ACADEMIC, SOCIAL AND EMOTIONAL FUNCTIONING OF COLLEGE STUDETNS WITH ATTENTION-DEFICIT/HYPERACTIVITY DISORDER (ADHD)

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Attention deficit/hyperactivity disorder (ADHD) is frequently associated with negative occupational, social and psychological outcomes among community samples of adults; as such, it is expected that college students with ADHD face similar struggles. The research targeting this group of individuals, however, is sparse and tempered by significant limitations. The current study aimed to address methodological limitations in the current literature by including instruments to formally diagnosis ADHD and comorbid disorders, utilizing psychometrically sound instruments and comparing functioning of college students with ADHD across gender and subtype. It was hypothesized that participants with ADHD would report lower GPAs, higher levels of emotional distress and negative relationship characteristics than participants without ADHD. It was also hypothesized that participants with ADHD-combined type (ADHD-C) would report higher levels of substance and alcohol use than participants with ADHD-predominately inattentive type (ADHD-I), and that participants with ADHD-I would report higher levels of anxiety and depression than participants with ADHD-C. Women diagnosed with ADHD were expected to report higher levels of anxiety and depression than men diagnosed with ADHD; whereas, men diagnosed with ADHD were expected to report higher levels of substance and alcohol use than women. MANOVA, ANOVA and Mann-Whitney U tests were conducted to test hypotheses. Results revealed no significant differences between the ADHD and comparison group on GPA and relationship characteristics. Participants diagnosed with ADHD did report significantly higher emotional distress than participants in the comparison group. No differences in GPA or relationship characteristics were found across ADHD subtype or gender. Overall,

these findings provide evidence to suggest that college students with ADHD are functioning relatively well compared to their non-ADHD peers.

TABLE OF CONTENTS

LIST OF TABLES

Page

CHAPTER 1

INTRODUCTION

Attention-deficit/hyperactivity disorder (ADHD) is a psychiatric disorder that is typically first diagnosed in childhood (American Psychiatric Association, 2013). Recently there has been evidence to suggest that the prevalence of ADHD in children outside of the United States is similar to that of children in the United States (Faraone, Sergeant, Gillberg & Biederman, 2003), indicating that ADHD may not be a diagnosis unique the United States as previously believed (Taylor & Sandberg, 1984). Core ADHD symptoms include: impaired attention, poor impulse control and hyperactive behavior that can significantly impact many aspects of behavior and performance at school, work, in social settings, and at home (American Psychiatric Association, 2013; Sobanski et al., 2007).

Inattention can include "[failing] to give close attention to details," making "careless mistakes," having difficulty "organizing tasks and activities," or getting distracted by "irrelevant stimuli" (APA, 2013, p. 59). Hyperactivity and impulsivity may involve "fidgetiness," "impatience," "blurting out answers," or "grabbing or [touching] things they are not supposed to" (APA, 2013, p. 60). Overall, children with ADHD may exhibit a relatively low tolerance for frustration, frequent temper outbursts and dysphoria. In addition, they are more likely to be rejected by their peers and experience family discord and negative parent-child interactions (APA, 2013).

There are three subtypes of Attention-Deficit/Hyperactivity Disorder outlined in the DSM-V: Attention-deficit/hyperactivity disorder, predominately inattentive type (ADHD-I), Attention-deficit/hyperactivity disorder, predominately hyperactive-impulsive type (ADHD-HI) and Attention-deficit/hyperactivity disorder, combined type (ADHD-C); (APA, 2013). An individual can be diagnosed with ADHD at any time during the lifespan, as long as there is

evidence of ADHD in at least two settings (e.g., school or home) by the time the individual was 12 years old (APA, 2013).

Prior to the 1970s, ADHD was thought to be a disorder that occurred solely in childhood, and that symptoms disappeared with the onset of puberty (Barkley, 1990). It is currently believed, however, that approximately 50-66% of children with ADHD continue to exhibit significant symptoms into adulthood (Resnick, 2005). The estimated prevalence rate of adult ADHD is 2-7%, and the ratio of men to women who are diagnosed with ADHD is estimated to be between 2:1 and 1:1 (Resnick, 2005).

Although ADHD symptoms continue to persist from childhood into adulthood for many people, symptom presentation changes across time as a result of maturation and enhanced cognitive ability and coping (Resnick, 2005). For example, hyperactive symptoms decrease but may be replaced by mental restlessness in adulthood (Kessler, Adler & Barkley, 2006). Additionally, symptoms related to impulsivity and executive functioning (e.g., problems with planning, delaying of gratification, and dividing and focusing attention) become increasingly evident in young adulthood relative to childhood as a higher demand for self-sufficiency becomes necessary with age (Resnick, 2005). By contrast, inattentive symptoms remain relatively stable with age (Frazier, Youngstrom & Glutting, 2007; Stavro, Ettenhofer & Nigg, 2007). Research indicates that adaptive impairments (i.e., educational, occupational and social) are more strongly associated with inattentive symptoms compared to hyperactive and impulsive symptoms associated with ADHD (Stavro, Ettenhofer & Nigg, 2007). Secondary symptoms that are often associated with adult ADHD are affective "lability," "hot temper," "emotional overreactivity" and "disorganization" (Wender, 1995, p.14).

Educational and Occupational Functioning of Adults with ADHD

Adults with Attention-Deficit/Hyperactivity Disorder (ADHD) exhibit significant educational and occupational difficulties compared to their non-ADHD counterparts (Barkley, Fischer, Smallish & Fletcher, 2006; Barkley, Murphy & Kwasnik, 1996; Biederman et al., 2006; Murphy & Barkley, 1996). For instance, in a community sample of 160 adults between the ages of 17 and 28 years old that were divided into three groups (ADHD-I, ADHD-C and Control) significantly more adults with both subtypes of ADHD reported receiving special education services in high school, obtaining lower grade point averages in high school, and graduating high school at a lower rate relative to adults without ADHD. Moreover, a higher lifetime prevalence of conduct disordered symptoms, being retained in a grade, and severity of childhood hyperactive symptoms were predictive of failure to graduate high school (Barkley, Fischer, Smallish & Fletcher, 2006; Murphy, Barkley & Bush, 2002). Adults diagnosed with ADHD in this sample were also less likely to have graduated from college compared to adults not diagnosed with ADHD. There were no differences in graduation rate, however, between the ADHD-I and the ADHD-C groups (Murphy, Barkley, & Bush, 2002).

Further, the employment histories of individuals with ADHD tend to be unstable; as such, they are three times more likely to get fired from a job, and typically have a poorer work presentation scores on Barkley's Work Performance Rating Scale, a measure that assesses the degree to which inattentive, hyperactive and impulsive symptoms are apparent on the job (Shifrin, Proctor & Prevatt, 2010). Lower job performance ratings by employers are also more common among adults who display ADHD symptoms than adults who do not (Barkley, Fischer, Smallish & Fletcher, 2006). By 30 years of age, many individuals with ADHD are self-employed and have changed jobs at a rate of 2 to 3 times within a 10 year period of time (Barkley, 2002).

Among a sample of 500 adults from the community with self-reported ADHD (M_{age} = 31.9 yrs., *SD* = 12 yrs.), approximately 43% of the sample reported they had lost or left one or more jobs in some part because of their ADHD symptoms (Biederman, Faraone, Spencer, Mick, Monuteaux & Aleardi, 2006).

Social Functioning of Adults with ADHD

The negative outcomes associated with ADHD go beyond academics and the workplace. Adults with Attention-Deficit/Hyperactivity Disorder (ADHD) also report significant social impairments (Biederman et al., 2006; Eakin et al., 2004; Murphy, Barkley & Bush, 2002; Wymbs et al., 2012). For example, adults with ADHD are significantly more likely than their non-ADHD peers to abuse alcohol and drugs, especially marijuana, and this is particularly the case for adults who exhibit hyperactive/impulsive symptoms compared to adults who only exhibit inattentive symptoms (Murphy & Barkley, 1996). Adults with ADHD also report higher rates of having been addicted to cigarettes or chewing tobacco compared to adults without a history of ADHD (Biederman et al., 2006).

Higher levels of interpersonal difficulties and lower levels of relationship satisfaction are reported more frequently among adults with ADHD compared to adults without ADHD as well (Able, Johnston, Adler & Swindle, 2006). Specifically, symptoms of hyperactivity and impulsivity (e.g., conversation interruptions, intrusiveness, blurting comments, impatience, restlessness) related to ADHD can significantly disable skills necessary for socially appropriate behavior. Adults with ADHD, therefore, tend to report problems engaging others in conversation as well with social skills (e.g., tactfulness, ability to adjust behavior to be appropriate given the situation) (Friedman, Rapport, Lumley, Tzelepis, Van Voorhis, Stettner & Kakaati, 2003).

In addition, males with ADHD are two times more likely to endorse verbal aggression and five times more likely to endorse violence (e.g., throwing things) against their romantic partner compared to men without ADHD. The rates of violent behavior reported by the ADHD group are more than double the rate of male-to-female violence reported in studies with large, nationally representative community samples (Wymbs et al., 2012). It makes sense given the finding that adults with a history of ADHD symptoms report interpersonal difficulties.

Indeed, in a sample of 500 adults with self-reported ADHD (M_{age} = 31.9 yrs., *SD* = 12 yrs.) and 501 gender and age-matched comparison adults (M_{age} = 33.4 yrs., *SD* = 14 yrs.), only 47% of adults with self-reported ADHD described having a close relationship with their parents compared to 70% of comparison adults, which was a significant difference. Adults with self-reported ADHD in this sample also reported feeling like they fit in with peers less than adults without self-reported ADHD did (40% and 70% respectively). Finally, only 47% of adults with ADHD reported being "popular" among coworkers compared to 66% of adults without ADHD (Biederman et al., 2006). In another study consisting of adult participants diagnosed with ADHD-HI in childhood (M_{age} = 21.1 yrs., *SD* = 1.3 yrs.) and a comparison group with no history of ADHD (M_{age} = 20.5 yrs., *SD* = 0.6 yrs.), results indicated that adults with ADHD had significantly fewer close friends, and had more trouble keeping friends than the comparison group did. Specifically, severity of childhood hyperactive symptoms was predictive of number of close friendships, and current severity of hyperactive symptoms was predictive of overall social problems (Barkley, Fischer, Smallish & Fletcher, 2006).

Marital relationships can also be negatively affected by ADHD symptomatology. For example, on average, adults with ADHD report less stability in their love relationships, feel less able to provide emotional support to their loved ones, and report more sexual dysfunction

compared to their non-ADHD peers (Biederman, Faraone, Spencer, Mick, Monuteaux & Aleardi, 2006). As such, adults with ADHD report lower marital satisfaction than adults without ADHD, and divorce rates are higher among this group than adults without ADHD (i.e., 28% versus 15%) (Biederman et al., 2006; Murphy & Barkley, 1996).

In a study comprising 33 adults diagnosed ADHD and their spouses and 26 comparison adults and their spouses, results revealed that adults with ADHD report significantly lower marital satisfaction, consensus, affectional expression and cohesion, as well as poorer general family functioning (e.g., involvement, roles, communication and problem-solving) when contrasted with comparison adults. Adults with ADHD also report significantly lower marital adjustment and family functioning than their spouses. Finally, approximately 96% of spouses shared that their ADHD partner's behavior interfered with their functioning in one or more ways. The most frequent complaints fell within the domains of general household organization/time management, child rearing, and communication/marital relationship (e.g., frequent arguments, lack of follow-through, problems with intimacy, imbalance in roles). Additionally, 92% of spouses felt that they compensated for their partners' struggles in some way (Eakin, Minde, Ochs, Bouffard, Greenfield & Looper, 2004).

In a pilot study, eighty couples with one ADHD spouse (ages 23-59 yrs. old) were asked to rank 34 brief statements of potentially problematic behaviors that the ADHD spouse might exhibit. These statements were obtained from a review of adult ADHD rating scales, marital measures, clinical literature on ADHD and marriage and the authors' experience with ADHD couples. Both partners agreed that communication behavior (e.g., says things without thinking, zones out in conversations), completion/time management behavior (e.g., has trouble getting started on a task, does not remember being told things), and self-regulation of affect behavior

(e.g., has trouble dealing with frustration) contributed most to one or the other spouse feeling unloved, unimportant or ignored (Robin & Payson, 2002).

Emotional Functioning of Adults with ADHD

Internalizing (e.g., depression, anxiety, somatitization) and externalizing (e.g., aggression, delinquent behavior) symptoms are more common among adults with ADHD symptomatology compared to adults without ADHD symptomatology (Kessler et al., 2006; Wasserstein, 2005). Indeed, adults with all three subtypes of ADHD (e.g., ADHD-I, ADHD-HI and ADHD-C) have a significantly higher lifetime prevalence rate of psychiatric comorbid disorders compared to adult controls (76.7%, 80.6%, 87.5% and 42.9% respectively) (Sobanski et al., 2008). In particular, mood, anxiety, and substance use disorders are higher in adults with ADHD compared to their non-ADHD counterparts (Kessler et al., 2006). Comorbid behavior disorders like oppositional defiance disorder (ODD), conduct disorder (CD), and antisocial personality disorder (APD) are also common among adults with ADHD (Murphy, Barkley & Bush, 2002; Resnick, 2005; Wasserstein, 2005).

In one study consisting of 25 adults with ADHD (M_{age} = 22.5 yrs., *SD* = 4.0 yrs.), and 23 adults without ADHD (M_{age} = 22.0 yrs., *SD* = 4.0 yrs.), the ADHD group reported significantly higher rates of a wide range of problems, including interpersonal difficulties, depression, obsessive-compulsive disorder and paranoia relative to the control group. They also reported engaging in more antisocial activities (e.g., had stolen others' property or money, committed acts of disorderly conduct and possessed illegal drugs) than the control group (Barkley, Murphy & Kwasnik, 1996). Adults with ADHD also present with lower self-esteem, self-acceptance and optimism relative to adults without ADHD (Biederman, Farone, Spencer, Mick, Monuteaux & Aleardi, 2006; Rucklidge, Brown, Crawford & Kaplan, 2007).

The few studies that have examined psychological impairment across ADHD subtype indicate that individuals who exhibit hyperactivity and impulsivity are at greater risk of developing substance use disorders as well as conduct disorder and oppositional defiant disorder compared to individuals who only exhibit inattention, especially among men (Sprafkin, Gadow, Weiss, Schneider & Nolan, 2007; Waite, 2007). For instance, in a sample of 118 adults with ADHD, diagnosed according to DSM-IV criteria, and a control group (ages 18-59 yrs. old) only 23.3% of participants with ADHD:I reported lifetime substance use disorders, which was significantly lower than the rate reported by participants with ADHD-HI and ADHD-C (Sobanski et al., 2008). Conversely, it is more likely for individuals who display inattention only to report greater dysthymic symptoms compared to those who display impulsivity and hyperactivity (Sprafkin, Gadow, Weiss, Schneider & Nolan, 2007; Waite, 2007). In general, adults who report a combination of hyperactive, impulsive and inattentive symptoms suffer more psychological impairment compared to adults who report hyperactivity/impulsivity or inattention alone (Murphy, Barkley & Bush, 2002).

Compared to men, women with ADHD are more likely than men with ADHD to experience dysphoria (e.g., reactive moodiness versus a true vegetative depression), depression, anxiety, and social withdrawal (Quinn, 2005; Waite, 2007). Men, however, are twice as likely than women to have conduct disorder and oppositional defiant disorder; they also present with stress intolerance and poor social skills at a greater rate than women (Quinn, 2005; Waite, 2007). It is important to note that phenotypic expression of ADHD symptoms is different for men and women. For example, women often do not display hyperactivity, and if they do, it is in the form of hypertalkativenesss or emotional reactivity rather than the excessive motor activity seen in

men. Moreover, ADHD in females has a more subtle presentation than it does in males; as such, females often go undiagnosed (Quinn, 2005).

Attention-Deficit/Hyperactivity Disorder Among College Students

ADHD is frequently associated with negative occupational, social and psychological outcomes among community samples of adults with ADHD; as such, it is expected that college students with ADHD would face similar struggles (Blasé et al., 2009). Some researchers, however, propose that the negative outcomes of community samples may not apply to college students with ADHD. That is, higher ability levels, greater academic success during primary and secondary school and better compensatory skills likely protect college students with ADHD compared to individuals with ADHD from the general population. As such, college students with ADHD may represent a distinctive subpopulation of adults with ADHD (Glutting, Youngstrom & Watkins, 2005).

Research examining academic, social and psychological functioning among college students with ADHD, however, is limited (Blasé, Anastopolous, Costello, Hoyle, Swartzwelder & Rabiner, 2009). This is unfortunate given that more young adults with disabilities, like ADHD, are attending college (Wolf, 2001). The dramatic increase in attendance is related to special education laws (e.g., Americans with Disabilities Act, Section 504 of the Rehabilitation Act) mandating special education services for individuals with ADHD, which helps make it possible for greater numbers of adolescents with ADHD to graduate from high school. Indeed, statistics also reveal that the greatest increase in disabilities on college campuses is in "hidden disabilities" like ADHD (Wolf, 2001). Since college students with ADHD are a fast growing population in the United States, more research is needed to evaluate the extent to which findings from

community samples of adults with ADHD generalize to the college population in order to provide appropriate interventions.

Currently, it is estimated that between 2-8% of college students in the United States have ADHD (Green & Rabiner, 2012). It is difficult, however, to determine the exact prevalence rate of college students with ADHD because most researchers gather estimates from reports of students receiving accommodations through the Office of Disability and Accommodations (ODA). These reports, therefore, do not reflect all college students with ADHD since students are not required to report their disability and may not receive services as a result (Weyandt, DuPaul, O'Dell & Varejao, 2009).

Academic Functioning of College Students with ADHD

Although college students with ADHD are apt to display higher ability levels and advanced compensatory skills than adults with ADHD who do not attend college, there are many reasons why the college environment might put these students at greater risk for negative academic outcomes compared to the general population of college students (Pelham & Fabiano, 2008). Namely, when young adults with ADHD enter college they lose the structure provided by secondary school, and they are removed from their family and friends who most likely provided support and help with time-management in the past (Buchanan, 2011). Without help and support from significant others, students with ADHD may struggle with time-management, which is required for success in college. Students with ADHD, therefore, may participate in social activities at the cost of their academic responsibilities (Wolf, Simkowitz & Carlson, 2009). Indeed, students with ADHD report belonging to fraternities and participating in college athletics more often than adults without ADHD (Buchanan, 2011). While important for social

development, these activities may impede academic achievement if the student is not skilled at time management.

There is ample support in the research literature to suggest that college students with ADHD struggle academically (Blasé et al., 1999; Lewandowski, Lovett, Codding & Gordon, 2008; Rabiner, Anastopoulos, Costello, Hoyle & Swartzwelder, 2008). For instance, in a meta-analysis combining results of 72 research studies, researchers found a moderate to large discrepancy for grade point average, class ranking and semesters passed between college, and the ADHD group scored significantly lower than the comparison group on all variables. In the same study, students with ADHD were significantly more likely to fail a semester and drop out of school than their peers (Frazier, Youngstrom, Glutting & Watkins, 2007). Withdrawing from classes and reporting academic concerns (e.g., worrying grades will not be good enough, not feeling satisfied with academic performance) is also more common among adults with ADHD compared to their peers without ADHD (Advokat, Lane & Luo, 2011; Rabiner, Anatopoulos, Costella, Hoyle & Swarzwelder, 2008).

These findings are not surprising given that students with ADHD often do not possess appropriate study habits and skills (Norwalk, Norvilitis & MacLean, 2009; Reaser, Prevatt, Petscher & Proctor, 2007). For example, in a study consisting of 321 introductory and upper-level undergraduate psychology students (ages 18-49 yrs. old; M = 20.04 yrs., SD = 4.33 yrs..), students with ADHD reported a lower level of effective study habits compared to their peers. As such, the ADHD group endorsed reading textbooks and other assigned readings for classes at a lower rate and watching television or listening to music while studying at a higher rate than the group without ADHD reported (Norwalk, Norvilitis & MacLean, 2009). Students with ADHD

also endorse perfectionism, procrastination and difficulty utilizing study skills as significant obstacles to academic success (Kaminski, Turnock, Rosen & Laster, 2006).

In another study comparing learning and study strategies of 150 undergraduate students diagnosed with a learning disability (LD), attention-deficit/hyperactivity disorder (ADHD) or no disability (ND), researchers found that students with ADHD reported significantly lower scores than students in the LD and ND groups on four subscales: time management, concentration, selecting main ideas and test strategies. Time management and concentration difficulties are associated with core ADHD symptoms like inattention and poor self-regulation that have been shown to severely hinder academic performance of children with the disorder. The low scores obtained on the other two subscales are likely also linked to difficulty focusing and attending, as tasks on both of these subscales assess a student's capability to focus on details, identify important points, understand what is asked and plan their work (Barkley, 1998; Reaser, Prevatt, Petscher & Proctor, 2007).

Indeed, there is research to support the notion that inattentive symptoms, rather than hyperactive symptoms, account for more variance in academic difficulties (Frazier, Youngstrom, Glutting & Watkins, 2007; Lewandowski, Lovett, Codding & Gordon, 2008; Rabiner, Anastopoulos, Costello, Hoyle & Swarzwelder, 2008). In particular, among a sample of 534 undergraduate students ages 18-49 years old (M = 19.2 yrs.) from a large northeastern university, academic complains such as "finishing timed tests," "finishing timed tests on time" and "taking longer to complete assignments" were endorsed at a significantly higher rate by students with a self-reported diagnosis of ADHD than students without a self-reported diagnosis of ADHD. Moreover, inattentive symptoms accounted for more variance in these complaints did than hyperactive symptoms (Lewandowski, Lovett, Codding & Gordon, 2008). In another study of

1648 freshman recruited from public and private universities who completed a web-based survey, researchers examined academic concerns and performance of participants with and without ADHD. Results revealed that inattentive symptoms remained a significant predictor of academic concerns even after personality characteristic domains (e.g., extraversion, agreeableness, consciousness, emotional stability and openness to experience) were controlled for, but hyperactive symptoms did not predict any of the outcomes considered (Rabiner, Anastopoulos, Costello, Hoyle & Swartzwelder, 2008).

Further, in a study comprising 380 parent-student dyads from 18 northeastern universities in the United States (M_{age} = 19.1 yrs.; *SD* = 0.37 yrs.), researchers were interested in assessing the predictive value of parent and student-reported inattentive, hyperactive and impulsive symptoms on first year grade point average. Results indicated that parent and student-reported inattentive symptoms were predictive of the student's first year grade point average. Both accounts of hyperactive and impulsive symptoms, however, were not significantly predictive of academic status (Frazier, Youngstrom, Glutting & Watkins, 2007). Finally, in a similar study consisting of 316 college students at a liberal arts university in the southeastern United States (M_{age} = 20.3 yrs., *SD* = 2.5 yrs.), researchers concluded that self-reported inattentive symptoms accounted for more variance in student grade point average (7%) than self-reported hyperactive symptoms (2%), although both inattentive and hyperactive symptoms significantly predicted GPA (Schwanz, Palm & Brallier, 2007).

Social Functioning of College Students with ADHD

Research on social functioning of college students with ADHD is limited and somewhat mixed (Green & Rabiner, 2012). For example, in a sample of 91 undergraduate students with ADHD (M_{age} = 20.13 yrs., *SD* = 1.50 yrs.) and without ADHD (M_{age} =19.6 yrs., *SD* = 0.67 yrs.),

it was concluded that ADHD symptoms, independent of conduct disorder history, increased the likelihood of having ever used marijuana or nonmarijuana illict drugs, age of first use for both illicit drug categories, and higher levels of impairment related to illicit drug use. Among this sample, the ADHD group was also more vulnerable to developing alcohol dependence or experiencing negative repercussions (e.g., having a hangover, doing something that is later regretted or being hurt or injured) as a result of the alcohol use (Rooney, Chronis-Tuscano & Yoon, 2012). Additionally, adults with ADHD endorse more blackouts from alcohol consumption and greater difficulty controlling the amount of drinks consumed during an outing compared to adults without ADHD (Baker, Prevatt & Proctor, 2012). Relative to comparison students, college students with ADHD are also between 2 and 2.5 times more likely to use cigarettes and marijuana (Blasé et al., 2009).

Students with ADHD also report lower levels of overall social skills and more negative interpersonal relationships in comparison to their non-ADHD peers (Chew, Jensen & Rosen, 2009; Shaw-Zirt, Popali-Lehane, Chaplin & Bergman, 2005; Theriault & Holmberg, 2001). Indeed, results of a study assessing social functioning among 41 college participants (ages 18 to 24 yrs. old) from a large, Catholic university in the Northeastern United States (M_{age} = 18.86 yrs.) revealed that positive social behavior scores of adults with ADHD were lower relative to their non-ADHD peers, and that female participants, compared to male participants, displayed significantly more negative social behaviors. Social self-esteem (e.g., feelings of self-worth in a variety of social settings) scores were also significantly lower among participants with ADHD than participants without ADHD (Shaw-Zirt, Popali-Lehane, Chaplin & Bergman, 2005). Additionally, in a study where researchers were interested in student perceptions of ADHD, approximately 196 students with and without ADHD (M_{age} = 19.42 yrs., *SD* = 1.74 yrs.) rated

their attitudes toward adulthood ADHD and also endorsed negative and positive adjectives related to ADHD. Overall, both groups endorsed significantly more negative adjectives regarding college students with ADHD than positive adjectives. Females without ADHD endorsed more favorable attitudes than towards ADHD than the other groups in the study (Chew, Jensen & Rosen, 2009).

Researchers have also examined heterosocial-relational outcomes among college students, and interpersonal relationships of adults with ADHD can be more conflictual compared to those of college students without ADHD. In a study of 157 participants (ages 17 to 46 yrs. old; M_{age} = 19.78 yrs.), results revealed that core symptoms associated with ADHD like inattention and impulsivity predicted the use of aggressive tactics in relationship conflict among adult males with ADHD and their female partners. In particular, kicking, shoving, or throwing objects, sometimes to the extent of slight injury, were associated with core ADHD symptomatology in this sample. Results of the study also revealed that verbal impulsivity, which is defined as jumping into conversations before waiting one's proper turn, was a particularly strong predictor of relationship aggression. Indeed, once verbal impulsivity was taken into account, other variables like conduct disorder, inattention, hyperactivity and negative mood were no longer predictive of relationship aggression (Theriault & Holmberg, 2001).

Further, in a sample of 64 college students diagnosed with ADHD-I (M_{age} = 20.1 yrs., *SD* = 1.4 yrs.), ADHD-C (M_{age} = 19.2 yrs., *SD* = .9 yrs.) and no diagnosis of ADHD (M_{age} = 19.2 yrs., *SD* = .6 yrs.), researchers concluded that students with ADHD-C achieved dating milestones (e.g., age of first date) at an earlier age (M_{age} = 14.6 yrs. old) than the ADHD-I group (M_{age} = 16.2 yrs. old) but not the control group (M_{age} = 15.4 yrs. old). Also, research confederates rated themselves more willing to consider participants in the control group and in the ADHD-C group

for friendship and as potential dating partners more than they did participants in the ADHD-I group. This finding is likely related to the comfortability of handling social situations and higher rate of initiating conversation reported among the control group and the ADHD-C group but not the ADHD-I group (Canu & Carlson, 2003).

There is also data evidencing no differences, in at least some social dimensions, when comparing adults with and without ADHD (Blasé, Anastopoulos, Costello, Hoyle & Swartzwelder, 2009; Buchanan, 2011; Heiligenstein et al., 1999; Rabiner, Anastopoulos, Costello, Hoyle & Swartzwelder, 2008). For instance, in a longitudinal study of 846 college students who were examined during their freshman year of college and again during their sophomore year of college, researchers found that ADHD symptoms measured at time 1 did not predict social concerns measured at time 2. Examples of social concerns included items like, "I have friends that care about me and that I enjoy being with" and "I have trouble getting along with my close friends and acquaintances." Importantly, no more than 30% of students with ADHD in this sample were impaired in any domain measured (e.g., social concerns, academic concerns, depression, emotional stability, alcohol use, etc.), indicating that college students with ADHD are generally functioning without major impairment (Blasé, Gilbert, Anastopoulos, Cosello, Hoyle & Swarzwelder, 2009).

Regarding social satisfaction (e.g., "I feel lonely," "I feel satisfied with the quality of my social life"), there was no indication that students with self-reported ADHD were less satisfied with their social lives relative to students without self-reported ADHD among a sample of 1,648 college first-years who completed an online survey (Rabiner, Anastopoulos, Costello, Hoyle & Swarzwelder, 2008). Finally, in a study examining overall well-being among 317 college students, individuals with ADHD did not differ on social aspects of well-being (e.g., "People

would describe me as a giving person, wiling to share my time with others") from individuals without ADHD (Buchanan, 2011).

Emotional Functioning of College Students with ADHD

Much like research studies assessing social functioning, the literature regarding psychological and emotional functioning in college students with ADHD has produced fairly inconsistent findings (Green & Rabiner, 2012). Some literature indicates that on average, adults with ADHD report higher levels of internalizing symptoms like anxiety and depression compared to the general population of college students (Blasé et al., 2009; Norwalk, Norvilitis & MacLean, 2009; Rabiner, Anastopoulos, Costello, Hoyle & Swartzwelder, 2008). Additionally, lower levels of global self-esteem, personal-emotional adjustment, psychological well-being and quality of life are reported by individuals with ADHD compared to individuals without ADHD (Buchanan, 2011; Canu & Carlson, 2007; Grenwald-Mayes, 2001; Shaw-Zirt, Popali-Lehane, Chaplin & Bergman, 2005). For instance, among 369 male (M_{age} = 22.5 yrs., *SD* 4.6 yrs.) and female (M_{age} = 23.7 yrs., *SD* = 6.0 yrs.) students from a large university in Iceland, ADHD symptoms significantly predicted a lower level of life satisfaction and emotional functioning. Upon further examination, however, researchers concluded that comorbid symptoms like emotional control (e.g., anxiety, anger/frustration emotional lability, depression) and social functioning (e.g., ability to positively engage and socialize with others) are key factors that affect life satisfaction rather than ADHD symptoms per se (Gudjonsson, Sigurdsson, Eyolfsdottir, Smari & Young, 2008).

In another study, 34 young adults with a prior diagnosis of ADHD endorsed lower scores on a measure of overall well-being compared to 283 young adults without a history of ADHD. More specifically, purpose in life, mastery of one's environment and personal growth subscale

scores were significantly lower compared to their peers without ADHD, all of which represent aspects of well-being associated with organizational functioning. These results are not surprising given that past research has shown that tasks like planning and organizing are difficult among adults with ADHD (Buchanan, 2011). Finally, in another study, self-esteem scores of 21 college students who met DSM-IV criteria for ADHD and 20 non-ADHD college students, ages 18 to 24 years old, were examined. Students with ADHD reported lower levels of global self-esteem as measured by the Rosenberg Self-Esteem Scale in comparison to the control group without ADHD. Further, self-esteem partially mediated the relationship between ADHD symptoms and difficulty adjusting to college (Shaw-Zirt, Popali-Lehane, Chaplin & Bergman, 2005).

Alternatively, other research studies have not provided support for increased emotional distress and psychological difficulties for college students with ADHD (Canu & Carlson, 2007; Gudjonsson, Sigurdsson, Eyjolfsdottir, Smari & Young, 2008). For instance, in one study that assessed depression and anxiety among 210 college students, participants were categorized into three clinical groups based on results of a comprehensive psychological evaluation (i.e., ADHD, dyslexia and ADHD/dyslexia) (M_{age} = 19.72 yrs., *SD* = 1.46 yrs.; M_{age} = 19.95 yrs., *SD* = 1.5 yrs.; M_{age} = 19.87 yrs., *SD* = 1.5 yrs. respectively) and one control group (e.g., without a diagnosis). The ADHD group was further categorized into ADHD-I and ADHD-C to compare subtype differences in depression and anxiety. Results revealed that self-reported depression and anxiety did not differ between groups, nor did depression and anxiety differ between ADHD subtypes (Nelson & Gregg, 2012). Similarly, in a sample of 54 college students who sought services at a university counseling center, adults diagnosed with ADHD did not differ on measures of self-reported depression or anxiety compared to adults not diagnosed with ADHD (Heiligenstein, Guenther, Levy, Savino & Fulwiler, 1999).

Additionally, a small sample of 36 college students enrolled in a private university in the Mideastern United States, students with a previous diagnosis of ADHD did not differ from students without a previous diagnosis of ADHD on global self-concept as measured by subscales assessing physical, moral, personal, family, social and academic self-concept. There were also no significant differences in scores of total psychological well-being between groups. Total psychological well-being is a concept that includes subjective, social and psychological well-being, as well as health related behaviors (Wilmhurst, Peele & Wilmhurst, 2011). Finally, in a study comparing self-esteem of 95 students (M = 19.41 yrs., SD = 1.41 yrs.) diagnosed with and without ADHD via a comprehensive psychological assessment recruited, researchers concluded that there was no difference in self-reported self-esteem between groups. Additionally, there was not a difference in self-esteem profiles among subtype of ADHD (e.g., ADHD-C and ADHD-I) (Nelson, 2011).

Limitations of the Current Literature

Although the research community has become more interested in college students with ADHD since the mid-to-late 1990s, there is still a relatively sparse amount of research literature targeting this group of individuals (Green & Rabiner, 2012). Further, conclusions regarding academic, social and emotional functioning of college students with ADHD are tempered by significant limitations of those investigations that have been completed (Weyandt & DuPaul, 2006). In order to provide appropriate interventions and treatment recommendations for this population, it is important to conduct more research in this area, as well as to address the limitations in the current literature.

There are several methodological limitations that need to be addressed in future research. For example, a large number of the studies investigating adults with ADHD on college campuses

have relied on clinic or counseling center samples that may not necessarily be representative of the overall population of students with ADHD (Green & Rabiner, 2012). Further, some studies include measures that are psychometrically poor (e.g., low reliability and validity) and consist of too few items to accurately measure constructs of interest like academic, social and emotional functioning (Weyant & DuPaul, 2006). Other research studies do not examine differences across gender or subtype (Weyandt & DuPaul, 2006). Exploring these differences are important because gender and subtype differences in academic, social and emotional functioning have been found among children (Marshall, Hynd, Handwerk & Hall, 1997; Molina & Pelham, 2003; Power, Costigan, Eiraldi & Leff, 2004).

Additionally, an overwhelming amount of research has depended upon self-reported symptoms of ADHD above a certain cutoff, previous diagnoses of ADHD or ADHD status through the Office of Disability Accommodations (ODA) to identify samples (DuPaul, Weyandt, O'Dell & Varejao, 2009). Without a formal psychological assessment consisting of structured interviews, student-reported ADHD symptoms, as well as intellectual and academic functioning to diagnose current ADHD, results may not reflect impairment related to ADHD per se. That is, outcomes may be at least partially explained by other psychiatric conditions (DuPaul, Weyandt, O'Dell & Varejao, 2009; Green & Rabiner, 2012). Indeed, another limitation in the current literature is that researchers do not typically assess for comorbid conditions that are common among young adults with ADHD like depression, anxiety or learning disabilities (Green & Rabiner, 2012).

Statement of Purpose

Thus, the purpose of the current study was to address limitations in the literature with the aim of accurately examining academic, social and emotional functioning of college students with

ADHD. Specifically, the current research included structured interviews, objective measures of symptoms and a neuropsychological measure to formally diagnosis ADHD. Structured interviews also helped to identify college students who do not have ADHD to serve as a comparison group. Structured interviews and objective measures further allowed for the diagnosis of comorbid disorders typically associated with ADHD (e.g., depression, anxiety, substance abuse). Psychometrically sound measures were utilized in the study to increase internal validity.

Hypothesis 1. College students with ADHD were expected to report significantly lower grade point averages (GPAs) than college students without ADHD.

Hypothesis 2. College students with ADHD were expected to report significantly lower relationship depth and support but significantly higher relationship conflict than college students without ADHD.

Hypothesis 3. College students with ADHD were expected to report significantly more emotional distress (e.g., depression, anxiety, substance abuse) than college students without ADHD.

Hypothesis 4. The difference between self-reported GPA for college students with ADHD-I, ADHD-H and ADHD-C was expected to be significantly different than zero.

Hypothesis 5. The difference between relationship depth, support and conflict for college students with ADHD-I, ADHD-H and ADHD-C was expected to be significantly different than zero.

Hypothesis 6. College students with ADHD-C were expected to exhibit significantly higher levels of emotional distress (e.g., depression, anxiety, substance abuse) than college students with ADHD-I and ADHD-H.

Hypothesis 7. Female college students with ADHD were expected to report significantly more depression and anxiety than male college students with ADHD but significantly less substance abuse than male college students with ADHD.

Hypothesis 8. The difference in relationship depth, support and conflict between males and females with ADHD was expected to be significantly different than zero.

CHAPTER 2

METHOD

Participants

Participants were recruited from a four-year university in the southern part of the United States. Participants were recruited via a former research study on ADHD and obesity, as well as through flyers, classrooms across campus and the university's research participation pool (SONA), which offers students extra credit points in their psychology classes for participation in research studies. Participants who completed phase I (e.g., completed screening measures of ADHD and comorbid symptoms) of the ADHD and obesity study were contacted by email and telephone first because they agreed to participate in phase II (e.g., complete structured clinical interviews to further assess for ADHD and comorbid symptoms) of the ADHD and obesity study. Since the researcher who conducted the ADHD and obesity study never followed up with participants regarding phase II of the study, however, they were contacted to participate in phase II of the current study, which also included structured clinical interviews to further assess for ADHD and comorbid symptoms. Two participants (1.22%) from the ADHD and obesity study completed the current study. A majority of the participants in the current study were recruited via classrooms across campus (64.02%) and SONA (34.76%).

Participants who completed phase I of the study but who were not invited to complete phase II of the study were screened into the comparison group. Participants who met criteria for ADHD were screened into the ADHD group. A participant was classified as having ADHD if they obtained at least two clinically significant scores on inattention and/or hyperactivity subscales on the screening measures and met criteria for ADHD based on responses given on the DIVA 2.0.

Performance on the CPT-IP was also taken into account when considering a diagnosis of ADHD (e.g., a high d prime score indicates attention deficits). A majority of the participants in the ADHD group also met criteria for a variety of comorbid mental health disorders. Mental health diagnoses other than ADHD were diagnosed based on PAI scores, as well as their responses on the SCID-I. Participants who met criteria for a mental health disorder but who did not meet criteria for ADHD were screened into the Non-ADHD diagnosis group.

The overall sample initially included 164 participants; however, 39 participants did not respond to invitations to complete phase II of the study and were removed from the sample (See tables 2 and 4). Thus, the final sample included 125 participants, 36 males (28.8%) and 89 females (71.2%). The participants' ages ranged from 18-43 years old (M_{age} = 21.19; *SD* = 3.83). The race/ethnicity of the sample was: 50.4% European-American/White (*n* = 63), 20% Latin-American/Hispanic (*n* = 25), 12.8% African American/Black (*n* = 16), 4.8% Asian-American/Asian (*n* = 6) and 12% Other (*n* = 15). Concerning sexual orientation, over half of the participants identified as straight/heterosexual (81.6%; *n* = 102) while the remaining participants identified as gay/homosexual (8.8%; *n* = 11), bisexual (4.8%; *n* = 6) or questioning/unsure (4%; *n* = 5). Approximately 27.2% of the participants were freshman in college (*n* = 34), 16% of them were sophomores (*n* = 20), 24.8% were juniors (*n* = 31) and 32% of them were seniors (*n* = 40).

Each participant was asked about previous and current mental health diagnoses. Regarding an ADHD diagnosis, 21.6% reported they had an ADHD diagnosis (*n* = 27) and 78.4% reported they did not have an ADHD diagnosis (*n* = 98). Approximately 25.7% of the entire sample reported taking medication for ADHD (*n* = 9) and 45.7% reported not taking medication for ADHD (*n* = 16). Concerning a Major Depressive Disorder (MDD) diagnosis, 12% reported they had a MDD diagnosis (*n* = 15), 80% reported no MDD diagnosis (*n* = 100),

and 6.4% reported they had never been diagnosed but suspected a diagnosis of MDD (n = 8). About 10.4% of the sample reported a former diagnosis of Generalized Anxiety Disorder (GAD) (n = 12), 72% reported no diagnosis of GAD (n = 90) and 16.8% have suspect a diagnosis of GAD (n = 21). About 37.1% of the sample reported taking medication for a mental health diagnosis (n = 13) while 62.9% of the sample reported that they were not taking medications for a mental health diagnosis (n = 22).

Means and standard deviations of continuous variables by diagnostic group (e.g., ADHD, Non-ADHD diagnosis and comparison groups) and frequencies for categorical variables by diagnostic group are shown in Tables 5 and 3 respectively. In the ADHD group, there were 11 males (31.4%) and 21 females (68.6%). Their ages ranged from 18-32 years old (M_{age} = 20.86; SD = 3.37). The race/ethnicity of the ADHD sample was: 62.9% European-American/White (n = 22), 17.1% Latin-American/Hispanic (n = 6), 11.4% African American/Black (n = 4), 4.8% and 8.6% Other (n = 3). Over half of the participants in the ADHD group identified as straight/heterosexual (80%; n = 28) while the remaining participants identified as gay/homosexual (8.6%; n = 3), bisexual (8.6%; n = 3) or questioning/unsure (2.9%; n = 1). With regards to class rank, 25.7% of the participants with ADHD were freshman in college (n = 9), 20% of them were sophomores (n = 7), 34.3% were juniors, and 20% were seniors (n = 7).

In the Non-ADHD diagnosis group there were 14 males (31.1%) and 31 females (68.9%). Their ages ranged from 18-30 years old (M_{age} = 21.11; SD = 3.36). The race/ethnicity of the ADHD sample was: 48.9% European-American/White (n = 22), 22.2% Latin-American/Hispanic (n = 10), 13.3% African American/Black (n = 6), 4.4% Asian American (n = 2) and 11.1% Other (n = 5). Similar to the ADHD group, half of the participants in the non-ADHD diagnosis group identified as straight/heterosexual (73.3%; n = 33) while the remaining participants identified as

gay/homosexual (13.3%; *n* =6), bisexual (6.7%; *n* = 3) or questioning/unsure (6.7%; *n* = 3). Class ranks are as follows: freshman (28.9%; *n* = 13), sophomore (8.9%; *n* = 4); junior (22%; *n* = 10) and senior (40%; *n* = 18).

In the comparison group, there were 11 males (24.4%; *n* = 11) and 34 females (75.6%; *n* = 34), and the ages ranged from 18-43 years old (M_{age} = 21.53, *SD* = 3.39). Approximately 8.9% of the comparison group identified as Asian American (*n* = 4), 13.3% as African American/Black (*n* = 6), 42.2% European-American/White (*n* = 19), 20% Latin American/Hispanic (*n* = 9) and 15.6% Other (*n* = 7). With regards to sexual orientation, 91.1% identified as straight/heterosexual (*n* = 41), 4.4% as gay/homosexual (*n* = 2) and 2.2% as questioning/unsure (*n* = 1). Class ranks are as follows: freshman (26.7%; *n* = 12), sophomore (20%; *n* = 9); junior (20%; *n* = 9) and senior (33.3%; *n* = 15).

Among the 39 participants who dropped out of the study, 15 were male (38.5%) and 24 were female (61.5%). Ages ranged from 18-40 years old (M_{age} = 22.23, *SD* = 5.21). Regarding ethnicity, approximately 12.8% identified as Asian American (*n* = 5), 20.5% identified as African American/Black (*n* = 8), 43.6% identified as European-American/White (*n* = 17), 20.5% identified as Latin American/Hispanic (*n* = 8) and 2.6% identified as Other (*n* = 1). Approximately 92.3% of the dropout group reported their sexual orientation to be Straight/heterosexual (*n* = 36) while 2.6% of the participants identified as Gay/homosexual (*n* = 1) and 5.1% identified as Bisexual (*n* = 2). Class ranks are as follows: freshman (23.1%; *n* = 9), sophomore (10.3%; *n* = 4); junior (28.2%; *n* = 11) and senior (38.5%; *n* = 15).

Measurement Approaches

Demographic Questionnaire. The Demographic Questionnaire was prepared specifically for this study. Participants reported on characteristics such as age, ethnicity,

GPA and year in school. The questionnaire was also used to collect data related to learning disabilities, ADHD and other psychiatric diagnoses.

Diagnostic Interview for Adult ADHD (DIVA 2.0). The DIVA 2.0 is a structured clinical interview that accesses the presence of a *DSM-IV-TR* diagnosis of ADHD in adulthood (including the three subtypes), as well as the presence of the *DSM-IV-TR* criteria in both childhood and adulthood (Kooij, 2010). The DIVA 2.0 was also constructed to investigate impairments in five areas of functioning: education, work, social relationships, social activities/leisure time, and partner/family relationships and self-esteem. Every *DSM-IV-TR* criterion that the DIVA 2.0 addresses is accompanied by several examples in order for clarification of the interview questions. The DIVA 2.0 should be used alongside an instrument for diagnostic assessment of comorbid disorders and differential diagnoses (Kooij, 2010).

Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I). The SCID-I is a semi-structured interview that is utilized by clinicians to diagnose *DSM-IV-TR* Axis I disorders. In the current study, all eligible participants were administered the entire SCID-I (modules A through F). The SCID-I is referred to as "the gold standard" for clinicians and researchers when using a structured clinical interview (Pez et al., 2010). Indeed, previous research has demonstrated moderate to excellent inter-rater agreement on Axis I diagnoses (e.g., major depression, dysthymia, alcohol abuse/dependence, drug abuse/dependence and eating disorder), with kappa values ranging from. 061 to .81 (Lobbestael, Leurgans, & Arntz, 2011). Among a sample of young adults, inter-rater agreement was k = .83 for major depressive disorder, k = .65 for social phobia, k= .85 for generalized anxiety disorder and k = .85 for obsessive compulsive disorder (Griffith, Zinbarg, Craske, Mineka, Rose, Waters & Sutton, 2010).

In the current study, graduate student helpers, undergraduate research assistants and one of the principal investigators administered the DIVA 2.0 and SCID-I to eligible participants. Each administrator viewed eight SCID-I training videos (totaling approximately 15 hours). Additionally, graduate and undergraduate students completed practice SCID-I administrations with their peers and completed a "check-out" administration of the SCID-I in which they interviewed one of the principal investigators of the study and had to arrive at an accurate diagnosis(es) to be given permission to interview research participants. There are no training videos available for the DIVA 2.0; however, each administrator completed practice administrations and a "check-out" administration with a principal investigator of the study. Weekly research meetings were scheduled so that graduate and undergraduate students could consult with each other, as well as with one of the principal investigators of the study regarding appropriate diagnoses for each participant. Additionally, the licensed psychologist who oversaw the current study randomly selected administrations of these instruments from recordings and examined them for errors.

Measures of ADHD Symptoms

Continuous Performance Test- Identical Pairs Version (CPT-IP). The Continuous Performance Test – Identical Pairs Version (CPT-IP) (Cornblatt, Risch, Faris, Friedman, & Erlenmeyer-Kimling, 1988) is a computerized continuous performance task that measures sustained attention. Participants were presented with random two, three and four digit numbers for 50 msecs, followed by 950 msecs of a blank screen. Participants were required to lift their finger off of a button on a computer mouse each time they recognize two stimuli in a row that are identical. Over the course of the presentation of the stimuli, 20% are truly identical, 20% are nearly identical but wrong and 60% are clearly wrong. A measure of signal detection (d prime)

was used to examine sustained attention, with higher numbers indicating a better performance. The CPT-IP has good reliability and validity with a test-retest coefficient of .84 (Nuechterlein, Barch, Gold, Goldberg, Green & Heaton, 2004).

Conners' Adult ADHD Rating Scale (CAARS). The CAARS was designed to aid in the diagnosis of ADHD in adults age 18 and above (Conners, Erhardt, & Sparrow, 1999). The long form of the CAARS, which contains 66 items, was used in the current study. This version contains four factors (Inattention/Memory Problems, Hyperactivity/Restlessness, Impulsivity/Emotional Lability, and Problems with Self-Concept) as well as three *DSM-IV* ADHD symptom subscales (Inattentive Symptoms, Hyperactive-Impulsive Symptoms, and Total ADHD symptoms). The CAARS also includes an ADHD Index and an Inconsistency Index. The purpose of the ADHD Index is to identify individuals who are likely to meet the criteria of ADHD as adults, while the function of the Inconsistency Index is to detect possible response deviations that might be due to random responding or uncooperative behavior (Norwalk, Norvilitis & MacLean, 2009).

Among young adults, previous investigations have noted coefficient alphas for each of the four subscales that ranged from .86 to .92, suggesting excellent internal reliability. The test-retest reliability correlations are .88 for the Inattention Problems subscale, .90 for the Hyperactivity/Restlessness subscale, .90 for the Impulsivity/Emotional Liability subscale, and .91 for the Problems with Self-Concept subscale (Erhardt, 1999). Satisfactory construct and criterion validity have also been demonstrated with the CAARS (Alder, Spencer, Stein & Newcorn, 2007). The CAARS has been shown to detect true cases of adult ADHD 82% of the time and true non-ADHD cases 87% of the time. The CAARS has a total classification accuracy rate of approximately 85% (Taylor, Deb & Unwin, 2011). In the current study, Cronbach's alpha

for the Inattention/Memory Problems, Hyperactive/Impulsive Symptoms, DSM-IV Inattention, DSM-IV Hyperactivity/Impulsivity and ADHD Index scales were .93, .90, .92, .85 and .87 respectively.

Brown Attention-Deficit Disorder Scales (BADDS). The BADDS is a self-report 40-item inventory that is used to assess symptoms and associated features of ADHD (Brown, 1996). The BADDS, however, focuses primarily on attention rather than symptoms of hyperactivity and impulsivity (Roesler, Retz, Thorne, Scheider, Stieglitz & Falkai, 2006). Specifically, the BADDS assesses five dimensions: Organizing and Activating to Work, Sustaining Attention and Concentration, Sustaining Energy and Effort, Managing Affective Interference, and Utilizing "Working Memory" and Accessing Recall. Respondents are asked to indicate how much they believe that a feeling or behavior has been a problem for them over the past 6 months based on a four-point likert scale (0-3), specifying "never," "once a week or less," "twice a week," and "almost daily."

In a systematic review of all studies to date validating the BADDS, alpha coefficients ranged from .69 to .81 (Taylor, Deb & Unwin, 2011). In a previous study, the test-retest coefficient proved satisfactory (r = .87) (Brown, 1996). Approximately 84-92% of the time, the BADDS detects true cases of ADHD, and 33% of the time the BADDS detects true non-cases of ADHD. The BADDS has a total classification accuracy rate of 74% (Taylor, Deb & Unwin, 2011). In the current study, the Cronbach's alpha coefficient for the Attention scale was .91.

Attention-Deficit Scales for Adults (ADSA). The ADSA is a 54-item self-report inventory that is used to assess symptoms associated with a diagnosis of ADHD (Triolo & Murphy, 1996). For each item, the respondent is asked to indicate the frequency of occurrence on a 5-point Likert scale: "never," "seldom," "sometimes," "often," and "always."

Nine content subscales are included in the ADSA: Attention-Focus/Concentration, Interpersonal, Behavior-Disorganized Activity, Coordination, Academic Theme, Emotive, Consistency/Long-term, Childhood, and Negative-Social. In previous studies, alpha coefficients have ranged from .70 to .83, and split-half reliability has been demonstrated at .92. Additionally, sensitivity to detect true cases of ADHD has ranged from 58-81% in previous studies (Taylor, Deb & Unwin, 2011). In the current study, alpha coefficients were .86 for the Attention Concentration scale, .80 for the Behavior-Disorganized Activity scale and .65 for the Negative Social scale.

Measures of Academic Functioning

Grade Point Average (GPA). Academic functioning was assessed through the use of student-reported GPA. The Academic Theme subscale of the Attention-Deficit Scales for Adults (ADSA) was also used to assess perception of academic functioning. Because the Academic Theme scale has less than 10 items, the mean inter-item correlation was computed rather than Cronbach alpha to determine reliability. The mean inter-item correlation for the Academic Theme scale was .24, which is considered to be in the optimal range (Briggs & Cheek, 1986).

Measures of Social Functioning

Substance Abuse Subtle Screening Inventory – 3rd Edition (SASSI-3). The SASSI-3 (See Appendix H) is a self-report questionnaire that consists of two face-valid subscales (i.e., Face Valid Alcohol and Face Valid Other Drugs) and eight true/false subscales (i.e., Symptoms, Obvious Attributes, Subtle Attributes, Defensiveness, Supplemental Addiction Measure, Family versus Controls, and Correctional) (Miller, 1997). In the current study, only the two face-valid subscales were utilized to assess alcohol and drug use over the participant's entire life. The SASSI-3 has been shown to be a reliable and valid measure to use among college population to assess for alcohol and drug use. Specifically, the Face Valid Other Drugs (FVOD) subscale

demonstrated excellent internal consistency (α = .95) and construct validity in a study assessing drug use among college students (Laux, Perera-Diltz, Smirnoff & Salyers, 2005). The Face Valid Alcohol (FVA) subscale also demonstrated excellent internal consistency in a separate study assessing psychometric properties of the SASSI-3 among college students (α = .92), as well as high-moderate construct validity and concurrent validity (Laux, Salyers & Kotova, 2005).

Quality of Relationships Inventory (QRI). The QRI is a 39-item measure developed to assess three broad dimensions of satisfaction associated with a specific relationship: (1) the perceived availability of support associated with the relationship (support; DSS); (2) the positivity, stability, and importance of the relationship (depth; DD); and (3) the conflict and ambivalence in the relationship (conflict; DC) (Pierce, Sarason & Sarason, 1991). Participants were asked to complete the QRI for their closest friend. Prior research has confirmed the three-factor structure of the QRI (Verhofstadt, Buysse, Rosseel & Peene, 2006). Each scale exhibits good internal consistency (α = .83, 92, and .91 for DSS, DD, and DC respectively). In the current study, Cronbach's alpha coefficients were .85, .82 and .86 for the Relationship Support, Relationship Depth and Relationship Conflict scales respectively.

Measures of Emotional Functioning

Personality Assessment Inventory (PAI). The PAI is a multidimensional 344-item self-report measure of personality and psychopathology that requires respondents to rate items on a 4-point scale (Morey, 1991). Responses to items range from 1(false) to 4 (always), indicating the degree to which each statement is true. The PAI consists of 22 full scales: 4 validity scales, 11 clinical scales, 5 treatment consideration scales, and 2 interpersonal scales (Morey, 1991). The psychometric properties of the PAI have been investigated across a number of samples, including college samples. Internal consistency coefficients have ranged from .81 to .86 for the full scales

across these studies (McDevitt-Murphy, Weathers, Flood, Eakin & Benson, 2007). Internal consistency coefficients for the Anxiety, Anxiety Related Disorders, Depression, Drug Use and Alcohol Use scales in the current study ranged from .79 to .93, demonstrating good to excellent reliability.

Procedure

After receiving IRB approval, former participants in the ADHD and obesity study were contacted via telephone and email. Participants were also recruited via flyers, classrooms and SONA. Participants viewed and signed a detailed consent form before completing the measures. Participants completed one of three counter-balanced questionnaire packets. Each packet contained a demographic questionnaire, the CAARS (Conners, Erhardt, & Sparrow, 2004), the BADDS (Brown, 1996), the ADSA (Triolo & Murphy, 1996), the SASSI-3 (Miller, 1997), the PAI (Morey, 1996) and the QRI (Pierce, Sarason & Sarason, 1991). Participants also completed the CPI-IP (Cornblatt, Risch, Faris, Friedman, & Erlenmeyer-Kimling, 1988).

After each participant completed the CPT-IP and questionnaire packet, an undergraduate research assistant scored the packet of measures to determine eligibility for phase II of the study. If a participant obtained a clinically significant score (T score = 65 or higher) on at least two of the inattention and/or hyperactivity/impulsivity scales across the CAARS, BADDS and ADSA, they were contacted by telephone or email to participate in phase II of the study. If a participant self-reported a previous diagnosis of ADHD on the demographic questionnaire, regardless of their scores on the screening measures, they were also invited to participate in phase II of the study. Additionally, participants were eligible for phase II of the study if they obtained at least one clinically significant score on the Personality Assessment Inventory (PAI). Participants who did not self-report a previous diagnosis of ADHD, and who did not receive clinically significant

scores on the BADDS, CAARS, ADSA and PAI were not eligible for phase II. A graduate student, undergraduate research assistant or a principal investigator of the study administered the SCID-I and DIVA 2.0 in phase II of the study to further assess for the presence of ADHD and/or other mental health disorders (e.g., major depressive disorder). Regardless of what clinically significant scores were obtained on screening measures in phase I of the study, each participant was administered the entire SCID-I and DIVA 2.0.

Upon completion of both phase I and phase II of the study, participants received a list of counseling, assessment and psychiatric referrals. Participants who completed phase I of the study but who were not eligible for phase II (i.e., did not receive any clinically significant scores on screening measures) were entered into a drawing to win a $50 Visa gift card. Participants who completed both phase I and phase II of the study either received an assessment report outlining their test results, as well as diagnoses and recommendations, or extra credit depending on the recruitment method. Specifically, participants recruited via SONA received extra credit and all other participants received an assessment report. Participants who received extra credit had the option to know if they met criteria for any mental health diagnoses after the phase II interview was complete.

Data Preparation, Design and Analysis

To ensure the data was accurately entered, one research assistant (RA) entered the data and another RAs compared the data entered with each participant's responses. Basic screening procedures were used to check for missing values and outliers, as well as to test the assumptions of ANOVA (i.e., normality of dependent variables, random sampling, level of measurement, independence of observations and homogeneity of variance) and MANOVA (i.e., normality of dependent variables, sample size, linearity, homogeneity of regression, multicollenarity and

homogeneity of variance-covariance matrices). Frequency tables were examined to identify missing values and data entry errors. In the sample, less than 2% of all the possible data was missing on each subscale. Through the missing values analysis in SPSS, the data showed to be missing values completely at random (MCAR). The "exclude cases pairwise" option was utilized to handle missing data, meaning that a participant was excluded from an analysis if they were missing data required for the specific analysis but were included in any analysis for which they had the necessary data (Pallant, 2007).

To assess normality of dependent variables, total scores, means, standard deviations, and distributional properties (i.e., skewness and kurtosis), histograms and Kolmogorov-Smirnov tests of normality were examined. Upon examination of these factors, it was discovered that total scores on the Personality Assessment Inventory (PAI) depression, anxiety and anxiety-related disorders scales were normally distributed, as were total scores on the Attention Deficit Scales for Adults (ADSA) interpersonal and negative-social scales. Total scores on the PAI alcohol and drug scales, the SASSI face valid alcohol and face valid other drug scales and the QRI relationship conflict scale, however, were not normally distributed and positively skewed. Additionally, total scores on the QRI relationship depth and support scales were not normally distributed and negatively skewed (see Table 6). Square root and logarithmic procedures (Tabachnick & Fidell, 2007) were used to transform these measures; however, the transformed scores still remained skewed and kurtotic. Therefore, the decision was made to keep the nontransformed values in the data, as ANOVA and MANOVA are generally robust to modest violations of normality (Tabachnick & Fidell, 2007). Conceptually, one would expect these variables to be skewed because most participants reported that they do not drink alcohol/use drugs excessively and that their relationships are generally supportive and without conflict. The

internal consistency reliabilities and correlations among the total scales were also computed (see tables 8 and 7 respectively).

Next, data were screened for univariate and multivariate outliers by examining standardized scores and Mahalanobis distances (Tabachnik & Fidell, 2007). Upon examination of standardized total scores on dependent variables, several univariate outliers (i.e., greater than three standard deviations above or below the mean) were detected on drug and alcohol measures, as well as on GPA. The values of these outliers were manually transformed to reflect values less than three standard deviations above or below the mean so as not to influence analyses too greatly. No multivariate outliers were detected.

The linearity and multicollenearity assumptions associated with MANOVA were tested via correlation analyses and examination of scatter plots. A correlation greater than .8 between dependent variables is indicative of multicollenearity and can be problematic (Tabachnik & Fidell, 2007). Bivariate correlation coefficients among observed variables ranged from -.025 to .787 across MANOVA analyses, indicating no problem with bivariate multicollinearity. Scatter plots of the relationships between dependent variables were examined to detect non-linear relationships. Scatter plots did not demonstrate any obvious evidence of non-linearity.

CHAPTER 3

RESULTS

The first hypothesis stated that college students with ADHD would report a significantly lower grade point average (GPA) than college students without ADHD. An ANOVA was conducted to compare GPAs of college students with a diagnosis of ADHD (ADHD group), college students diagnosed with a mental health disorder besides ADHD (e.g., major depressive disorder, generalized anxiety disorder); (Non-ADHD diagnosis group) and college students without a mental health diagnosis (Comparison group); (See table 9). Participants with a self-reported diagnosis of a learning disability were screened out of the analysis. Levene's test was significant (p = .030), meaning that equality of variances could not be assumed. The analysis was not significant *Welch's F* (2, 109) = 1.64, p = .202, indicating no differences in GPA between diagnostic groups.

A chi-square test of independence was conducted to determine if there was an association between GPA and medication usage (e.g., antianxiety, antidepressant, etc.) among participants in the ADHD and Non-ADHD diagnosis groups (see Table 10). Results revealed that there was no association between medication use and GPA, χ^2 (2, n = 80) = .51, p = .776. To determine if there was a relationship between GPA and when a participant in the current sample was diagnosed with ADHD (e.g., in current study or previously), an additional chi-square test of independence was conducted (See table 11). The results indicated that there is no relationship between GPA and when a participant was diagnosed with ADHD, χ^2 (2, n = 35) = .37, p = .830.

Another ANOVA was conducted to determine if differences existed between diagnostic groups on perception of academic achievement (e.g., ADSA Academic Theme subscale); (See table 12). Levene's test was not significant (p = .310); thus, equality of variances could be

assumed. Results of the analysis indicate that there is a significant difference in perception of academic achievement across diagnostic groups, F (2, 110) = 20.798, $p < .001$. Post hoc analysis revealed significantly more academic concerns among the ADHD group (M = 7.00, SD = 1.63) and Non-ADHD diagnosis group (M = 6.81, SD = 1.62) than the comparison group (M = 4.74, SD = 1.85, $p < .001$). There was not a difference in academic concerns between the ADHD and non-ADHD diagnosis group (p = .902). The effect size (eta squared = .27) was large.

The second hypothesis stated that college students with ADHD will report significantly lower relationship support and depth, but significantly higher relationship conflict than college students without ADHD. A MANOVA was conducted to examine differences in relationship quality between the ADHD, Non-ADHD diagnosis and comparison groups (See table 15). Box's Test of Equality of Covariance Matrices was greater than .001 (p = .024); thus, the assumption of homogeneity of variance-covariance matrices was not violated. There was not a significant difference between diagnostic groups on the combined dependent variables, F (6, 240) = .849, p = .533, Wilks' Lambda = .96.

An ANOVA was conducted to examine group differences on the ADSA Negative-Social subscale to further investigate relationship quality among diagnostic groups (See table 13). Levene's test was not significant (p = .900); thus, equality of variances could be assumed. Results of the analysis indicate that there is a significant difference in negative social interactions across diagnostic groups, F (2, 110) = 10.16, p = .000, partial eta squared = .16. Post hoc analysis revealed significantly more negative social interactions among the ADHD group (M = 17.36, SD = 4.01) and Non-ADHD diagnosis group (M = 17.42, SD = 4.39) than the comparison group (M = 13.86, SD = 3.80, $p < .001$). There was not a difference in academic concerns between the ADHD and non-ADHD diagnosis group (p = .999).

The third hypothesis stated that college students with ADHD would report significantly higher levels of emotional distress (e.g., anxiety, depression, alcohol use, drug use) than college students without ADHD. A MANOVA was conducted to examine differences in depression, anxiety, anxiety-related disorders (e.g., OCD, PTSD), alcohol use and drug use between the ADHD, Non-ADHD diagnosis and comparison groups (See table 14). Box's Test of Equality of Covariance Matrices was not greater than .001 ($p < .001$); thus, the assumption of homogeneity of variance-covariance matrices was violated. Rather than interpret the Wilks' Lambda statistic, the Pillai's Trace statistic was interpreted because it is generally more robust to violations of assumptions.

Results indicate significant group differences on the combined dependent variables, $F(10, 230) = 6.48$, $p < .001$, Pillai's Trace = .44. The partial eta squared was .22, which is a medium effect size. Post-hoc analyses revealed significant group differences between the ADHD group and the comparison group in anxiety ($M = 32.88$, $SD = 13.47$ and $M = 17.37$, $SD = 10.20$ respectively, $p < .001$), partial eta squared = .33), anxiety related disorders ($M = 30.21$, $SD = 11.69$ and $M = 18.91$, $SD = 7.60$ respectively, $p < .001$, partial eta squared = .27), depression ($M = 28.10$, $SD = 13.33$ and $M = 15.26$, $SD = 8.38$ respectively, $p < .001$, partial eta squared = .28), drug use ($M = 5.48$, $SD = 6.91$ and $M = 1.11$, $SD = 3.61$ respectively, $p = .005$, partial eta squared = .10) and alcohol use ($M = 4.72$, $SD = 4.45$ and $M = 1.57$, $SD = 2.28$ respectively, $p = .007$, partial eta squared = .13), with college students in the ADHD group reporting significantly more symptoms than college students in the comparison group. There were no significant group differences between the ADHD group and the non-ADHD diagnosis group.

Exploratory Analyses

Hypotheses 4-8 examined differences among subtypes of ADHD (i.e., ADHD-I, ADHD-C and ADHD-H/I) and sex on several dependent variables (i.e., GPA, relationship quality and emotional distress). Only two participants were diagnosed with ADHD- H/I in the current sample; thus, only participants diagnosed with ADHD-I and ADHD-C could be compared in the exploratory analyses. Additionally, due to small and unequal sample sizes, Mann-Whitney U tests were conducted rather than ANOVAs and MANOVAs to compare groups. Nonparametric tests are generally ideal to use with small and unequal sample sizes because they do not make assumptions about the underlying population distribution (i.e., normality).

A Mann Whitney U was conducted to evaluate significant differences in GPA among specific subtypes of ADHD (hypothesis 4) (See table19). Participants with a self-reported diagnosis of a learning disability were screened out of the analyses. Results revealed no significant differences in GPA between ADHD-I (mean rank = 13.75) and ADHD-C (mean rank = 13.29) groups, $U = 81.00$, $z = -.16$, $p = .877$. An additional Mann-Whitney U was conducted to determine if any differences in perception of academic achievement exist between ADHD-I and ADHD-C groups; however, the second test similarly did not reveal any significant differences between the ADHD-I (mean rank = 11.33) and ADHD-C (mean rank = 15.36) groups, $U = 110$, $z = 1.37$, $p = .170$.

Three Mann-Whitney U tests were conducted to assess hypothesis 5, which stated that differences in relationship support, depth and conflict would exist between ADHD-I and ADHD-C groups (See table 17). Results indicate no significant differences between the ADHD-I group and ADHD-C group in relationship support (mean rank = 15.00 and 12.21, respectively; $U = 66.00$, $z = -.94$, $p = .348$), relationship conflict (mean rank = 14.54 and 12.61, respectively; $U =$

71.50, z = -.65, p = .518) and relationship depth (mean rank = 14.62 and 12.54, respectively; U = 70.50, z = -.70, p = .483). An additional Mann-Whitney U test was conducted to evaluate group differences in negative social interactions, and results revealed no group differences among participants diagnosed with ADHD-I and ADHD-C (mean rank = 10.86 and 13.88 respectively; U = 89.50, z = 1.05, p = .296).

Five additional Mann-Whitney U tests were conducted to evaluate group (i.e., ADHD-I and ADHD-C) differences in anxiety, anxiety related disorders, depression, drug use and alcohol use (hypothesis 6). Results indicate no significant differences between the ADHD-I group and ADHD-C group in anxiety (mean rank = 15.65 and 18.44, respectively; U = 159.00, z = .83, p = .407), anxiety related disorders (mean rank = 16.50 and 17.53, respectively; U = 144.50, z = .31, p = .759), depression (mean rank = 15.24 and 18.88, respectively; U = 166.00, z = 1.08, p = .279), alcohol use (mean rank = 15.81 and 17.19, respectively; U = 139.00, z = .42, p = .677) and drug use (mean rank = 14.59 and 19.56, respectively; U = 177.00, z = 1.49, p = .137).

Hypothesis 7 stated that females diagnosed with ADHD would report significantly higher levels of depression and anxiety, but significantly less alcohol and drug use, than males diagnosed with ADHD. Five Mann-Whitney U tests were conduct to evaluate hypothesis 7, and participants without a diagnosis of ADHD were screened out of the analyses (See table 16). There were no significant differences between males and females with ADHD in anxiety (mean rank = 14.64 and 19.54, respectively; U = 169.00, z = 1.32, p = .188), anxiety related disorders (mean rank = 17.14 and 18.40, respectively; U = 141.50, z = .34, p = .735), depression (mean rank = 15.95 and 18.94, respectively; U = 154.50, z = .80, p = .423) and drug use (mean rank = 19.36 and 17.38, respectively; U = 117.00, z = -.54, p = .591). There was a significant difference between men and women with ADHD in alcohol use, with females reporting significantly more

alcohol use than men (female mean rank = 20.65 and men mean rank = 12.23; U = 195.50, z = .19, p = .022).

To evaluate group differences in relationship variables among males and females diagnosed with ADHD (hypothesis 8) five additional Mann-Whitney U tests were conducted (See table 18). There were no significant differences between men and women diagnosed with ADHD on relationship support (mean rank = 19.18 and 17.46, respectively; U = 119.00, z = -.47, p = .639), relationship depth (mean rank = 15.32 and 19.23, respectively; U = 161.50, z = 1.06, p = .290), relationship conflict (mean rank = 16.23 and 18.81, respectively; U = 151.50, z = .70, p = .486) and negative social interactions (mean rank = 16.28 and 17.27, respectively; U = 114.50, z = .26, p = .792).

Additional Exploratory Analyses

Four hierarchical multiple regressions (HMR) were conducted to evaluate the extent to which inattention and hyperactivity/impulsivity, as measured by the Conners' Adult ADHD Rating Scales (CAARS), predicts GPA, relationship support, relationship depth and relationship conflict after controlling for anxiety, anxiety related disorders, depression, alcohol use and substance use (See tables 20-23). In the first HMR, anxiety, anxiety related disorders, depression, alcohol use and substances use were entered at Step 1 and explained 5.3% of the variance in GPA. Inattention and hyperactivity/impulsivity explained and additional 4% of the variance in GPA at Step 2 after controlling for anxiety, anxiety related disorders, depression, alcohol use and substance use, *F change* (2,140) = 3.10, p = .048 (R squared change = .09). In the final model, only inattention was statistically significant, with inattention recording a higher beta value (beta = -.24) than hyperactivity/impulsivity (beta = -.01).

In the second HMR, anxiety, anxiety related disorders, depression, alcohol use and substances use were entered at Step 1 and explained 11% of the variance in relationship support. Inattention and hyperactivity/impulsivity were entered at Step 2 and did not account for a significant amount of additional variance after controlling for variables at Step 1, *F change* (2,140) = .47, *p* = .626 (R squared change = .01). In the final model, only depression was statistically significant (beta = -.42, *p* = .001). In the third HMR, anxiety, anxiety related disorders, depression, alcohol use and substance use were entered at Step I and explained 12% of the variance in relationship conflict. Inattention and hyperactivity/impulsivity did not explain a significant additional amount of variance in relationship conflict after controlling for variables at Step 1, *F change* (2,140) = 1.42, *p* = .245 (R squared change = .02). In the final model, only anxiety related disorders approached significance (beta = .26, *p* = .051). In the final HMR, anxiety, anxiety related disorders, depression, alcohol use and substance use were entered into the model at Step 1 and explained 8.6% of the variance in relationship depth. Inattention and hyperactivity/impulsivity did not predict a significant amount of variance in relationship depth after controlling for variables at Step 1, *F change* (2,140) = .33, *p* = .719 (R squared change = .00). In the final model, anxiety and depression were statistically significant (beta = .35 and -.34 respectively).

CHAPTER 4

DISCUSSION

The purpose of the current study was to address various limitations in the ADHD literature in order to accurately examine academic, social and emotional functioning of college students with ADHD. Participants were diagnosed with ADHD and/or comorbid disorders (e.g., major depressive disorder, generalized anxiety disorder) via comprehensive evaluations rather than relying solely on self-report measures and/or ODA classification. Additionally, only psychometrically sound instruments were utilized in the current study to ensure accurate measurement of constructs, and academic, social and emotional functioning was compared across sex and two of the ADHD subtypes. It was predicted that college students diagnosed with ADHD would report significantly lower grade point averages (GPA) and relationship quality, as well as significantly higher emotional distress. Additionally, it was hypothesized that participants diagnosed with ADHD-Combined Type (ADHD-C) would report significantly different relationship quality, and significantly higher emotional distress, than participants diagnosed with ADHD- Predominately Inattentive Type (ADHD-I). It was expected that females diagnosed with ADHD would report significantly higher anxiety and depression compared to males diagnosed with ADHD; whereas, men diagnosed with ADHD would report significantly higher alcohol and substance use than females diagnosed with ADHD.

Upon examination of self-reported ADHD diagnosis by diagnostic group (e.g., ADHD, Non-ADHD diagnosis and Comparison groups), it appears that out of the 27 participants who self-reported a diagnosis of ADHD on the demographic form only 16 of them were classified as actually having ADHD in the current study (see Table 3). The remaining 11 participants were either incorrectly diagnosed with ADHD previously, falsely reported a diagnosis of ADHD or

are no longer symptomatic. Indeed, 9 of the 11 participants who self-reported a diagnosis of ADHD on the demographic form were screened into the Non-ADHD diagnosis group and two were screened into the comparison group. Out of the 98 participants who moved to phase II of the current study because they earned at least two clinically significant scores on the ADHD screening measures (e.g., BADDS, ADSA, CAARS) but who did not report a previous diagnosis of ADHD, 19 were diagnosed with ADHD.

These findings are consistent with a study conducted by Green and Rabiner (2013), in which they classified participants as having ADHD using four different selections methods (e.g., self-reported diagnosis, ADHD symptom counts, symptom counts greater than 1.5 standard deviations above the sample mean and full DSM-IV criteria) and found that significantly fewer participants were classified as having ADHD via the full DSM-IV criteria selection method than the other three methods. Additionally, these findings speak to the importance of using a formal assessment method to classify participants into ADHD and non-ADHD groups rather than relying solely on a self-reported diagnosis of ADHD or ADHD screening measures, as both methods inaccurately classified participants in the current study.

Academic Functioning

The first hypothesis stated that college students diagnosed with ADHD would report significantly lower GPAs than college students not diagnosed with ADHD. GPAs of college students diagnosed with ADHD (ADHD group) were compared to the GPAs of college students diagnosed with a mental health disorder (or disorders) that were not ADHD (Non-ADHD diagnosis group) and college students without a mental health diagnosis (comparison group). Findings from the current study indicate that GPAs are similar across groups, which is consistent with findings from other studies in which researchers discovered no differences in GPA between

ADHD and comparison groups (Gray, Fettes, Woltering, Mawjee & Tannock, 2015; Green & Rabiner, 2013; Sparks, Javorsky & Phillips, 2004). Results of an exploratory hierarchical multiple regression (HMR) revealed that inattention significantly predicts GPA after controlling for anxiety, anxiety related disorders, depression, alcohol use and substance abuse, with higher attention deficits associated with lower GPAs. When perception of academic achievement (i.e., "My knowledge of the material I learned in school was greater than what was reflected in my grades") was compared across groups, participants in the ADHD and Non-ADHD diagnosis groups reported significantly less confidence in their academic performance compared to participants in the comparison group.

One potential explanation for these findings is that although inattention does affect GPA, it does not matter what the primary cause of inattention is. For example, inattention caused by ADHD, depression, life stress or a medical condition (e.g., hypoglycemia) will similarly impair academic performance. Despite their inattention, however, college students with ADHD and other mental health diagnoses in the current sample are performing adequately, and comparably to their peers without a mental health diagnosis in college. Upon closer examination of mean GPAs across diagnostic groups, participants in the ADHD group appear to be performing in the "B" range on average, as are participants in the non-ADHD diagnosis and comparison groups. Perhaps individuals with a mental health diagnosis who attend college possess high cognitive abilities and mature coping skills, both of which might mediate the relationship between inattentive symptoms and academic performance.

Despite being accepted into college and earning a good GPA, however, participants in the ADHD and Non-ADHD diagnosis groups perceive their academic performance more negatively than participants in the comparison group. One potential explanation is that college students with

ADHD and other mental health diagnoses possess more negative academic perceptions than college students without a mental health diagnosis because they actually do struggle to keep up with academic demands and have to work harder than their peers to achieve good grades (Gray, Fettes, Woltering, Mawjee & Tannock, 2015). Indeed, the literature indicates that college students with ADHD struggle on a day to day basis with timed tests, completing tests and assignments on time, taking longer to complete assignments, time management and organizational difficulties (Lewandowski, Lovett, Codding & Gordon, 2008; Reaser, Prevatt, Petscher & Proctor, 2007). ADHD is also associated with academic impairment like lower graduation rates and higher likelihood of academic probation (Gray, Fettes, Woltering, Mawjee & Tannock, 2015). Anxiety and depression also predict lower graduation rates among college students (Eisenberg, Golberstein & Hunt, 2009; Mark, 2009). Therefore, the non-significant findings related to GPA do not necessary indicate that college students with ADHD and other mental health disorders do not struggle academically; rather, they possess higher intellectual ability and/or find ways to compensate for their struggles in order to maintain their GPA.

Even though college students with ADHD struggle with daily tasks like time management and organization, it is likely that their academic self-concept is more negative than is warranted given that they are doing well academically and likely possess high abilities. There is ample support that children and adolescents with ADHD struggle academically (Daley & Birchwood, 2010; Ek, Westerlund, Holmberg & Fernell, 2010); however, it could be that children with ADHD, especially the children who possess above average cognitive ability and/or academic skills and who are eventually accepted into college, are perceived more negatively regarding their academic skills than is warranted. If parents and teachers regard their child with ADHD as academically challenged despite their ability, it makes sense that the child would

develop a poor academic self-concept. Eisenberg and Schneider (2007) examined teacher and parent perceptions of the ADHD child's academic skills in reading and math compared to teacher and parent perceptions of the non-ADHD child's academic skills in reading and math, after controlling for test scores in reading and math. The academic skills of girls with ADHD were perceived to be substantially lower by parents and teachers than girls without ADHD despite actual test scores. Similar results were found among boys with ADHD; however, the findings were less pronounced. College students with ADHD who possess a negative academic self-concept might struggle more with day-to-day tasks than those with a more positive academic self-concept.

At the same time, students who participated in the current study might represent a unique subsample of college students diagnosed with ADHD and/or comorbid mental health disorders. Samples were limited to participants who completed both phases of the study, and participants who completed both phases of the study might be more motivated, as well as more stable and better adjusted, than participants who dropped out of the study before completing phase II. Additionally, the incentive for participating in the study was an assessment report outlining potential mental health diagnoses, as well as treatment recommendations. It is possible, therefore, that students more interested in seeking help and resources were more likely to be participants. These participants' level of motivation, as well as their desire for help and resources, could parallel their academic behaviors. They might be more motivated in their classes and more willing to seek help from professors, peers, etc. than the general population of college students with ADHD and/or comorbid disorders and, as a result, their GPAs are higher.

Only four students (two in the ADHD group and two in the non-ADHD diagnosis group) in the overall sample reported receiving accommodations through the disability resource center

on campus. This is congruent with previous research studies that suggest that college students with ADHD do not often utilize the resources available to them because these students do not believe they need them or because they are not offered adequate accommodations (Parker, Hoffman, Sawilowsky & Rolands, 2011; Sparks, Javorsky & Philips, 2005). The low number of students in the study receiving accommodations may also be explained by the fact that services at the disability resource center were not available to these students since they had not received a diagnosis of ADHD or any other mental health disorder prior to the study. Another hypothesis is that participants in the current sample are utilizing other resources on campus (tutoring, the learning center, counseling, etc.) to help buffer their GPA, or that they do not need accommodations on account on their high cognitive ability, compensatory strategies and levels of motivation that positively impact their GPA.

GPAs of college students taking medication for mood, anxiety and other mental health disorders were compared to GPAs of college students not taking medication among participants diagnosed with ADHD and/or a separate mental health disorder. No significant group differences were found, suggesting that medication did not buffer the effects of mood and anxiety symptoms on academic performance among participants in the ADHD and Non-ADHD diagnosis groups in the current sample. However, the consistency with which the medication is taken among participants, which would certainly impact its effectiveness, was not assessed in the current study. GPAs of college students taking ADHD medication versus not taking ADHD medication were not compared because only 11 participants in the current sample were taking ADHD medication. There is some support, however, that ADHD medication does not improve GPA among college students with self-reported ADHD (Advokat, Lane and Luo, 2011).

Social Functioning

The second hypothesis proposed that college students diagnosed with ADHD would report significantly lower relationship depth and support, and significantly higher relationship conflict, than college students not diagnosed with ADHD. This hypothesis was not supported, as relationship depth, support and conflict did not differ across the ADHD, Non-ADHD diagnosis and comparison groups. When negative social qualities (i.e., "I do not have much patience with people") were compared across groups, however, participants screened into the ADHD and Non-ADHD diagnosis group reported significantly more negative social qualities than participants screened into the comparison group. Results of several exploratory hierarchical multiple regressions (HMR) revealed that inattention and hyperactivity/impulsivity do not significantly predict relationship support, depth or conflict after controlling for anxiety, anxiety related disorders, alcohol abuse and substance abuse. Depression significantly predicted relationship support, however, with higher levels of depression predicting lower levels of relationship support. Additionally, anxiety and depression both significantly predicted relationship depth, with higher levels of depression predicting decreased depth and higher levels of anxiety predicting increased depth.

One hypothesis for the lack of group differences between the ADHD and comparison group on relationship characteristics is that college students diagnosed with ADHD lack confidence in their social skills, possibly as a result of negative peer or familial interactions in childhood (Deault, 2009; Harold et al., 2013; Hoza, 2007; Rosen et al., 2014); but that their social skills are not as impaired as they once were or as they perceive. Research supports the notion that hyperactive/impulsive symptoms associated with ADHD become generally less severe with age; thus, college students are less likely to talk excessively, interrupt the activities

of others or interrupt the conversations of others by blurting out answers and/or changing the topic of conversation. In one study assessing the frequency of positive and negative adjectives associated with a diagnosis of ADHD, researchers discovered that individuals diagnosed with ADHD described other individuals with ADHD much more negatively than individuals without a diagnosis of ADHD described them (Chew, Jensen & Rosen, 2009), supporting the idea that adults with ADHD perceive themselves more negatively than might be accurate.

Alternatively, it is possible that college students with ADHD continue to struggle in their social interactions with acquaintances, but that they are still able to form close friendships over time. Most of the studies that have examined social functioning of college students with ADHD have relied on measures of social skills, social adjustment or general social impairment and not functioning within a single relationship; however, in studies examining impairment in romantic relationships among college students with ADHD no impairment was found (Sacchetti & Lefler, 2014). Chew, Jensen and Rosen (2009) also found that participants who have more frequent contact with individuals diagnosed with ADHD endorsed significantly fewer negative adjectives about ADHD than participants who do not have frequent contact with individuals diagnosed with ADHD. These findings support the idea that individuals with ADHD are able to form intimate relationships with others despite the possibility that they continue to exhibit social deficits that negatively impact their relationships with acquaintances.

Upon closer examination of who each participant completed the QRI about, a large majority of participants completed the QRI about their best friend or their roommate, both of which are intimate relationships. It makes sense that one's best friend would be more empathic and understanding about ADHD and/or comorbid symptoms than an acquaintance would given the many years spent together and shared interests, personality traits and values that typically

comprise close friendships. Similarly, college roommates are typically forced to work together, compromise and share personal information, all of which builds intimacy, understanding and compassion.

College students with a mental health diagnosis might also rely on their roommates for the structure and support they lost in moving away from their parents and high school friends. They might study with their roommates, receive reminders about assignments/tests from their roommates and rely on their roommates for motivation to attend class and perform self-care activities (e.g., eating, sleeping, etc.), especially in the case of college students diagnosed with a depressive disorder. The structure and support provided by roommates could be another potential explanation for the adequate GPAs among college students in the ADHD and Non-ADHD diagnosis groups in the current sample. That is, the structure and support provided by roommates and close friends might help mediate the relationship between ADHD and/or comorbid symptoms on academic performance.

Emotional Functioning

The third hypothesis stated that college students diagnosed with ADHD would report significantly higher levels of depression, anxiety, substance use and alcohol use than college students not diagnosed with ADHD. Results of the current study support this hypothesis. College students diagnosed with ADHD did report significantly higher depression, anxiety, anxiety related disorders (e.g., obsessive compulsive disorder, PTSD), drug use and alcohol use than college students in the comparison group, which is consistent with other studies (Blasé, Gilbert, Anastopoulos, Costello, Hoyle, Swartzwelder & Rabiner, 2009; Shaw-Zirt, Popali-Lehane, Chaplin & Bergman, 2005); however, college students with a diagnosis of ADHD reported similar emotional distress to students diagnosed with other mental health disorders.

Upon closer examination of the frequencies of mental health diagnoses in both the ADHD and Non-ADHD diagnosis groups (See Table 1), it appears that both groups of participants met criteria for a wide variety of mental health diagnoses at similar frequencies, except that the ADHD group had a higher percentage of eating disorders, panic disorder and undifferentiated somatoform disorder than the Non-ADHD diagnosis group. Frequencies also demonstrate that, like other studies have concluded, major depressive disorder (MDD) is one of the most common comorbid diagnosis associated with ADHD (McGough et al., 2005; Secnik, Swensen & Lage, 2005). Even though about half the participants in both the ADHD and Non-ADHD diagnosis groups were diagnosed with major depressive disorder, it should be noted that participants in the ADHD group were diagnosed with recurrent forms of MDD, as well as MDD with severe and severe with psychotic features specifiers, at a higher frequency than participants in the non-ADHD diagnosis group.

It is possible that poor academic and social self-concepts among individuals diagnosed with ADHD contribute to comorbid symptomatology. If one does not believe they possess normative academic and social skills, it is more likely that they will attend to shortcomings associated with ADHD (e.g., taking longer to complete a test than their peers, getting distracted during a conversation) and will be less likely to notice strengths (e.g., cognitive ability, determination, coping skills) and positive outcomes (e.g., good test grades, the ability to build a close friendship over time, etc.). More frequently attending to shortcomings and negative outcomes can certainly impact the development of anxiety and depression. Anxiety and depression will further compromise academic and social skills, which will lead to even poorer academic and social self-concepts. In the current study, anxiety and depression significantly influenced the level of depth and support received within close friendships, whereas inattention

and hyperactivity/impulsivity did not. This finding suggests that mood and anxiety symptoms are more problematic in intimate relationships than ADHD symptoms.

Academic, Social and Emotional Functioning Across ADHD Subtype and Sex

Hypotheses 4-8 stated that college students diagnosed with ADHD-C would report higher levels of relationship impairment and emotional distress than students diagnosed with ADHD-I. Additionally, it was expected that females with ADHD would report higher levels of depression and anxiety than males with ADHD while males with ADHD would report higher levels of drug and alcohol use than females with ADHD. No group differences were found across relationship variables or emotional distress variables, except that females with ADHD reported significantly higher alcohol use than males with ADHD in the current sample.

Given that a majority of college students with ADHD in the current sample earned an adequate GPA and reported healthy levels of relationship depth, support and conflict it is not surprising that group differences in academic achievement and relationship characteristics were not discovered among the two ADHD subtypes. Additionally, while inattention significantly predicted GPA in the current study hyperactivity/impulsivity did not. It makes sense, therefore, that both subtypes of ADHD would struggle academically as a result of attention deficits, and that the hyperactive/impulsive symptoms associated with a combined type diagnosis only would not contribute to any additional impairment.

Further, hyperactive/impulsive symptoms typically decrease in adulthood. Indeed, only four symptoms of hyperactivity/impulsivity are required for a diagnosis of ADHD, combined type in adulthood whereas six symptoms are required for a diagnosis in childhood. Thus, many of the social difficulties associated with hyperactivity/impulsivity, such as interrupting the activities of others or conversations are less likely to occur in adulthood and therefore less likely

to cause impairment in social relationships beyond the impairment caused by attention deficits (e.g., being easily distracted during a conversation, forgetting an event, etc.).

There have been very few studies in which emotional and social functioning among ADHD subtype has been examined; however, results of the few studies that have been conducted reveal that participants diagnosed with ADHD-C and ADHD-I do not report significantly different levels of anxiety, depression or self-esteem (Nelson, 2011; Nelson & Gregg, 2012). Results of the current study are consistent with findings from previous studies, except that females with ADHD reported more alcohol use than males with ADHD in the current sample. It is possible that females are better reporters of their alcohol use than males are, and that male participants in the current study underreported their alcohol consumption as a consequence. Women might be more accurate reporters of their alcohol use because they are likely more aware of their alcohol intake. That is, females probably monitor their eating and drinking habits more diligently than men do in general. Additionally, females might have to more closely observe their alcohol consumption than males do for safety reasons. For instance, college females are more likely to be sexually victimized than college males are (Hines, Armstrong, Palm & Cameron, 2012), especially when intoxicated (Mouilso & Fischer, 2012).

Clinical Implications

The current study is an important contribution to the body of literature examining academic, social and emotional functioning of college students with ADHD. Namely, it is one of the few research studies in which participants were classified into ADHD and non-ADHD groups based on diagnoses via a comprehensive evaluation. Additionally, the current study utilized reliable and valid measures and addressed academic, social and emotional functioning across sex and two ADHD subtypes. Initial findings indicate that if researchers rely solely on a

self-reported diagnosis of ADHD and/or ADHD screening measures, participants will be incorrectly classified into ADHD and non-ADHD groups, which might result in inaccurate findings related to academic, social and emotional outcomes of college students with ADHD.

Indeed, unlike findings from other studies assessing the functioning of college students with ADHD, results of the current study indicate that college students with ADHD are functioning relatively well in academic and social domains compared to their peers without ADHD. At the same time, clinicians should be aware that attention deficits do affect GPA, and students with and without ADHD can struggle with attention problems. Thus, clinicians should teach skills to manage attention deficits and/or introduce computer programs meant to increase focus to their inattentive clients. On-campus resources like tutoring, the learning center and the office of disability accommodations should be common referrals offered to these students as well.

Additionally, it seems likely that even though college students with ADHD are faring well in academic and social domains, that they experience day-to-day impairment in academic functioning related to difficulties with time management and organizational skills, etc. Further, college students with ADHD seem to experience negative social interactions with acquaintances. It is important, therefore, that clinicians address these issues and teach skills to help manage academic and social difficulties. Clinicians should also recognize that these students' academic and social problems might be partially explained by a poor academic and social self-concept and associated comorbid symptomatology like anxiety and depression.

Indeed, clinicians should keep in mind that college students with ADHD and other mental health disorders may have lower academic and social self-concepts than are warranted given their relative success in college. Every attempt should be made to strengthen these students' self-

concept by exploring and normalizing previous and current academic failures and social interactions that might contribute to their self-concept, as well as by helping them to realize that they are resilient and functioning well in college despite negative experiences. Clinicians should focus on client strengths and compensatory strategies, as well as their ability to form intimate relationships in an effort to bolster self-concept. Given that comorbid symptoms like anxiety and depression most likely contribute to academic difficulties, negative social interactions and problems within close friendships, clinicians should treat these symptoms as well.

Limitations

There are several limitations to the current study that warrant discussion. For instance, about half of the current sample was comprised of individuals who identified as European-American (White), which is double that of any other ethnicity represented in the sample. Also, 75% of the current sample was between the ages of 18-20. Males, comprising 36% of the sample, were also underrepresented. Future research might attempt to include a more diverse sample.

The second limitation of the study was the small sample size of the ADHD group. Initially researchers wanted to examine subtype and sex differences among the ADHD sample utilizing parametric statistics. Nonparametric statistics had to be conducted, however, as a result of the small sample size. Unfortunately nonparametric tests do not have the power to detect significant group differences that parametric tests do. In the future, researchers should ensure that there is an adequate sample size to conduct parametric tests in an effort to make sure that there is enough power to detect significant effects. Additionally, the current study did not include college students with ADHD, Primarily Hyperactive/Impulsive type because only three students in the current study were diagnosed with ADHD-H.

Another limitation of the current study was the difficulty that some participants had in remembering childhood ADHD symptomatology, which could have impacted the identification of ADHD in participants. Finally, although researchers utilized the CPT-IP in the current study to aid in diagnosing ADHD, the instrument did not appear to discriminate between ADHD and non-ADHD participants well. Indeed, most participants in the current study performed in the average range on the CPT-IP tasks regardless of ADHD symptomatology.

Directions for Future Research

The current study did not examine any other variables associated with academic achievement besides GPA. Future researchers could examine the frequency of classes dropped and withdrawn from among college students diagnosed with ADHD and not diagnosed with ADHD to gain a greater understanding of the way individuals with ADHD are impacted academically. Future researchers might also want to inquire about type of classes being taken and academic majors among college students with ADHD compared to their peers, as individuals with ADHD might take less rigorous classes, and because their classes are easier they are able to maintain an adequate GPA.

In general, future research studies should focus on compensatory strategies that college students with ADHD are utilizing to function well in college. Indeed, very little is known about how college students with ADHD succeed; rather, the literature is focused on how college students with ADHD struggle. For example, future researchers should obtain information about any on-campus resources that college students with ADHD are utilizing to help maintain their GPA. Past mental health and medication treatment should also be explored as a possible reason that college students with ADHD are able to function well academically and socially. The roles that cognitive ability, roommates and close friends play in helping college students diagnosed

with ADHD and other mental health disorders maintain their GPA should also be assessed. Future research studies could also examine what types of academic and social experiences are predictive of a poor academic and social-self concept among college students with a mental health disorder.

As part of the comprehensive evaluation to identify ADHD and non-ADHD participants in future studies, researchers should ask parents to complete a valid and reliable retrospective measure of ADHD symptoms in order to gain the most accurate description of childhood ADHD symptoms. It would also be helpful if a roommate, close friend or relative completed the Conners' Adult ADHD Rating Scale-Observer Form to further assess current ADHD symptomatology. Additionally, future researchers should include a neuropsychological measure other than the CPT-IP as part of the comprehensive evaluation to diagnose ADHD. A neuropsychological task that is administered for longer than 10 minutes and that includes more indices of attention and hyperactivity/impulsivity, like the CPT-II, might be more appropriate.

Appendix A

Consent Form A

University of North Texas Institutional Review Board

Informed Consent

Before agreeing to participate in this research study, it is important that you read and understand the following explanation of the purpose, benefits and risks of the study, and how it will be conducted.

Title of Study: Academic, Social and Emotional Functioning of College Students with Attention-Deficit/Hyperactivity Disorder (ADHD)

Student Investigator: Tara N. McKelvy, M.S. **Supervising Investigator**: Patricia L. Kaminski, PhD. Affiliation: Department of Psychology, University of North Texas (UNT).

Purpose of the Study: The main purpose of this study is to improve our understanding of academic, social and emotional functioning among college students with ADHD. In order to do so, all participants will be formally assessed for ADHD and comorbid disorders (e.g., depression, anxiety, substance abuse) using a variety of questionnaires, a computer assessment and structured interviews.

Study Procedures: There are two parts of this study. Both parts are required for investigators to make a mental health diagnosis of ADHD and comorbid disorders (e.g., depression, anxiety, substance abuse); thus, it is important that everyone is willing to participate in both parts of the study.

The initial portion of the study asks that you complete a packet of screening questionnaires that will take about 60-120 minutes. After completing them, a research assistant will get your contact information for the second portion of the study. The types of questions in the packet of screening questionnaires are related to demographics (for example, age, class year, GPA), attention, memory, and other symptoms of ADHD, alcohol and drug use, relationship satisfaction, personality and psychopathology (e.g., depression and anxiety).

If your scores on the screening measures indicate that you might meet criteria for a mental health diagnosis or diagnoses, you will be asked to return to Terrill Hall where the student clinician will ask you more detailed questions about your symptoms to find out if they are consistent with a mental health diagnosis. This private interview will take 30 to 120 minutes, depending on the number of symptoms you have. All student clinicians will be trained and supervised by Dr. Kaminski. So that the students can be supervised and the proper administration of the interviews monitored, interview sessions will be digitally video recorded through the Psychology Clinic's "Riverstick" system. You will sit off camera and care will be taken so that you do not disclose identifiable information (e.g., you will be addressed by your 1st name, you will not be asked about where you were born or other details that could potentially identify you).

Foreseeable Risks: The potential risks involved in this study are minimal. We expect that some participants may feel uncomfortable or experience mild distress when completing questionnaires during the screening phase of the study or answering interview questions about their feelings and mental health symptoms. If you would prefer not to answer a certain question, you can simply choose to skip it. Alternatively, should you experience such discomfort and wish to stop your participation, you may do so. Furthermore, the researcher will have a list of counseling resources available for every participant upon completion of each portion of the study and even if you chose to withdraw from the study, in case you wish to speak with a mental health professional or support group about any concerns. There is also potential risk of reputation if confidentiality is breached since participants are being asked to complete a measure related to illegal drug use. Every precaution will be taken, however, to ensure that participant confidentiality is maintained (See below for a detailed description of how confidentiality will be maintained).

Benefits to the Subjects or Others: This study may or may not result in direct benefits to you. Participants who are coping with mental health symptoms may find the list of resources you will be given today useful in finding a counselor or a support group. Participants who have many symptoms may find it beneficial to talk about their symptoms privately with a graduate-student-clinician during the interview portion of the study and learn about treatment options that could lessen their suffering and/or improve their quality of life. Your participation in this study is expected to benefit science by contributing to the understanding of academic, social and emotional functioning of ADHD.

Compensation for Participants: If you are asked to participate in the screening and interview phases of the study, your compensation will be a brief assessment report outlining all of your test results, which will detail whether or not you met formal diagnostic criteria for a variety of mental health diagnoses. This information can be considered compensation in that the type of formal interviews conducted typically cost $80-$125 per hour. If you are only asked to participate in the screening phase of the study (e.g., your scores on screening measures were not indicative of a potential mental health diagnosis/es), you will be entered into a drawing for a $50 Visa gift card after 75 people have been screened as compensation for participating in the study.

Procedures for Maintaining Confidentiality of Research Records: All of your information will be kept confidential (private) unless you are in immediate danger of harming yourself or others, inform us of a child, elderly, or disabled person being abused or neglected or reveal sexual exploitation by a mental health provider. Every survey packet will have a unique study identification number associated with it. That same number will also be recorded on your contact form, so that researchers will be able to contact you for the interview portion of the study. The contact form will <u>not</u> be kept in the same place as the survey packets in order to maintain complete confidentiality. Furthermore, our copy of your signed Consent Form will <u>not</u> be stored or associated with your survey packet or interview responses. Consent Forms, your responses, and your contact form will be kept in separate locked file cabinets in a locked room in Terrill Hall. Only study personnel will have access to data locked in the file cabinets. The confidentiality of your individual information will be maintained in any publications or presentations regarding this study. Per federal regulations, your de-identified data and signed consent forms will be stored separately and kept in a locked file cabinet in a locked room for 3 years after the conclusion of this study. Your contact information and the document that links

your name to your unique study code number, however, will be shredded at the conclusion of the interviews.

For Interview Portion of Study: Only Dr. Kaminski and the clinic director, Dr. Randy Cox, will have access to the digital video recordings of your interviews. You will be sitting off camera during these interviews and all mention of personally-identifying information will be avoided. These recordings will be deleted as soon as possible and no later than the end of the semester following your interview. Drs. Cox and Kaminski are both licensed psychologists who abide by the Ethical Guidelines of the American Psychological Association; thus, Dr. Cox will only be accessing videotapes to delete them and Dr. Kaminski will only be watching them to supervise student-clinicians and ensure that they are conducting interviews properly. The only exceptions to these situations would be if you are in immediate danger of harming yourself or others, inform us of a child, elderly, or disabled person being abused or neglected, or reveal sexual exploitation by a mental health provider. Assessment reports will include minimal identifying information (e.g., name, date of birth). The rationale for including identifying information is so that the assessment report can only be used by the participant. Each report will be written on a graduate student researcher's personal computer. As soon as the assessment report is completed, however, each participant's file will be deleted. In order to deliver assessment reports, each participant will also be asked to provide their mailing address on a self-addressed address card. The assessment report, along with the mailing address, will be sent via mail as soon as the report is completed. Thus, there will be no record of participants' assessment report or mailing address once reports are completed.

Questions about the Study: If you have any questions about the study, you may contact Tara N. McKelvy at 817-891-6626 or Patricia L. Kaminski at 940-565-2650.

Review for the Protection of Participants: This research study has been reviewed and approved by the UNT Institutional Review Board (IRB). The UNT IRB can be contacted at (940) 565-3940 with any questions regarding the rights of research subjects.

Research Participants' Rights:

Your participation in the survey confirms that you have read all of the above and that you agree to all of the following:

- A researcher has explained the study to you and you have had an opportunity to contact him/her with any questions about the study. You have been informed of the possible benefits and the potential risks of the study.
- You understand that you do not have to take part in this study, and your refusal to participate or your decision to withdraw will involve no penalty or loss of rights or benefits. The study personnel may choose to stop your participation at any time.
- Your decision whether to participate or to withdraw from the study will have no effect on your grade or standing in any UNT course.

- You understand why the study is being conducted and how it will be performed.
- You understand your rights as a research participant and you voluntarily consent to participate in this study.

_____
Printed Name of Participant

_____ _____
Signature of Participant Date

For the Student Investigator or Designee:

I certify that I have reviewed the contents of this form with the subject signing above. I have explained the possible benefits and the potential risks and/or discomforts of the study. It is my opinion that the participant understood the explanation.

_____ _____
Signature of Student Investigator or Designee Date

Consent Form B

University of North Texas Institutional Review Board

Informed Consent

Before agreeing to participate in this research study, it is important that you read and understand the following explanation of the purpose, benefits and risks of the study, and how it will be conducted.

Title of Study: Academic, Social and Emotional Functioning of College Students with Attention-Deficit/Hyperactivity Disorder (ADHD)

Student Investigator: Tara N. McKelvy, M.S. **Supervising Investigator**: Patricia L. Kaminski, PhD. Affiliation: Department of Psychology, University of North Texas (UNT).

Purpose of the Study: The main purpose of this study is to improve our understanding of academic, social and emotional functioning among college students with ADHD. In order to do so, all participants will be formally assessed for ADHD and comorbid disorders (e.g., depression, anxiety, substance abuse) using a variety of questionnaires, a computer assessment and structured interviews.

Study Procedures: There are two parts of this study. Both parts are required for investigators to make a mental health diagnosis of ADHD and comorbid disorders (e.g., depression, anxiety, substance abuse); thus, it is important that everyone is willing to participate in both parts of the study.

The initial portion of the study asks that you complete a packet of screening questionnaires that will take about 60-120 minutes. After completing them, a research assistant will get your contact information for the second portion of the study. The types of questions in the packet of screening questionnaires are related to demographics (for example, age, class year, GPA), attention, memory, and other symptoms of ADHD, alcohol and drug use, relationship satisfaction, personality and psychopathology (e.g., depression and anxiety).

If your scores on the screening measures indicate that you might meet criteria for a mental health diagnosis or diagnoses you will be contacted by a student clinician to schedule an interview in which you will be asked more detailed questions about your symptoms to find out if they are consistent with a mental health diagnosis. This private interview will take 30 to 120 minutes, depending on the number of symptoms you have, and will take place in the Psychology Clinic, research lab or via Skype. Graduate student researchers will conduct interviews in the Psychology Clinic and/or research lab, and the student investigator will conduct interviews via Skype when possible, as well as in the research lab. All student clinicians will be trained and supervised by Dr. Kaminski. When interviews are conducted in the Psychology Clinic, interview sessions will be digitally video recorded through the Psychology Clinic's "Riverstick" system so that the students can be supervised and the proper administration of the interviews monitored. You will sit off camera and care will be taken so that you do not disclose identifiable information

(e.g., you will be addressed by your 1st name, you will not be asked about where you were born or other details that could potentially identify you). Similarly, if the interview is conducted in the research lab, your interview will be video recorded and saved to a DVD-R, and identifiable information will be avoided. Interviews conducted via Skype will not be video recorded.

Foreseeable Risks: The potential risks involved in this study are minimal. We expect that some participants may feel uncomfortable or experience mild distress when completing questionnaires during the screening phase of the study or answering interview questions about their feelings and mental health symptoms. If you would prefer not to answer a certain question, you can simply choose to skip it. Alternatively, should you experience such discomfort and wish to stop your participation, you may do so, and if you are enrolled in a psychology course that requires research credits you will earn one research credit for each portion of 30 minutes that you participated in the study. Furthermore, the researcher will have a list of counseling resources available for every participant upon completion of each portion of the study and even if you chose to withdraw from the study, in case you wish to speak with a mental health professional or support group about any concerns. There is also potential risk of reputation if confidentiality is breached since participants are being asked to complete a measure related to illegal drug use. Every precaution will be taken, however, to ensure that participant confidentiality is maintained (See below for a detailed description of how confidentiality will be maintained).

Benefits to the Subjects or Others: This study may or may not result in direct benefits to you. Participants who are coping with mental health symptoms may find the list of resources you will be given today useful in finding a counselor or a support group. Participants who have many symptoms may find it beneficial to talk about their symptoms privately with a graduate-student-clinician during the interview portion of the study and learn about treatment options that could lessen their suffering and/or improve their quality of life. Your participation in this study is expected to benefit science by contributing to the understanding of academic, social and emotional functioning of ADHD.

Compensation for Participants: Depending on how much time you spend, you will earn 2-4 "SONA" research participation points today (for Part 1) and an additional 1-4 credits for Part 2 if you are currently enrolled in a psychology course that requires or accepts them. The number of credits depends on how much time you spend on the questionnaires and/or interview (1 credit per ½ hour). In addition, if you are chosen & participate in Part 2, you can choose to learn if you did or did not meet formal diagnostic criteria for a variety of mental health diagnoses. This information can be considered compensation in that the type of formal interviews conducted during Part 2 typically cost $80-$125 per hour. However, in order for us to know which interview results belong to you, you will need to record your unique study code number and contact Tara McKelvy, M.S. at 817-891-6626 between 10 business days and 3 months from the date of your interview. It is important to note that the only way Ms. McKelvy will be able to share that information with you is if you know your unique study code number.

Procedures for Maintaining Confidentiality of Research Records: All of your information will be kept confidential (private) unless you are in immediate danger of harming yourself or others, inform us of a child, elderly, or disabled person being abused or neglected or reveal

sexual exploitation by a mental health provider. Every survey packet will have a unique study identification number associated with it. That same number will also be recorded on your contact form, so that researchers will be able to contact you for the interview portion of the study. The contact form will not be kept in the same place as the survey packets in order to maintain complete confidentiality. Furthermore, our copy of your signed Consent Form will not be stored or associated with your survey packet or interview responses. Consent Forms, your responses, and your contact form will be kept in separate locked file cabinets in a locked room in Terrill Hall. Only study personnel will have access to data locked in the file cabinets. The confidentiality of your individual information will be maintained in any publications or presentations regarding this study. Per federal regulations, your de-identified data and signed consent forms will be stored separately and kept in a locked file cabinet in a locked room for 3 years after the conclusion of this study. Your contact information and the document that links your name to your unique study code number, however, will be shredded at the conclusion of the interviews.

For Interview Portion of Study: Only Dr. Kaminski and the clinic director, Dr. Randy Cox, will have access to the digital video recordings of your interviews on Riverstick. You will be sitting off camera during these interviews and all mention of personally identifying information will be avoided. These recordings will be deleted as soon as possible and no later than the end of the semester following your interview. Similarly, only Dr. Kaminski will have access to the video recordings of the interviews conducted in the research lab, and identifying information will be avoided. Drs. Cox and Kaminski are both licensed psychologists who abide by the Ethical Guidelines of the American Psychological Association; thus, Dr. Cox will only be accessing videotapes to delete them and Dr. Kaminski will only be watching them to supervise student-clinicians and ensure that they are conducting interviews properly. The only exceptions to these situations would be if you are in immediate danger of harming yourself or others, inform us of a child, elderly, or disabled person being abused or neglected, or reveal sexual exploitation by a mental health provider. Skype interviews will not be video recorded. The student investigator, however, is well trained in structured interviews and other assessment techniques and does not require the level of supervision the graduate student researchers do. All Skype interviews will be conducted in clinician's private office to insure that confidentiality is maintained. If you want to know if you did or did not meet criteria for the mental health diagnoses we are asking about during interviews, you can contact Ms. McKelvy (anonymously) & tell her your unique study code number (so your datafile can be located) and correctly answer a few demographic questions (so your "identity" can be verified). In this way, no one but you will be able to determine your mental health diagnoses.

Questions about the Study: If you have any questions about the study, you may contact Tara N. McKelvy at 817-891-6626 or Patricia L. Kaminski at 940-565-2650.

Review for the Protection of Participants: This research study has been reviewed and approved by the UNT Institutional Review Board (IRB). The UNT IRB can be contacted at (940) 565-3940 with any questions regarding the rights of research subjects.

Research Participants' Rights:

Your participation in the survey confirms that you have read all of the above and that you agree to all of the following:

- A researcher has explained the study to you and you have had an opportunity to contact him/her with any questions about the study. You have been informed of the possible benefits and the potential risks of the study.
- You understand that you do not have to take part in this study, and your refusal to participate or your decision to withdraw will involve no penalty or loss of rights or benefits. The study personnel may choose to stop your participation at any time.
- Your decision whether to participate or to withdraw from the study will have no effect on your grade or standing in any UNT course.
- You understand why the study is being conducted and how it will be performed.
- You understand your rights as a research participant and you voluntarily consent to participate in this study.

_____
Printed Name of Participant

_____ _____
Signature of Participant Date

For the Student Investigator or Designee:

I certify that I have reviewed the contents of this form with the subject signing above. I have explained the possible benefits and the potential risks and/or discomforts of the study. It is my opinion that the participant understood the explanation.

_____ _____
Signature of Student Investigator or Designee

Appendix B

Demographic Survey

1. Gender: (1) ☐Male (2) ☐Female

2. Ethnicity: (1) ☐Asian American (4) ☐Latin American (Hispanic)
(2) ☐African American (Black) (5) ☐Native American (Indian)
(3) ☐European American (Caucasian) (6) ☐Other

3. Age: _____ years old

4. Class Rank: (1) ☐Freshman (3) ☐Junior
(2) ☐Sophomore (4) ☐Senior

5. GPA: _____

6. How would you classify your sexual orientation?

(1) ☐Straight/heterosexual (2)☐ Gay/homosexual (3)☐ Bisexual (4)☐ Questioning/Unsure

7. Have you ever been diagnosed with Attention-Deficit/Hyperactivity Disorder, sometimes called ADHD, ADD, or Hyperactivity?

(1) ☐Yes (2) ☐No

8. If answered "yes" to question #7, are you currently taking ADHD medication?

(1) ☐ Yes (2) ☐ No

9. If yes, please list the medication(s) and dosage(s):

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10. If you answered "yes" to question 6, to the best of your recollection, at what age were you diagnosed with ADHD? _____

10a. Who diagnosed you with ADHD? (e.g., psychologist, pediatrician, doctor, etc.)_____

11. Have you ever been diagnosed with a Learning Disability (e.g., reading disorder, dyslexia, math disorder, disorder of written expression)?

(1) ☐ Yes (2) ☐ No

12. If you answered "yes" to question #10, to the best of your recollection, at what age were you diagnosed with a learning disability? _____

12a. Who diagnosed you with a learning disability? (e.g., counselor at school, psychologist etc.)_____

13. Have you ever repeated a grade?

(1) ☐ Yes (2) ☐ No

14. Did you ever receive special education services at school?

(1) ☐ Yes (2) ☐ No

If yes, what was your eligibility?	(1) Yes	(2) No
a. Orthopedically Impaired	☐	☐
b. Other Health Impaired	☐	☐
c. Auditorially Impaired	☐	☐

d. Visually Impaired	☐	☐
e. Deaf-Blind	☐	☐
f. Mentally Retarded	☐	☐
g. Emotionally Disturbed	☐	☐
h. Learning Disabled	☐	☐
i. Speech Impaired	☐	☐
j. Autistic	☐	☐
k. Traumatic Brain Injury	☐	☐

15. If yes, what grade did you begin receiving special education services? _____

16. Do you currently receive accommodations with the Office of Disability Accommodations (ODA)?

(1) ☐ Yes (2) ☐ No

17. If you answered "yes" to question #16, what do you receive accommodations for (e.g., ADHD, Learning Disability)?

_____

18. Are you currently taking any medications? (1) ☐ Yes (2) ☐ No

19. If yes, please list the name of the medication(s) and dosage(s).

_____
_____

20. Have you ever been diagnosed with any of the following?

	(1) Yes	(2) No	(3) Suspected
a. Generalized Anxiety	☐	☐	☐
b. Post Traumatic Stress Disorder	☐	☐	☐

c. Social Anxiety	☐	☐	☐
d. Obsessive Compulsive Disorder	☐	☐	☐
e. Bulimia Nervosa	☐	☐	☐
f. Anorexia Nervosa	☐	☐	☐
g. Major Depressive Disorder	☐	☐	☐
h. Dysthymia	☐	☐	☐
i. Bipolar Disorder	☐	☐	☐
j. Schizophrenia	☐	☐	☐

21. If you answered "yes" to any disorder listed in question #18, how old were you when first diagnosed? _____

22. If you answered "yes" to any disorder listed in question #18, who were you diagnosed by?

☐ School counselor/psychologist (LSSP, Ph.D.)

☐ Other counselor/psychologist (M.S., Ph.D., Psy.D.)

☐ Psychiatrist (M.D.)

☐ Family physician/general practitioner (M.D.)

☐ Other (please specify _____)

23. Has anyone in your family ever been diagnosed with any of the following?

	(1) Yes	(2) No	(3) Suspected
a. Generalized Anxiety	☐	☐	☐
b. Post Traumatic Stress Disorder	☐	☐	☐
c. Social Anxiety	☐	☐	☐
d. Obsessive Compulsive Disorder	☐	☐	☐
e. Bulimia Nervosa	☐	☐	☐
f. Anorexia Nervosa	☐	☐	☐
g. Major Depressive Disorder	☐	☐	☐

h. Dysthymia	☐	☐	☐
i. Bipolar Disorder	☐	☐	☐
j. Schizophrenia	☐	☐	☐

24. If you answered "yes" to any disorder in question #23, please specify family members diagnosed with each disorder below

_____
_____

Table 1

Frequencies and Percentages of Comorbid Diagnoses (N = 80)

	ADHD group (*n* = 35)		Non-ADHD diagnosis group (*n* = 45)	
	n	%	*n*	%
Major Depressive Disorder	18	51.43%	24	53.33%
Generalized Anxiety Disorder	6	17.14%	11	24.44%
Social Phobia	6	17.14%	16	35.56%
Obsessive Compulsive Disorder	3	8.57%	5	11.11%
Dysthymia	1	2.86%	7	15.56%
Posttraumatic Stress Disorder	4	11.43%	3	6.67%
Anxiety Disorder NOS	2	5.71%	0	0%
Panic Disorder	7	20%	3	6.67%
Adjustment Disorder	2	5.71%	4	8.89%
Depressive Disorder NOS	1	2.86%	3	6.67%
Specific Phobia	2	5.71%	4	8.89%
Anorexia Nervosa	1	2.86%	0	0%
Bulimia Nervosa	1	2.86%	0	0%
Eating Disorder NOS	2	5.71%	2	4.44%
Bipolar I Disorder	0	0%	2	4.44%
Bipolar II Disorder	1	2.86%	0	0%

Substance Dependence	4	11.43%	4	8.89%
Substance Abuse	3	8.57%	1	2.22%
Alcohol Dependence	2	5.71%	4	8.89%
Alcohol Abuse	0	0%	4	8.89%
Schizoaffective Disorder	1	2.86%	1	2.22%
Undifferentiated Somatoform Disorder	2	5.71%	0	0%

Table 2

Frequencies and Percentages of Categorical Variables (N = 125)

	n	%
Sex		
Male	36	28.8
Female	89	71.2
Ethnicity		
Asian-American (Asian)	6	4.8
African-American (Black)	16	12.8
European-American (White)	63	50.4
Latin-American (Hispanic)	25	20
Other	15	12
Sexual Orientation		
Straight/Heterosexual	102	81.6
Gay/Homosexual	11	8.8
Bisexual	12	4.8
Questioning/unsure	5	4
Academic Level		
Freshman	34	27.2
Sophmore	20	16
Junior	31	24.8
Senior	40	32
ADHD Diagnosis		
ADHD Diagnosis	27	21.6
No Diagnosis	98	78.4

Learning Disability (LD) Diagnosis		
LD Diagnosis	12	9.6
No Diagnosis	113	90.4
Major Depressive Disorder (MDD) Diagnosis		
MDD Diagnosis	15	12
No Diagnosis	100	80
Never diagnosed, but suspect I have the disorder	8	6.4
Dysthymia Diagnosis		
Dysthymia Diagnosis	2	1.6
No Diagnosis	116	92.8
Never diagnosed, but suspect I have the disorder	3	2.4
Bipolar Disorder Diagnosis		
Bipolar Disorder Diagnosis	7	5.6
No Diagnosis	112	89.6
Never diagnosed, but suspect I have the disorder	3	2.4
Social Phobia Diagnosis		
Social Phobia Diagnosis	5	4
No Diagnosis	105	84
Never diagnosed, but suspect I have the disorder	13	10.4
Generalized Anxiety Disorder (GAD) Diagnosis		
GAD Diagnosis	13	10.4

No Diagnosis	90	72
Never diagnosed, but suspect I have the disorder	21	16.8
Post-Traumatic Stress Disorder (PTSD) Diagnosis		
PTSD Diagnosis	2	1.6
No Diagnosis	110	88
Never diagnosed, but suspect I have the disorder	9	7.2
Obsessive Compulsive Disorder (OCD) Diagnosis		
OCD Diagnosis	2	1.6
No Diagnosis	109	87.2
Never diagnosed, but suspect I have the disorder	12	9.6
Anorexia Nervosa Diagnosis		
Anorexia Nervosa Diagnosis	3	2.4
No Diagnosis	117	93.6
Never diagnosed, but suspect I have the disorder	3	2.4
Bulimia Nervosa Diagnosis		
Bulimia Nervosa Diagnosis	2	1.6
No Diagnosis	117	93.6
Never diagnosed, but suspect I have the disorder	3	2.4
Schizophrenia Disorder Diagnosis		
Schizophrenia Disorder Diagnosis	0	0
No Diagnosis	121	96.8

Never diagnosed, but suspect I have the disorder	1	.8

Table 3

Frequencies and Percentages of Categorical Variables Across Diagnostic Groups (N = 125)

	ADHD Group (N =35)		Non-ADHD Diagnosis Group (n =45)		Comparison Group (N = 45)			
	n	%	*n*	%	*n*	%	χ^2	*p*
Sex							.65	.722
Male	11	31.4	14	31.1	11	24.4		
Female	24	68.6	31	68.9	34	75.6		
Ethnicity							6.13	.633
Asian-American (Asian)	0	0	2	4.4	4	8.9		
African-American (Black)	4	11.4	6	13.3	6	13.3		
European-American (White)	22	62.9	22	48.9	19	42.2		
Latin-American (Hispanic)	6	17.1	10	22.2	9	20		
Other	3	8.6	5	11.1	7	15.6		

Sexual Orientation							1.79	.617
	Straight/Heterosexual	28	80	33	73.3	41	91.1	
	Gay/Homosexual	3	8.6	6	13.3	2	4.5	
	Bisexual	3	8.6	3	6.7	0	0	
	Questioning/unsure	1	2.9	3	6.7	1	2.3	
Academic Level							6.61	.358
	Freshman	9	25.7	13	28.9	12	26.7	
	Sophomore	7	20	4	8.9	9	20	
	Junior	12	34.3	10	22.2	9	20	
	Senior	7	32	18	40	15	33.3	
ADHD Diagnosis (Self-Reported)								
	ADHD Diagnosis	16	45.7	9	20	2	4.4	
	No Diagnosis	19	54.3	36	80	43	95.6	
Learning Disability (LD) (Self-Reported)								
	LD Diagnosis	7	20	3	6.7	2	4.4	
	No Diagnosis	28	80	42	93.3	43	95.6	
Major Depressive Disorder (MDD)								

	MDD Diagnosis	7	20	1	2.2	1	2.2
	No Diagnosis	24	68.6	44	97.8	44	97.8
	Never diagnosed, but suspect I have the disorder	2	5.7	0	0	0	0
Dysthymia							
	Dysthymia Diagnosis	0	0	1	2.2	1	2.2
	No Diagnosis	32	91.4	44	97.8	44	97.8
	Never diagnosed, but suspect I have the disorder	0	0	0	0	0	0
Bipolar Disorder							
	Bipolar Disorder Diagnosis	4	11.4	0	0	0	0
	No Diagnosis	28	80	45	100	45	100
	Never diagnosed, but suspect I have the disorder	1	2.9	0	0	0	0
Social Anxiety Disorder							
	Social Anxiety Disorder Diagnosis	3	8.6	0	0	0	0
	No Diagnosis	27	77.1	45	100	45	100
	Never diagnosed, but suspect I have the disorder	4	11.4	0	0	0	0

Generalized Anxiety Disorder (GAD)						
GAD Diagnosis	6	17.1	1	2.2	1	2.2
No Diagnosis	19	54.3	43	95.6	43	95.6
Never diagnosed, but suspect I have the disorder	9	25.7	1	2.2	1	2.2
Post-Traumatic Stress Disorder (PTSD)						
PTSD Diagnosis	1	2.9	0	0	0	0
No Diagnosis	28	80	42	93.3	42	93.3
Never diagnosed, but suspect I have the disorder	3	8.6	3	6.7	3	6.7
Obsessive Compulsive Disorder (OCD)						
OCD Diagnosis	0	0	0	0	0	0
No Diagnosis	27	77.1	43	95.6	43	95.6
Never diagnosed, but suspect I have the disorder	7	20	2	4.4	2	4.4
Anorexia Nervosa						
Anorexia Nervosa Diagnosis	3	8.6	0	0	0	0
No Diagnosis	28	80	45	100	45	100

Never diagnosed, but suspect						
I have the disorder	3	8.6	0	0	0	0
Bulimia Nervosa Diagnosis						
Bulimia Nervosa Diagnosis	1	2.9	0	0	0	0
No Diagnosis	30	85.7	45	100	45	100
Never diagnosed, but suspect						
I have the disorder	2	5.7	0	0	0	0
Schizophrenia Disorder Diagnosis						
Schizophrenia Disorder			0	0	0	0
Diagnosis	0	0				
No Diagnosis	32	91.4	45	100	45	100
Never diagnosed, but suspect						
I have the disorder	1	2.9	0	0	0	0

Table 4

Means and Standard Deviations of Continuous Demographic Variables (*N*= 125)

	N	Mean	*SD*	Min	Max
Age	125	21.19	3.83	18	43

Table 5

Means and Standard Deviations of Continuous Demographic Variables by Diagnostic Groups (N = 125)

	ADHD group		Non-ADHD Diagnosis Group		Comparison Group	
	n	%	n	%	n	%
Age	35	20.86	45	21.11	45	21.53

Table 6

Means and Standard Deviations of Continuous Measures

	N	Mean	*SD*	Min	Max	Skewness	Kurtosis
PAI Anxiety Scale	125	28.33	14.55	3.00	64.00	.30	-.58
PAI Anxiety Related Disorders	125	26.82	11.72	2.00	57.00	.35	-.21
PAI Depression Scale	125	23.90	12.48	.00	60.00	.49	-.11
SASSI Face Valid Alcohol	125	3.73	4.52	.00	18.89	1.53	2.16
SASSI Face Valid Drug	122	3.53	5.99	.00	23.00	1.80	2.18
GPA	125	3.24	.63	1.00	5.06	-.64	1.26
QRI Support Subscale	125	3.38	.56	1.57	4.00	-1.35	1.90
QRI Conflict Subscale	125	1.60	.47	1.00	3.08	.98	.55
QRI Depth Subscale	125	2.99	.62	1.33	4.00	-.61	.03

Note: PAI = Personality Assessment Inventory; SASSI = Substance Abuse Subtle Screening Inventory; GPA = grade point average; QRI = Quality of Relationships inventory

Table *7*

Correlation Matrix of Measured Variables (N = 125)

	1	2	3	4	5	6	7	8	9
1. GPA	--	.147	-.010	.018	-.066	-.009	-.142	-.111	-.186*
2. QRI Depth	.147	--	.014	.710**	.098	.023	-.097	-.117	-.182*
3. QRI Conflict	-.010	.014	--	-.265*	.176*	.243**	.295**	.107	.194*
4. QRI Support	.018	.710**	-.265*	--	-.113	-.171*	-.292**	-.016	-.123
5. PAI Anxiety	-.066	.098	.176*	-.113	--	.776**	.700**	.094	.161*
6. PAI ANX Related Disorders	-.009	.023	.243**	-.171*	.776**	--	.643**	.122	.241**
7. PAI Depression	-.142	-.097	.295**	-.292**	.700**	.643**	--	.113	.243**
8. SASSI Alcohol	-.111	-.117	.107	-.016	.094	.122	.113	--	.546**
9. SASSI Drug	-.186*	-.182*	.194*	-.123	.161*	.241**	.243**	.546**	--

Note. 1 = Grade Point Average (GPA); 2 = Quality of Relationship Inventory Depth scale; 3 = Quality of Relationship Inventory Conflict scale; 4 = Quality of Relationship Inventory Support scale; 5 = Personality Assessment Inventory Anxiety scale; 6 = Personality Assessment Inventory Anxiety Related Disorders scale; 7 = Personality Assessment Inventory Depression scale; 8 = Substance Abuse Subtle Screening Inventory Face Valid Alcohol scale; 9 = Substance Abuse Subtle Screening Inventory Face Valid Drug scale; ** $p < .01$.

Table 8

Reliability Analysis of Subscales (N = 125)

Subscale	Mean Inter-Item Correlation	α
PAI Anxiety Scale (24 items)	.34	.93
PAI Anxiety Related Disorders (24 items)	.20	.86
PAI Depression Scale (24 items)	.28	.90
SASSI Face Valid Alcohol (24 items)	.42	.87
SASSI Face Valid Drug (24 items)	.32	.79
ADSA Disorganized Behavior Scale (20 items)	–	.80
ADSA Negative Social Scale (7 items)	–	.65
ADSA Academic Theme (2 items)	.24	_
ADSA Attention Concentration Scale (13 items)	–	.86
QRI Depth Scale (6 items)	.44	.82
QRI Support Scale (7 items)	.46	.85
QRI Conflict Scale (12 items)	.34	.86
BADDS Attention Scale (9 items)	.52	.91
CAARS Inattention/Memory Problems Scale (12 items)	.50	.92
CAARS Hyperactivity Impulsivity Scale (12 items)	.40	.90
CAARS DSM-IV Inattention Scale (9 items)	.54	.92
CAARS DSM-IV Hyperactivity Impulsivity Scale (9 items)	.39	.85

CAARS ADHD Index Scale (11 items)	.38	.87

Note. PAI = Personality Assessment Inventory; ADSA = Attention Deficit Scales for Adults; QRI = Quality of Relationships Inventory; CAARS = Conners' Adult ADHD Rating Scales; BADDS = Brown Attention Deficit Disorder Scales

Table 9

ANOVA Comparing GPA Across ADHD, Non-ADHD Diagnosis and Comparison groups (N = 125)

	Sum of Squares	df	Mean Square	F
Regression	1.41	2	.71	1.64
Residual	47.00	109	.43	
Total	48.41	111		

*p < 0.5

Table 10

Chi Square Test of Independence Examining GPA Across Medication Status (N = 80)

	High GPA		Low GPA			
	n	%	*n*	%	χ^2	*p*
Medication					.00	.990
Yes Medication	14	58.3	10	41.7		
No Medication	32	58.2	23	41.8		

Note. ADHD and Non-ADHD diagnosis groups only

Table 11

Chi Square Test of Independence Examining GPA Across When a Participant was Diagnosed with ADHD (N = 80)

	High GPA		Low GPA			
	n	%	*n*	%	χ^2	*p*
					.04	.845
Previous ADHD Diagnosis	10	58.8	7	41.2		
Current ADHD Diagnosis	10	55.6	8	44.4		

Note. ADHD and Non-ADHD diagnosis groups only

Table 12

ANOVA Comparing Academic Theme Across ADHD, Non-ADHD Diagnosis and Comparison groups (N = 125)

	Sum of Squares	df	Mean Square	F
Regression	122.78	2	61.39	20.80*
Residual	324.66	110	2.95	
Total	447.43	112		

*$p < 0.05$

Table 13

ANOVA Comparing Negative Social Across ADHD, Non-ADHD Diagnosis and Comparison groups (N = 125)

	Sum of Squares	df	Mean Square	F
Regression	333.40	2	167.20	10.16*
Residual	1809.57	110	16.45	
Total	31136.00	113		

*$p < 0.05$

Table 14

MANOVA Comparing Emotional Distress Across ADHD, Non-ADHD Diagnosis and Comparisons groups (N = 125)

	df	SS	MS	*F*	Sig.	Partial Eta Square
PAI Anxiety	2, 118	8201.99	4101.00	29.19	.000	.33
PAI Anxiety Related Disorders	2, 118	4335.74	2167.87	21.78	.000	.27
PAI Depression	2, 188	5252.90	2626.45	22.77	.000	.28
SASSI Face Valid Drug	2, 118	447.02	223.51	6.60	.000	.10
SASSI Face Valid Alcohol	2, 118	525.76	262.88	7.44	.000	.11

Table 15

MANOVA Comparing Relationship Characteristics Across ADHD, Non-ADHD Diagnosis and Comparison groups (N = 125)

	df	SS	MS	*F*	Sig.	Partial Eta Square
QRI Support	2, 122	.10	.05	.16	.850	.00
QRI Conflict	2, 122	1.04	.52	2.40	.100	.04
QRI Depth	2, 122	.15	.08	.20	.820	.00

Table 16

Mann-Whitney Us Comparing Emotional Distress Across Sex of ADHD Sample (N = 35)

Variable	Men (n = 24)	Women (n = 11)		
	Mean Rank	Mean Rank	*U*	*p*
PAI Anxiety	19.54	14.64	169.00	.188
PAI Anxiety Related Disorder	18.40	17.14	141.50	.735
PAI Depression	18.94	15.95	154.50	.423
SASSI Face Valid Alcohol	17.71	17.00	125.00	.849
SASSI Face Valid Drug	17.38	19.36	117.00	.591

Table 17

Mann-Whitney Us Comparing Relationship Characteristics Across ADHD Subtype (N = 33)

Variable	ADHD-C (n = 17)	ADHD-I (n = 16)		
	Mean Rank	Mean Rank	*U*	*p*
QRI Support	15.00	12.21	66.00	.348
QRI Conflict	14.54	12.61	71.50	.518
QRI Depth	14.62	12.54	70.50	.483

Table 18

Mann-Whitney Us Comparing Relationship Characteristics Across Sex of ADHD Sample (N = 35)

Variable	Female (n = 24)	Male (n = 11)		
	Mean Rank	Mean Rank	*U*	*p*
QRI Support	17.46	19.18	119.00	.639
QRI Depth	19.23	15.32	161.50	.290
QRI Conflict	18.81	16.23	151.50	.486

Table 19

Mann-Whitney U Comparing GPA Across ADHD Subtype (N = 26)

Variable	ADHD-C (n = 12)	ADHD-I (n = 14)		
	Mean Rank	Mean Rank	*U*	*p*
GPA	13.75	13.29	81.00	.877

Table 20

Hierarchical Multiple Regression Analysis with Inattention and Hyperactivity/Impulsivity Predicting GPA after Controlling for Emotional Distress (N = 125)

Variable	*B*	*SE B*	*Beta*	*t*	*p*
Dependent Variable: GPA					
Step 1					
Constant	3.36	.14		24.69	.000
PAI Anxiety	.00	.01	-.01	-.04	.970
PAI Anxiety Related Disorders	.01	.01	.17	1.24	.219
PAI Depression	-.01	.01	-.01	-.04	.056
SASSI Face Valid Alcohol	-.02	.01	-.12	-1.30	.195
SASSI Face Valid Drug	-.00	.01	-.04	-.39	.696
Step 2					
Constant	3.47	.15		23.62	.000
PAI Anxiety	.00	.01	.07	.48	.634
PAI Anxiety Related Disorders	.01	.01	.14	1.00	.318
PAI Depression	-.01	.01	-.15	-1.22	.225
SASSI Face Valid Drug	-.01	.01	-.09	-.97	.333
SASSI Face Valid Alcohol	.00	.01	.00	.03	.976
CAARS-Inattentive	-.02	.01	-.24	-2.01	.046
CAARS-Hyperactivity/Impulsivity	-.00	.01	-.01	-.09	.930
Overall $F(7, 140) = 2.05$, $p = .053$					

Note: $R^2 = .31$ for Step 1; $\Delta R^2 = .04$ for Step 2.

Table 21

Hierarchical Multiple Regression with Inattention and Hyperactivity/Impulsivity Predicting Relationship Support after Controlling for Emotional Distress (N = 125)

Variable	*B*	*SE B*	*Beta*	*t*	*p*
	Dependent Variable: QRI Support				
Step 1					
Constant	3.62	.12		29.103	.000
PAI Anxiety	.01	.01	.19	1.34	.182
PAI Anxiety Related Disorders	-.00	.01	-.06	-.426	.671
PAI Depression	-.02	.01	-.38	-3.25	.001
SASSI Face Valid Alcohol	.01	.01	.11	1.19	.238
SASSI Face Valid Drug	-.01	.01	-.05	-.54	.592
Step 2					
Constant	3.589	.14		26.239	.000
PAI Anxiety	.01	.01	.17	1.130	.261
PAI Anxiety Related Disorders	-.00	.01	-.04	-.30	.764
PAI Depression	-.02	.01	-.42	-3.34	.001
SASSI Face Valid Drug	.01	.01	.10	1.06	.291
SASSI Face Valid Alcohol	-.01	.01	-.66	-.68	.496
CAARS-Inattentive	.01	.01	.11	.90	.371
CAARS-Hyperactivity/Impulsivity	-.00	.01	-.02	-.20	.843
	Overall $F(7, 140) = 2.58$, $p = .016$				

Note: $R^2 = .34$ for Step 1; $\Delta R^2 = .01$ for Step 2.

Table 22

Hierarchical Multiple Regression with Inattention and Hyperactivity/Impulsivity Predicting Relationship Conflict after Controlling for Emotional Distress (N = 125)

Variable	*B*	*SE B*	*Beta*	*t*	*p*
	Dependent Variable: QRI Conflict				
Step 1					
Constant	1.286	.10		12.51	.000
PAI Anxiety	-.01	.01	-.18	-1.28	.203
PAI Anxiety Related Disorders	.01	.01	.23	1.73	.086
PAI Depression	.01	.01	.26	2.25	.026
SASSI Face Valid Alcohol	.00	.01	.01	.05	.960
SASSI Face Valid Drug	.01	.01	.07	.71	.476
Step 2					
Constant	1.308	.11		11.65	.000
PAI Anxiety	-.01	.01	-.18	-.18	.226
PAI Anxiety Related Disorders	.01	.01	.26	.26	.051
PAI Depression	.01	.01	.20	.20	.109
SASSI Face Valid Drug	.00	.01	.01	.10	.920
SASSI Face Valid Alcohol	.01	.01	.06	.06	.537
CAARS-Inattentive	.01	.01	.17	.17	.143
CAARS-Hyperactivity/Impulsivity	-.01	.01	-.16	-.16	.135
	Overall $F(7, 140) = 3.068$, $p = .005$				

Note: $R^2 = .13$ for Step 1; $\Delta R^2 = .02$ for Step 2.

Table 23

Hierarchical Multiple Regression Analysis with Inattention and Hyperactivity/Impulsivity Predicting Relationship Depth after Controlling for Emotional Distress (N = 125)

Variable	*B*	*SE B*	*Beta*	*t*	*p*
	Dependent Variable: QRI Depth				
Step 1					
Constant	2.98	.13		22.35	.000
PAI Anxiety	.02	.01	.38	2.56	.011
PAI Anxiety Related Disorders	-.00	.01	-.01	-.08	.938
PAI Depression	-.02	.01	-.33	-2.79	.006
SASSI Face Valid Alcohol	-.00	.01	-.01	-.10	.920
SASSI Face Valid Drug	-.01	.01	-.08	-.83	.406
Step 2					
Constant	2.93	.15		19.98	.000
PAI Anxiety	.02	.01	.35	2.29	.024
PAI Anxiety Related Disorders	-.00	.01	-.01	-.08	.935
PAI Depression	-.02	.01	-.34	-2.66	.009
SASSI Face Valid Drug	-.00	.01	-.02	-.23	.817
SASSI Face Valid Alcohol	-.01	.01	-.09	-.94	.351
CAARS-Inattentive	.00	.01	.03	.21	.838
CAARS-Hyperactivity/Impulsivity	.01	.01	.06	.54	.591
	Overall $F(7, 140) = 1.994$, $p = .060$				

Note: $R^2 = .091$ for Step 1; $\Delta R^2 = .00$ for Step 2.

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