hyperactivity, and impulsivity

symptoms and more often display disruptive behavior and externalizing symptoms

(Abikoff et al., 2002; Biederman et al., 2005; Gershon, 2002; Quinn, 2008). One

study found that boys with ADHD had greater impairment than girls with ADHD

(Newcorn, et al., 2001). As noted previously, adolescent females report having a

lowered self-esteem, greater feelings of ineffectiveness, and are more affected by

negative life events when compared with their male counterparts (Rucklidge &

Tannock, 2001). Further, girls with ADHD are more likely to anticipate negative

responses from their peers (Thurber, Heller, & Hinshaw, 2002).

        A meta-analysis exploring gender differences in ADHD revealed that both

depression and anxiety are a greater concern for girls with ADHD than for boys

(Gershon, 2002). Another study demonstrated that girls with the inattentive type

were more likely to engage in social isolation (Hinshaw, Carte, Sami, Treuting, &

Zupan, 2002). In adolescents, both males and females are at a greater risk for self-

harm and suicidal ideation when compared with their peers without the diagnosis

(Rucklidge, 2010). However, the risk for suicidal ideation is greater for adolescent

females with ADHD (17.9%) when compared with their male counterparts, who

demonstrated a significantly lower risk (5.9%) (Rucklidge & Tannock, 2001).

Although both male and female youth with ADHD are at risk for developing

emotional problems later in life, this is especially true for girls because the risk is

higher (Lahey et al., 2007). This finding is consistent with other research suggesting

that girls with ADHD exhibit more internalizing symptoms (i.e., emotional problems)

in comparison with boys with ADHD (Abikoff et al., 2002; Gaub & Carlson, 1997;

Gershon, 2002; Levy, Hay, Bennett, & McStephen, 2005). A follow-up study

revealed that girls with ADHD are 2.4 times more likely to have been admitted to a

psychiatric hospital, when compared with boys (Dalsgaard, Mortensen, Frydenberg, & Thomsen, 2002). Psychiatric comorbidity in children with ADHD has been shown to persist into adolescence but only for females, suggesting that comorbidity is less enduring over time for males (Monuteaux, Mick, Faraone, & Biederman, 2010). In sum, among youth with ADHD, females are more likely to internalize and experience low self-esteem, persistent emotional problems, suicidal thoughts, and are more frequently admitted into a psychiatric hospital, when compared with males with this diagnosis.

Gender differences in adults. Among adults with ADHD, women are also more likely to present with inattention and internalizing-problems, in comparison with men (Fedele, Lefler, Hartung, & Canu, 2012; Quinn, 2008; Rucklidge, 2010). Research evaluating differences in symptom severity between men and women found no significant differences in symptom severity but suggested that women perceived themselves as having fewer advantages and greater concerns with their symptoms than men (Arcia & Conners, 1998). Women with ADHD who have gone undiagnosed were found to have more issues managing their work and family demands, demonstrate less consistent parenting skills, have a greater risk for divorce and are more likely to be single parents, in comparison with women without ADHD and males with or without ADHD (Nadeau & Quinn, 2002).

Adult males with ADHD are at a higher risk for having comorbid antisocial personality disorder and substance abuse problems (Biederman et al., 2004; Kafka & Hennen, 2002; Kessler et al., 2006; Halmoy, Fasmer, Gillberg, & Haavik, 2009), whereas females with ADHD are more likely to display sleep problems and eating

disorders, in addition to mood and anxiety disorders (Biederman, et al., 2006; Cumyn,

French, & Hetchman, 2009; Rasmussen & Levander, 2009; Robison et al., 2008;

Sobanski et al., 2007; Wilens et al., 2009). In general, the risk of being diagnosed

with an emotional disorder is much greater among women with ADHD (49%) in

comparison with men with ADHD (28%) (Rasmussen et al., 2009). In sum, evidence

has confirmed that internalizing symptoms, such as inattention and depression or

anxiety, continue to affect females more frequently well into adulthood; however,

men exhibit more externalizing symptoms, such as hyperactivity or behavioral

problems.

       Cognitive Distortions. Beck (1967) initially used the term *cognition* to refer

to a thought that may act as an interpretation, command, or criticism within oneself.

Beck originally coined the term *cognitive distortion* to describe unique thought

content that is inaccurately conceptualized (Beck, 1967). Cognitive theory suggests

that negative self-perceptions can reflect cognitive distortions about the self (Beck,

1967, 1976). Moreover, this theory assumes that an individual's subjective

perception of his/her early life experiences forms and sustains fundamental beliefs

(also known as *schemas*) about the self, the world, and the future (Beck, 1976; Hastie,

1981; Young & Lindemann, 1992). Segal (1988) described schemas, as reactions and

experiences from the past that form a reasonably consistent and well-organized

source of knowledge, which can guide future insight and judgments. Furthermore,

schemas are maintained through cognitive distortions, which operate to alter

perceptions and interpretations in ways that confirm erroneous beliefs (Beck, 1967;

Young et al., 1992).

Schemas result from personal experiences, especially early in childhood, and reflect one's idiosyncratic understanding of objects or events (Hastie, 1981). Maladaptive schemas are said to develop early in life and, when left untreated, may continue throughout the lifespan (Young & Lindemann, 1992). In general, schemas are deeply held pervasive beliefs, whereas cognitive distortions are inconsistent/unhelpful and much more automatic thought processes; yet, both could potentially contribute to maladaptive behaviors, unpleasant emotions, physiological reactions, and other negative outcomes (Beck, 1995; Young et al, 1992). Schemas about the self are shaped from past experiences (Beck, Rush, Shaw, & Emery, 1979; Bong & Skaalvik, 2003) and may play a meaningful role in the development of self-concept and self-efficacy (Bandura, 1986; Bong et al., 2003; Skaalvik, 1997). As early as 8-years of age, schemas may begin to influence behavior, which can be potentially problematic for young children because maladaptive schemas may elicit negative behaviors then and throughout life (Taylor & Ingram, 1999). Around 8-years of age, children begin to distinguish between different areas of their overall self-concepts (Marton, Golombeck, Stein, & Korenblum, 1988).

The cognitive model suggests that distorted thinking is a shared experience among virtually all psychological disorders (Beck, 1995) including both clinical syndromes and personality disorders (e.g., Rosenfield, 2004). A study examining cognitive distortions in adolescents found that those who suffered from multiple disorders or co-occurring issues were more likely to exhibit cognitive distortions (Kempton et al., 1994). Research has demonstrated that being diagnosed with ADHD increases the risk for developing other psychiatric disorders (Nutt et al., 2007).

Further, adults with ADHD are more likely to hold core beliefs of inadequacy, which can lead to negative behaviors such as avoidance, thereby exacerbating consequences of the major symptoms of inattention, hyperactivity, and impulsivity (Knouse & Safren, 2010; Ramsay & Rostain, 2005; Strohmeier, 2013).

Targeting cognitive distortions is a key component of effective cognitive behavioral treatment for adults with ADHD (Ramsay & Rostain, 2008). The terms cognitive distortions, automatic thoughts, distorted thoughts, or irrational beliefs (Beck, 1967; Beck, 1976; Beck, Rush, Shaw, & Emery, 1979; Burns, 1990; Burns, 1999; Ellis, 1962) are often used interchangeably to describe errors in thought patterns in relation to the self. Therefore, for the purpose of clarification in this review, the term cognitive distortions will be used to encompass these previously mentioned, coinciding terms.

Gender differences and cognitive distortions. Research on internalizing and externalizing symptoms suggests that those who experience internalizing symptoms are more likely to experience higher rates of cognitive distortions (Kempton, Hasselt, Bukstein, & Null, 1994; Lueng & Wong, 1998). Moreover, severity of internalizing symptoms is positively related to a greater degree of cognitive distortions (Lueng et al., 1998). Given that females with ADHD are more likely to present with internalizing symptoms (Gershon, 2002), it is possible that these females may be more susceptible to experiencing cognitive distortions, although no research has explored this relationship.

Research on Cognitive Distortions and ADHD

As a group, individuals with ADHD appear to be at risk for developing cognitive distortions due to the multitude of issues that co-exist with this syndrome, which can maintain or worsen ADHD symptom severity. Although individuals with ADHD are likely to experience cognitive distortions which are associated with impairments, concerns of this nature are not included in the symptomology of this disorder. Rather, cognitive distortions are viewed as secondary issues to the chief complaints of ADHD, if at all, but are clinically relevant insofar as they exacerbate and maintain distress and impairment (Torrente et al., 2012). Researchers in this field have explained that, although "ADHD is not the result of negative distorted thoughts, many individuals who grew up with (often undiagnosed) ADHD may have developed maladaptive beliefs and cognitions that interfere with the implementation of effective coping strategies" (Rosenfield, Ramsay, & Rostain, 2008, p. 473). Overall, cognitive distortions are problematic because these negative thought processes influence treatment progress and can worsen the impact of their ADHD symptoms (Torrente et al., 2012). By understanding and treating these errors in thinking, individuals with ADHD may be more likely to adopt effective coping strategies and problem solving skills, as well as reduce the likelihood of negative consequences.

To date, six studies have investigated the relationship between ADHD and cognitive distortions in adults (Ambrovowitch & Schweiger, 2009; Knouse & Mitchell, 2015; Knouse, Zvorsky, & Safren, 2013; Mitchell, Benson, Knouse, Kimbrel, & Anastopoulos, 2013; Strohmeier, 2013; Torrente et al., 2012). In a study examining negative thought processes in college students, those with ADHD reported

more frequent unwanted and intrusive thoughts and anxious worrisome thoughts, and were also less likely to suppress these thoughts, in comparison with peers without an ADHD diagnosis (Ambrovowitch et al., 2009).

It has been well established that depression is associated with negative automatic thought patterns (Beck, 1967; Beck, Rush, Shaw, & Emory, 1979). Because depression is known commonly to co-occur with ADHD (Barkley, 2006; Gershon, 2002; Halmoy, Fasmer, Gillberg, & Haavik, 2009; Rucklidge & Tannock, 2001), studies have assessed the frequency of cognitive distortions in individuals with ADHD, while considering the influence of depression (Knouse, Zvorsky, & Safren, 2013; Mitchell et al., 2013; Strohmeier, 2013; Torrente et al., 2012).

Mitchell et al. (2013) found that negative distorted thoughts were significantly related to symptoms of ADHD in adults, even after controlling for co-occurring issues, such as depression. Further, this study revealed a significant, positive relationship between negative thinking and inattentive symptoms, but not hyperactive-impulsive symptoms. Related research has evaluated the relationship between ADHD, cognitive distortions, and depression, as well as how anxiety may play a role (Strohmeier, 2013; Torrente et al., 2012). Both of these studies found that cognitive distortions were correlated with ADHD independently of comorbid anxiety or depression (Strohmeier, 2013; Torrente et al., 2012). In one of these studies, the overall quality of life in adults with ADHD was also explored in relation to cognitive distortions. Overall, the presence of cognitive distortions negatively impacted quality of life among adults with ADHD (Torrente et al., 2012).

Thus, the manifestations of cognitive distortions are significant among individuals with ADHD (Mitchell et al., 2013; Strohmeier, 2013; Torrente et al., 2012). Additionally, individuals who display poor self-concept often experience negative cognitions or evaluations surrounding the overall view of the self (Beck, Steer, Epstein, & Brown, 1990; Ostrander & Herman, 2006). Because research has found that poor self-concept is associated with ADHD among children (Major, Martinussen, & Weiner, 2013; Reid, Carpenter, Gilliland, & Karim, 2011), evaluating how these factors might be related to ADHD symptom severity among adults could potentially provide further insight into this clinical condition during this stage in development. Finally, increasing one's understanding about the impact of cognitive distortions in adult ADHD could potentially improve the conceptualization and treatment planning strategies for this population.

Chapter Three

Hypotheses

The goal of the current study is to explore the relationship between ADHD symptom severity, cognitive distortions and self-concept, as well as the influence of gender and age.

1. It is hypothesized that frequency of cognitive distortions, as measured by the *Inventory of Cognitive Distortions* (ICD), male gender, age and problems with self-concept, as measured by a total score on the Problems with Self-concept subscale of the *Conners' Adult ADHD Rating Scale* (CAARS) will significantly predict severity of ADHD symptoms, as measured by a total score on the *Brown Attention Deficit Disorder Scale* for adults (BADDS).

2. It is hypothesized that frequency of cognitive distortions and female gender will predict problems with self-concept.

Chapter Four

Methods

Research Design

The present study employed an archival, correlational model to examine whether or not cognitive distortions, problems with self-concept, male gender, and age predict ADHD symptom severity. Furthermore, cognitive distortions and female gender were evaluated to determine if these variables predict problems with self-concept.

Participants

Archival data were gathered from 130 cases, including 83 males (63.8%) and 47 females (36.2%), who presented to a university-based outpatient clinic in a large Northeastern city of the United States, specializing in the assessment and treatment of ADHD. Participants included adults, ranging in age from 18 to 62 (M = 34.48 years, SD = 12.64), who presented to this specialty clinic and completed an in-depth diagnostic evaluation. These individuals typically presented for this assessment because they have been informally diagnosed with ADHD or it has been suspected that they have symptoms consistent with ADHD. Demographic information was not included in this study, although most often, these adults were Caucasian and lived in the city where the clinic was located or were from the surrounding areas.

Inclusion and exclusion criteria. Each patient who completed an intake assessment battery at this Adult ADHD specialty outpatient program, was considered for inclusion if he or she completed the following measures: ADHD total scores from the BADDS (Brown, 1996) and the CAARS (Conners et al., 1999), as well as a

subscale from the CAARS to study problems with self-concept. Cognitive distortion

total scores were obtained from the ICD (Yurica & DiTomasso, 2002).

   Charts were reviewed to determine further eligibility requirements. Inclusion

criteria required the presence of ADHD according to the BADDS and/or CAARS

total scores (T score $\geq$ 65). Participants younger than 18 years of age were excluded

from this research study because the majority of assessments were normed on adults.

Participants who did not complete all of the required measures and who did not meet

the threshold (T score $\geq$ 65) on the CAARS and BADDS were excluded from this

study. It is important to note that patients are generally screened on initial contact

and during intake for severe post-traumatic stress disorder, traumatic brain injury,

severe and current substance use, schizophrenia or other psychotic disorders; these

are generally referred and excluded from treatment, and are therefore believed not to

have been included in this study, although archival data did not specifically include

this information.

Measures

   Brown Attention Deficit Disorder Scale for Adults (BADDS) - Adult

Version. The BADDS is a 40-item instrument that measures a wide range of ADHD

symptoms in adults (Brown, 1996). Respondents are asked to rate their own

behaviors or problems on a 4-point scale (0=*never*, 1=*once a week or less*, 2=*twice a*

week, 3=*almost daily*). The items are then totaled and grouped to obtain scores on the

following five subscales: 1) *Activation* (initiating and getting started on tasks), 2)

Attention (sustaining attention), 3) *Effort* (level of effort and energy related to

following through with tasks until completion), 4) *Affect* (mood regulation), and 5)

Memory (working memory and recall ability). Cluster subtotal scores may vary in

range, depending on the cluster. For example the Activation, Attention, and Effort

subscales can range from 0-27 because these clusters are made up of 9 items each.

However, there are 7 items grouped into the Activation subscale; therefore, a score on

this cluster can range from 0-21, whereas only 6 items make up the memory subscale.

Thus, a score on this cluster may range from 0-18. Each cluster subtotal score is

converted to the appropriate, corresponding T score. If a subscale score indicates a T

score ≥ 70, it is said to be significantly elevated, whereas, the conventional threshold

for clinical elevation is defined as a T score ≥ 65.

A BADDS total score is obtained through the sum of all cluster subtotal

scores. The total score is used to determine the probability of a person being

diagnosed with ADHD by examining the range of scores according to the following

categories: ADHD possible but not likely (<40); ADHD probable but not certain (40-

54), and ADHD highly probable (55-120). Scores on each subscale and the total

ADHD score are then converted into T-Scores for further analysis, with total scores

greater than 50 reflecting clinical significance. The BADDS has demonstrated

reliability in both a clinical sample (N = 142) and a nonclinical sample (N = 143)

(Brown, 1996). The BADDS demonstrates high internal consistency (Cronbach $\alpha =$

.96) and sufficient test-retest reliability ($r = .87$) (Brown & Whiteside, 2003). In this

study, the participants were required to have either a BADDS total T score of ≥ 65 or

a CAARS total T score of ≥ 65 in order to meet inclusion criteria.

Conners' Adult ADHD Rating Scales (CAARS)-Self Report: Long

Version. The CAARS-Self-Report: Long Version, is a 66-item instrument that

measures a wide variety of symptoms of ADHD in Adults. Item responses are rated

on a 4-point scale (0=Not at all; 1=Just a little, Once in a while; 2=Pretty much,

Often; 3=Very much, Very frequently). This instrument yields scores that are

associated with DSM-IV diagnostic criteria and other difficulties associated with

ADHD in adults, according to the following factor-derived subscales, including:

Inattention/Memory Problems, Hyperactivity/Restlessness, Impulsivity/Emotional

Lability, and Problems with Self-Concept. The CAARS also assesses the DSM-IV

total ADHD and types as well as other additional subscales, including: Hyperactive-

Impulsive Symptoms, Inattentive Symptoms, Total ADHD Symptoms, ADHD Index,

and an Inconsistency Index. The Problems with Self-Concept subscale (Factor D) is

derived from 6 items related to low self-esteem, self-criticism, and failure to confront

challenges (Conners, Erhardt, & Sparrow, 1999), where total raw scores may range

from 0-18. The Inattention/Memory problems (Factor A), Hyperactivity/Restlessness

(Factor B), Impulsivity/Emotional Lability (Factor C), and ADHD Index (Factor H)

subscales are derived from 12 items each, where raw scores can range from 0-36 on

each domain. DSM-IV Inattentive Symptoms (Factor E) and DSM-IV Hyperactive-

Impulsive Symptoms (Factor F) subscales both consist of 9 items; therefore, a total

score on either factor can range from 0-27. Finally, the DSM-IV ADHD Symptoms

Total (Factor G) subscale is derived from all of the items from both factors E and F;

therefore, a total score in this domain can range from 0-54. Raw scores are then

converted into T scores, which are used to determine elevated scores. Significant

elevations (defined as a T score $\geq$ 70) and the conventional threshold for clinical

elevation (defined as a T score $\geq$ 65) can provide information regarding each specific

subscale. More specifically, a high score on the Problems with Self-concept subscale

suggests difficulties related to poor self-esteem and self-confidence, as well as poor

social relationships. In this study, the participants were required to have either a

CAARS total T score of $\geq$65 or a BADDS total T score of $\geq$65 in order to meet

inclusion criteria.

This measure has demonstrated excellent validity in a community-based

sample of 2000 nonclinical adults (Conners, Erhardt, & Sparrow, 1999). The

CAARS self-report questionnaire was normed on a large sample of nonclinical adults

(N=1026) both men (n=433) and women (n=510) ages 18-72, where age and gender

effects were taken into consideration. The normative sample was obtained from

several locations in the United States and Canada. Internal consistency for the

CAARS self-report form has yielded Cronbach α ranging from .66 to .90 respectively

(Conners et al., 1999). The CAARS long version has indicated exceptional test-retest

reliability (r = .80 to .95) (Conners et al., 1999). This measure has been effective in

accurately diagnosing 85% of ADHD cases in adults (Erhardt, Epstein, Conners,

Parker, & Sitarernios, 1999). Strong re-test reliability for each scale suggests its

validity for use, either solely or in combination with other measures, for clinical or

research purposes (Erhardt et al., 1999). Specifically, the Problems with Self-

Concept scale demonstrated good test-retest reliability with a correlation of .91 ($p <$

.05). Overall, this measure is useful in identifying symptoms and other characteristics

of ADHD but is not recommended as the sole basis for clinical diagnosis and should

be used along with another diagnostic tool for assessing symptoms of ADHD.

Inventory of Cognitive Distortions (ICD). The ICD is a 69-item self-report instrument designed solely to measure the occurrence of 11 different cognitive distortions in an outpatient clinical setting (Yurica & DiTomasso, 2002). This measure consists of single sentence items that represent the ways that people think or feel about themselves, about others or about situations. Respondents are asked to rate items on a five-point Likert scale (1=Never, 2=Rarely, 3=Sometimes, 4=Often, 5=Always); therefore, a score can range from 69-345, where higher scores reflect a greater frequency of cognitive distortions than lower scores. Yurica (2002) has demonstrated empirical support through factor analysis for 11 cognitive distortions, which include 1) Externalization of Self-Worth, 2) Fortune Telling, 3) Magnification, 4) Labeling, 5) Perfectionism, 6) Comparison with Others, 7) Emotional Reasoning, 8) Arbitrary Interference/Jumping to Conclusions, 9) Minimization, 10) Mind Reading, and 11) Emotional Reasoning and Decision-Making. The purpose of using the ICD is to obtain a total score of cognitive distortions.

Yurica (2002) demonstrated good criterion validity because total ICD scores discriminated clinical outpatients from non-patient controls and demonstrated excellent test-retest reliability ($r = .998$) and internal consistency for this instrument (Cronbach's $\alpha = .98$). Rosenfield (2004) further supported the clinical relevance of the ICD when he examined cognitive distortions among individuals diagnosed with a wide variety of DSM-IV Axis I and Axis II disorders. Through this research, it has been confirmed that the ICD provides good internal consistency on all items and homogeneity of item content (Cronbach's $\alpha = .97$; Rosenfield, 2004).

Procedure

The current study was approved by the University of Pennsylvania Institutional Review Board (IRB) and the Philadelphia College of Osteopathic Medicine IRB as a chart review study. Archival data for this study were retrieved from patients' charts on file in an electronic database at a specialty outpatient adult ADHD treatment center. Specifically, the data used in this study ranged from evaluations completed in July, 2010, which was the point at which the ICD was introduced as a part of the intake packet and it concluding in February, 2016. After being referred to the ADHD specialty clinic, all patients were required to complete an intake packet of forms before being evaluated by a clinician; the packets contained release waivers, an intake assessment questionnaire, a health information questionnaire, and a variety of measures including the ICD and the CAARS. The evaluations included a semi-structured clinical interview, which explores background history, as well as other information pertaining to any other barriers that may or may not be caused by ADHD. Additionally, the clinician had patients answer questions on the BADDS during the evaluation. Therefore, all subjects included in the present study completed the BADDS, CAARS, and ICD as part of their comprehensive psychological evaluation. This information was kept in an encrypted, password-protected file for future relevant research in this field. A clinician at this site reviewed the records on file and gathered data (i.e., the patient's age, gender, and scores on the BADDS, CAARS, and ICD). The data from patient's charts were retained at the program and a clinician at the center reviewed the charts and relevant records, and also obtained the patient information that was relevant for the current

study (i.e., age, sex, and scores on the BADDS, CAARS, and ICD). Protected health

information and other identifying data for each subject were removed through a

selective coding process and the de-identified data were then transferred to an

electronic database for the investigator to analyze.

Chapter Five

Results

The purpose of the current study was to evaluate the impact of ADHD

symptom severity, cognitive distortions and self-concept, as well as the influence on

gender and age in order to aid in the assessment and treatment of this disorder. A

priori power analyses indicated that 108 participants were needed to obtain 80%

power in detecting a medium-sized effect, when using a 0.05 cutoff for statistical

significance. Thus, the 130 participants in this study exceeded the minimum required

sample size. All analyses were completed using the Statistical Package for the Social

Sciences, version 22 (SPSS 22; IBM Inc., https://www.14.software.ibm.com).

Statistical Analysis

Table 1

Descriptive Statistics for Hypothesis 1

	N	M	SD
ADHD	129	79.085	8.2434
Gender	129		
Age	129	34.558	12.6651
Problems with self-concept	129	62.837	10.8978
Cognitive distortions	129	127.620	41.9135

Table 2

Descriptive Statistics for Hypothesis 2

	N	M	SD
Problems with self-concept	129	62.783	10.8440
Gender	129		
Cognitive distortions	129	127.612	41.9071

Hypothesis 1. First, it was hypothesized that frequency of cognitive

distortions (ICD total score), male gender, age and problems with self-concept

(CARRS Problems with self-concept subscale score) would significantly predict

severity of ADHD symptoms (BADDS total score). A multiple regression using the

enter method was conducted using gender, the ICD total score, age and the CAARS

Problems with self-concept subscale score as the predictors and the BADDS total

score as the criterion. In the enter method, each predictor was forced into the model

simultaneously; therefore, no decisions were made prior to the analysis regarding the

importance of any one predictor.

   Prior to running the analysis, the data were examined for outliers and

assumptions of the regression were checked. An examination of the data revealed

one outlier, which was more than the criteria of using three standard deviations from

the mean, and this was removed from the data. The assumption of independence was

satisfied as indicated by the Durbin Watson value of 2.3. Collinearity diagnostics

revealed that collinearity was not a problem. The Variance Inflation Factor and

tolerance values also measure multicollinearity and the extent to which a predictor

has a strong linear relationship with other predictors in the study. The VIF and

tolerance values were within acceptable ranges. Finally, data met the assumption of

normality as indicated by a histogram and PP plot.

   Results from the regression analysis revealed that the overall regression model

was significant, $F(4, 124) = 5.273$, $p = .001$. There was a multiple correlation

coefficient of .38 for each set of predictors with an R^2 value of .15 ($p = .001$). An R^2

value of .15 indicated that 15 percent of the variance in ADHD symptom severity

could be predicted by the frequency of cognitive distortions, gender, age, and self-

concept combined. The Adjusted R^2 value decreased to .12, resulting in shrinkage of

3%, meaning that the same model would account for 3% less variance in the outcome if derived from the population rather than from the sample (Field, 2013). An analysis of coefficients revealed that only the CAARS Problems with self-concept subscale was a significant predictor of the BADDS total score, $b = .21$, $t(124) = 2.84$, $p = .005$. Gender, age, and cognitive distortions did not significantly predict severity of ADHD symptoms. Results are shown in Table 3.

Table 3

Regression Analysis Summary for Hypothesis 1

	B	S. E. B	β	t	p
Constant	62.380	4.665		13.371	.000
Gender	1.032	1.420	.060	.726	.469
Age	-.048	.055	-.073	-.863	.390
Problems with self-concept	.212	.074	.280**	2.843	.005
Cognitive distortions	0.29	.019	.146	1.487	.140

Note: $R^2 = .12$ (N = 129, $p = .001$).
**$p < .05$

Hypothesis 2. A multiple linear regression analysis was conducted in order to test whether or not the independent variables, cognitive distortions as measured by the ICD and gender could significantly predict the dependent variable, self-concept as measured by the CAARS Problems with self-concept subscale score. The enter method was used again; the predictors were forced into the model simultaneously.

Prior to running the analysis, assumptions of the regression were checked. The value of the Durbin Watson statistic was 2.14, indicating that the assumption of independent errors was not violated. Both the tolerance statistic and the VIF were

indicative that multicollinearity was not a problem in this instance. Finally, data met

the assumption of normality, as indicated by a histogram and PP plot.

Results from the multiple regression indicated that the overall regression

model was significant, $F(2, 126) = 21.94$, $p = .001$. The multiple correlation for the

set of predictors was .508 with a coefficient of determination = .26, indicating 26% of

the variability in the CAARS Problems with self-concept subscale were attributable

to differences on the subset of the predictors. The value for R squared change was

significant ($\Delta R^2 = .26$, $p < .001$), which indicated that the regression equation made a

significant contribution in explaining the CAARS Problems with the self-concept

subscale. The Adjusted R^2 value decreased to .25, resulting in a shrinkage of 1%,

meaning that the same model would account for 1% less variance in the outcome if

derived from the population rather than from the sample (Field, 2013). However,

when the coefficients were evaluated, only the ICD total score made a significant

contribution to the prediction of the CAARS Problems with self-concept subscale

score, $b = .13$, $t(126) = 6.62$, $p < .001$. Gender was not a significant predictor, $b = -

.27$, $t(126) = -.16$, $p = .874$. Results are shown in Table 4.

Table 4

Regression Analysis Summary for Hypothesis 2

	B	S. E. B	B	t	p
Constant	46.382	3.566		13.006	.000
Gender	-.274	1.722	-.012	-.159	.874
Cognitive distortions	.131	.020	.508***	6.621	.000

Note: $\Delta R^2 = .26$ (N = 129, $p = .001$).
***p < .001

Chapter Six

Discussion

Findings and Clinical Implications

ADHD is a complex neurodevelopmental disorder (APA, 2013) that presents

in approximately 5% of children (Polanczyk, de Lima, Horta, Biederman, & Rohde,

2007) and 2.5% of adults (Simon, Czobor, Bálint, Mészáros, & Bitter, 2009). By

adulthood, ADHD can lead to a wide variety of impairments across multiple domains

of functioning, such as problems in education, employment, finances, relationships,

health, and legal concerns (Barkley, et al., 2002; Barkley, Murphy, & Fischer, 2008;

Harpin, 2005; Ramsay & Rostain, 2008; Ramsay, 2011). Additionally, poor self-

concept is a frequent secondary concern that is common among adults with ADHD

(Realmuto et al., 2009; Richman, Hope, & Michalas, 2010; Stormont, 2001).

The primary aim of this study was to examine the relationship between

ADHD symptom severity, cognitive distortions, and problems with self-concept, as

well as the influence of gender and age on these variables. Findings from the current

study suggested that problems with self-concept significantly and positively predicted

ADHD symptom severity, whereas gender, age, and the frequency of cognitive

distortions were not significantly predictive of ADHD symptoms. However, the

frequency of cognitive distortions significantly and positively predicted problems

with self-concept. Gender was not significantly predictive of problems with self-

concept.

It has been demonstrated, repeatedly, that cognitive distortions are clinically

relevant in the assessment and treatment of adult ADHD because they can trigger,

exacerbate, and maintain distress and impairment in a host of disorders, including

adult ADHD (Beck, 1979; Ambrovowitch & Schweiger, 2009; Knouse, Zvorsky, &

Safren, 2013; Mitchell et al., 2013; Rosenfield, 2004; Strohmeier, 2013; Torrente et

al., 2012), and can also interfere with the implementation of effective coping

strategies (Rosenfield, Ramsay, & Rostain, 2008). Prior research has demonstrated a

significant relationship between cognitive distortions and ADHD, in the presence of

or in the absence of additional clinical comorbidities (Abramovitch et al.; Knouse, et

al., 2013; Mitchell et al., 2013; Strohmeier, 2013; Torrente et al., 2014).

Consequently, targeting cognitive distortions is a basic component of effective

cognitive behavioral treatment for adults with ADHD (e.g., Knouse & Safren, 2010;

Ramsay & Rostain, 2008). Thus, empirical research and anecdotal clinical

experience also seems to support strongly, the utility of such interventions (Ramsay et

al., 2008; Ramsay, 2015; Rosenfield et al., 2008). Surprisingly though, contrary to

prior findings, the current study did not find a direct relationship between ADHD,

alone, and cognitive distortions.

In an attempt to explain further the somewhat novel results of the present

study, it is important to note that there were marked differences between the current

research and prior studies; this could offer insight into such contradictory findings.

First, the majority of the studies exploring ADHD and cognitive distortions have been

limited by a small sample size of individuals diagnosed with ADHD (Abramovitch &

Schweiger, 2009 (N =1); Mitchell et al., 2013, (N = 81); Strohmeier, 2013, (N = 30);

Torrente et al. 2014, (N = 35) and two of these studies investigated exclusively

college students (Abramovitch et al., 2009; Mitchell et al., 2013). Additionally,

variables other than *cognitive distortions* were used in some of these investigations;

these included "negative thoughts" (Mitchell et al., 2013), "unwanted intrusive

thoughts" (Abramovitch et al., 2009), and "dysfunctional attitudes" (Knouse, Zvorsky

& Safren, 2013), and there were different forms of measurement, other than the ICD

employed in the current study (Abramovitch et al., 2009; Knouse et al., 2013;

Mitchell et al., 2013; Torrente et al. 2014). Strohmeier (2013) was the only study

that utilized measures that were the same as the measures used in the current research

to study cognitive distortions and ADHD; that is, cognitive distortions being

operationalized by the ICD and ADHD operationalized through the BADDS.

Although Strohmeier (2013) demonstrated a significant relationship between

cognitive distortions and ADHD, this relationship was said to be weak.

Several other factors could further explain the reasons why the current study

failed to find a significant, direct relationship between ADHD and cognitive

distortions. First, it may be that the relationship between ADHD and cognitive

distortions are attributable to problems with self-concept, as was found in this study.

If this is the case, then particular attention to reducing cognitive distortions,

specifically related to self-concept, may be particularly valuable in this population.

Second, ADHD is a neurocognitive disorder. In this sample, it may be that distress

and impairment *of ADHD* was better accounted for by cognitive *deficit* than by

cognitive *distortion*. If this is the case, then the cognitive distortions shown to

correlate with ADHD in previous studies may be more properly attributed to the

various comorbidities rather than to ADHD, itself. Therefore, it is important to

consider the impact of cognitive deficits related to working memory, inhibition, and

processing speed that individuals with ADHD experience (Barkley, 1997; Barkley,

Murphy, & Fischer, 2008; Garon, Bryson, & Smith, 2008; Miller et al., 2013;

Willcutt et al., 2005); however, cognitive distortions may still be relevant treatment

targets, given the high prevalence of clinical comorbidities associated with adult

ADHD. Third, it is possible, although unlikely, that the current sample might not

have been truly representative of adults diagnosed with ADHD, indicating a Type II

error, which was statistically predicted to be a five percent probability.

Studies that have evaluated ICD scores appear to yield conflicting findings,

which supports the need for future research in this area. For example, Yurica (2002)

evaluated clinical versus non-clinical referred subjects and found that outpatients

demonstrated significantly higher ICD scores (M = 182.68, SD = 38.69) than the

control group (M = 138.43, SD = 32.72). In addition, Roberts (2015) examined ICD

scores in a nonclinical sample and found that females demonstrated more cognitive

distortions (M = 176.18, SD = 33.12) than males (M = 166.26, SD = 32.31), and that

the level of cognitive distortions decreased slightly with age. Thus, the findings from

the current study revealed that clinic referred adults with ADHD reported lower ICD

scores (M = 127.88, SD = 41.85) than the scores reported in a general community

sample in Roberts' (2015) study. Taken together, the ICD scores among the adult

ADHD outpatient sample in the current study appeared to relate more closely to the

ICD scores demonstrated by the non-clinical control group in Yurica's (2002) study.

In general, there appears to be conflicting findings between clinical and non-clinical

ICD scores. Finally, Strohmeier (2013) found a significant correlation between

ADHD symptomology and ICD scores, (M = 179.22, SD = 46.146), which were also significantly higher than the ICD scores reported in this research.

Studies investigating the relationship between age and gender differences and ADHD symptom severity have also yielded contradictory results. Research suggests that those who experience internalizing symptoms are more likely to experience higher rates of cognitive distortions (Kempton, Hasselt, Bukstein, & Null, 1994; Lueng & Wong, 1998) and that females with ADHD are more likely to present with internalizing symptoms (Gershon, 2002). Therefore, it was logical for the current study to investigate the relationship between female gender and cognitive distortions in this population. However, the current study did not find a significant relationship between female gender and cognitive distortions in adults diagnosed with ADHD.

Regarding problems with self-concept, adults with ADHD often hold maladaptive core beliefs, which can potentially exacerbate symptoms of inattention, hyperactivity, and impulsivity and cause other functional impairments in their lives (Knouse & Safren, 2010; Strohmeier, 2013; Ramsay & Rostain, 2005; Rosenfield, Ramsay & Rostain, 2008). These maladaptive beliefs can adversely affect the development of the self-concept. Consequently, both poor self-concept and low self-esteem are common in this population and may be conceptualized as secondary characteristics of many adults with ADHD (Jackson & Farrugia, 1997; Realmuto et al., 2009; Richman, Hope, & Michalas, 2010; Stormont, 2001). Consistent with prior research, the current investigation found that ADHD symptom severity was predictive of poor self-concept.

Among youth with ADHD, a significant relationship between poor self-concept and ADHD symptom severity has been established (Edbom, Granlund, Lichenstein, & Larson, 2008; Foley-Nicpon, Rickels, Assouline, & Richards, 2012; Richman, Hope, & Michalas, 2010). Although many studies have explored self-esteem in adults with ADHD (Canu & Carlson, 2007; Dooling-Liftin & Rosen, 1997; Rucklidge, Brown, Crawford, & Kaplan, 2007; Shaw-Zirt, Popali-Lehane, Chaplin, & Bergman, 2005), there is limited research exploring self-concept in adults diagnosed with ADHD (Norwalk, Norvilitis, & MacLean, 2008; Reid, Carpenter, Gilliland, & Karim, 2011). The current investigation found a significant relationship between poor self-concept and ADHD symptom severity, which was similar to the other findings exploring self-concept in young adults (Norwalk, et al., 2008), as well as in adults (Reid et al., 2011). However, the current study did not find a relationship between age and problems with self-concept in this population. The current study determined that problems with the self-concept appear to be related to cognitive distortions, yet the age of the individual was not significant.

Self-concept is a complex cognitive structure (Cantor & Kihlstrom, 1987; Greenwald & Pratkanis, 1984; Markus & Wurf, 1987), which includes beliefs about who one is today and what one fears or desires to become in the future (Cantor, 1990; Markus et al., 1987; Stein, 1995). This study has supported the idea that cognitive distortions play a significant role in the maintenance of low self-concept (Beck, Steer, Epstein, & Brown, 1990) and possibly in its development. Self-concept is highly related to thoughts and beliefs regarding the self, which may or may not be accurate.

Thus, it appears that adults with ADHD often hold inaccurate cognitions, which may result from a lifetime of negative experiences and feedback surrounding failure (Rucklidge, 2010; Young, Gray, & Rose, 2007). Such maladaptive cognitions may develop because children with ADHD begin to blame themselves for their problems as an attempt to assimilate the negative consequences they experience, which can lead to future expectations of failure and poor self-image (Cook, Knight, Hume, & Qureshi, 2014; Kelley, English, Schwallie-Giddis, & Jones, 2007; Young et al., 2007). These destructive views may lead to the development of other negative thoughts, which can further complicate issues by decreasing motivation and increasing avoidant behaviors, thereby creating a self-perpetuating pattern of problems well into adulthood (Knouse & Safren, 2010; Rosenfield, Ramsay, & Rostain, 2008). Thus, it is essential for clinicians treating adult ADHD to focus not only on psychoeducation concerning diagnosis, but also on cognitive restructuring and skills training to reduce the impact that this condition can have on the overall view of the self and to improve functioning (Quinn, 2008; Young, et al., 2007). Consequently, it is often salubrious to restructure underlying beliefs related to the self-concept, in a way that reduces overgeneralizing, catastrophizing, self-blaming, and externalizing worth, etc., to allow individuals to perceive their strengths accurately and to help them reduce their symptomatology and real-life problems.

Considering the limited research on the topic, this study further sought to add to the literature regarding cognitive distortions and self-concept in adult ADHD to inform both assessment and treatment planning. In general, research suggests that CBT in conjunction with pharmacotherapy, is the most efficacious treatment package

for adults with ADHD because cognitive behavioral interventions target the cognitive

and behavioral symptoms that are less likely to respond to medication (Ramsay &

Rostain, 2008; Safren et al., 2005; Sudak, 2011). Specifically, many pharmacological

interventions targeting ADHD symptoms have shown limited effect on functional

impairments experienced by adults with ADHD, such as issues related to time

management, procrastination, organization, and problems with self-efficacy (Solanto

et al., 2010), in addition to other comorbidities, including personality disorders and

clinical syndromes (Beck, 1979; Knouse, Zvorsky, & Safren, 2013; Mitchell et al.,

2013; Rosenfield, 2004; Rosenfield, Ramsay, & Rostain, 2008; Strohmeier, 2013;

Torrente et al., 2012). Thus, non-pharmacological interventions are often necessary

to target the symptoms that do not respond to medication, including the overall

negative views about the self. Considering the influence that cognitive distortions

and problems with self-concept appear to have on adults diagnosed with ADHD, and

the fact that CBT is uniquely effective in identifying and ameliorating such issues,

this study provides additional support for the notion that CBT is a highly relevant

treatment for adult ADHD (Root & Resnick, 2003; Sudak, 2011; Safren et al., 2004;

Safren et al., 2005).

Limitations

The present study has several limitations to consider when evaluating the

results. First, given the fact that the study relied on archival data, only correlational

conclusions may be drawn from these results and therefore, no causality is implied or

should be inferred. Additionally, the sample in this study includes predominantly

Caucasian, college-educated, individuals who presented for assessment and treatment

primarily as a result of experiencing a significant level of impairment or distress in their lives. These individuals were covered by a college-based health insurance plan or they had the means to self-pay. Therefore, these results should be considered with caution when generalizing to the greater ADHD population, with less education and financial standing, or even a typical subset of individuals suffering from ADHD who experience greater impairment or lesser impairment. A referral bias may also be a limitation of this study because clinic referred subjects often experience greater symptomology and impairment than subjects who have not sought treatment (Goodman et al., 1998).

This study also relied heavily on self-report measures that were completed by the subjects (e.g., ICD and CAARS) and in collaboration with clinician (i.e., BADDS). Two problems often arise through the use of self-report measures: respondents may lack self-awareness and insight into their disorders, which is common to individuals with ADHD, who may have limited self-awareness, or they may purposely fail to admit problems (Barkley, Fischer, Smallish, & Fletcher, 2002). In either of these cases, the result may be under-reporting symptoms.

However, in support of the present study's design, Murphy and Schachar (2000) demonstrated no significant differences between self-reports and informant-reports of ADHD symptom severity in adults. Nevertheless, contradictive evidence has indicated discrepancies between self-report and informant-report ratings of ADHD symptomology (Ferdinand, van der Ende, & Verhulst, 2004; Kooij, 2008).

Because the Problems with Self-Concept subscale of the CAARS was used as the sole measure for evaluating poor self-concept, lack of convergent validity from

other sources, such as multiple raters or objective measures, issues could increase the

likelihood of self-report bias and might have otherwise influenced the degree to

which these findings are valid and reliable. For example, the subjects' moods during

testing could influence their self-reported ratings in regards to the overall view of

their self-concepts. Therefore, clinician's ratings and other concurrent measures, in

addition to this subscale score on the self-report version of the CAARS could

potentially have yielded different results. However, strong test-retest reliability for

each scale on the CAARS suggests the utility of its use either solely or in

combination with other factors, for clinical or research purposes (Erhardt, Epstein,

Conners, Parker, & Sitarernios, 1999). Specifically, the Problems with Self-Concept

scale demonstrated good test-retest reliability with a correlation of .91 ($p < .05$).

Additionally, this study measured symptoms of ADHD using the BADDS, which is a

self-report measure that does not specify that these individuals demonstrated

symptoms throughout childhood and /or that symptoms might have arisen from

another presenting, differential diagnosis.

Another important finding from this research was that this study found a

significant correlation between cognitive distortions and problems with self-concept.

It is possible that there may have been overlapping constructs accounting for this

association, which could have influenced the findings in the current study. Also, the

ICD was used to measure cognitive distortions among adults with ADHD in the

current study. However, this scale was not developed to evaluate a particular group

of individuals, such as adults diagnosed with ADHD. Considering the fact that the

findings in the current study do not support a direct correlation between the cognitive

distortions and ADHD symptom severity, one possible explanation may be a result of the individual's cognitive deficits. For example, subjects may have responded impulsively, therefore, calling into question the accuracy of the ICD scores in this study.

It should also be considered that the limited characteristics of this sample (enumerated previously) might have influenced the findings. Moreover, the screening process in this study might have eliminated individuals with more severe symptoms, such as severe substance use, psychosis, or those who engage in self-harm. Those with these comorbidities, who would be hypothesized to experience more frequent cognitive distortions, would have been excluded from this study. For example, adults with more severe ADHD are at a greater risk for developing substance abuse issues, yet individuals with acute substance use would have been referred for drug and alcohol treatment unless they were at least 6 months sober according to the clinic's policy.

Generalizability of the current findings should be considered with caution. Information related to demographic variables (i.e., race, religion etc.) and other factors, such as comorbid mental health diagnoses were not controlled for in this study. Furthermore, the use of psychopharmacological treatments among subjects was not examined; this raises the question about the effects that medication may have had on self-concept, cognitive distortions, and/or ADHD symptoms.

Future Directions

The current findings support the notion that self-concept is a significant issue among adults diagnosed with ADHD. Just as symptoms appear to continue

throughout adulthood, secondary problems, such as poor self-concept appear to

remain an issue. Although the current research did not find any significant

differences in age and symptom severity among adults with ADHD, it might be

worthwhile to explore differences in age, beginning in child and through adulthood;

that is, whether or not problems with self-concept appear to diminish or increase with

age, the development of self-concept in relation to cognition, and the impact of actual

and perceived stressors. Additionally, this research has demonstrated that among

adults with ADHD, those who experienced more cognitive distortions, were more

likely to have problems with the self-concept. However, the direct relationship

between cognitive distortions and ADHD symptom severity was not significant,

which is contrary to earlier findings. Therefore, it would be beneficial for future

research examining cognitive distortions and ADHD to clarify further, the role of

these maladaptive thought patterns as well as the relevance of cognitive behavioral

treatments for this population. Similar to the current research, these studies should

utilize a larger sample size and explore a broader range of adults diagnosed with

ADHD.

 Future studies should evaluate different subscales on CAARS (e.g., emotional

regulation and executive functioning subscales) and other ADHD measures to

determine if specific domains of functioning are correlated with cognitive distortions.

 Finally, future research should seek to determine individualized cognitive

distortions specific to the problems of ADHD because this would increase our

understanding of the thought processes behind the mechanisms of this

neurodevelopmental disorder and could potentially inform treatments that lead to

better outcomes for this population.

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