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

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Attention-deficit/hyperactivity disorder (ADHD) is a complicated psychiatric disorder that is typically first diagnosed in childhood and associated with negative outcomes in adulthood such as poor academic performance and difficulties with social relationships. ADHD can be difficult to accurately diagnose in adulthood, given the absence of clear, agreed upon ADHD symptomology in adults. In the current study, two raters used psychometrically sound instruments and diagnostically valid assessment techniques on an archival dataset to create three distinct groups: ADHD [2/3 with other mental health diagnosis (OMH)], OMH only, and no diagnosis. Findings support the value of comprehensive assessment, combined with a thorough evaluation of the material by a trained clinician, for the accurate diagnosis of ADHD for research purposes. Comparisons were made across groups to infer that college students with ADHD have lower grade point averages and academic self-concept than students without mental health diagnoses. Yet, contrary to much of the current literature, college students with ADHD seem to create as strong, deep, supportive and harmonious relationships with loved ones and close friends as their non-diagnosed peers. Clinicians working with college students with ADHD may use the results of the current study to better inform conceptualization, better recognize the innate resilience college students with ADHD likely have, and inform treatment interventions.

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CHAPTER 1

INTRODUCTION

Attention-deficit/hyperactivity disorder (ADHD) is a complicated psychiatric disorder that is typically first diagnosed in childhood (American Psychiatric Association, 2013) and is associated with negative outcomes if not treated (Frazier, Youngstrom & Glutting, 2007). Per the *Diagnostic and Statistical Manual of Mental Disorders- Fifth Edition (DSM-5)*, diagnostic criteria for ADHD include: inattentive, hyperactive and impulsive behaviors that significantly impair functioning at school, work, social settings or home (American Psychiatric Association, 2013).

George Still first described this grouping of impairment in 1902 (Attention, 2017; Still, 1909). The first DSM labeled this same grouping of symptoms as, "minimal brain dysfunction" (American Psychiatric Association, 1952). The second edition referred to "hyperkinetic reaction to childhood" (American Psychiatric Association, 1968). Finally, in the third edition, "attention deficit disorder" was defined (American Psychiatric Association, 1980). The fourth and fifth editions include diagnostic criteria for three presentations of attention deficit/hyperactivity disorder (APA, 2013).

The three presentations of ADHD are: attention-deficit/hyperactivity disorder, predominantly inattentive type (ADHD-I), attention-deficit/hyperactivity disorder, predominantly hyperactive-impulsive type (ADHD-HI) and attention-deficit/hyperactivity disorder, combined type (ADHD-C) (APA, 2013). Individuals with ADHD can be diagnosed at any age; however, given the developmental nature of the disorder, individuals must have shown evidence of ADHD symptomatology across two settings before the age of 12 to receive diagnosis (APA, 2013).

Inattention symptoms include, "[making] careless mistakes," failing to "follow through on instructions," "[having] difficulty organizing tasks and activities," and becoming "easily distracted by extraneous stimuli" (APA, 2013, p. 59). Hyperactive and impulsive symptoms include, fidgeting, running or climbing at inappropriate times, excessive talking, and difficulty waiting (APA, 2013). Children with ADHD are more likely to experience mild developmental delays, have low frustration tolerance and struggle to stabilize their moods. These symptoms often lead children with ADHD to experience more familial conflict and have more negative peer and familial interactions (APA, 2013).

Prevalence of ADHD Diagnoses in Children

For the past two decades there has been an upward trend in the diagnosis of ADHD among individuals between the ages of 5 and 18 (Robison, Sclar & Skaer, 2005). Prevalence rates of ADHD range from 9.6% to 19.7% according to the DSM-IV-TR (Sibley et al., 2012). Yet, according to a 2007 metaregression analysis, ADHD prevalence rates should be around 5.29%. Specifically, researchers utilized well over 9,000 records, almost 200 research studies and included 171,756 subjects, to compute this statistic (Polanczyk, Silva de Lima, Horta, Biderman & Rohde, 2007). In 2011, however, Visser et al. determined that over 11% of children and adolescents aged 4 to 17 years had ever received an ADHD diagnosis (Visser et al., 2014). This upward trend in diagnosis in the U.S. has led researchers, clinicians, and even the general public to be concerned about over diagnosis and overmedication of children (Olfson, Gameroff, Marcus & Jensen, 2003). Moreover, the number of American youth taking medication for ADHD increased by 28% from 2007 to 2011. These upward trends in ADHD diagnosis and treatment have been documented from about 1987 (Lane, 2015; Olfson, Gameroff, Marcus & Jensen, 2003; Reuters, 2015; Schwarz & Cohen, 2013; Visser et al., 2014).

Regardless of the upward trend in diagnosis, boys are consistently diagnosed about three times more often than girls (Singh, 2008; Staller & Faraone, 2006; Poissant, Emond & Joyal, 2008). Yet, there is still debate as to why boys are diagnosed at higher rates than girls. Some argue that boys are more susceptible to having the disorder. Others argue that is simply more likely for boys to receive the diagnosis because of the relatively higher activity levels that are seen more in boys than girls (Staller & Faraone, 2006).

ADHD Diagnosis in Adulthood

The debate about whether or not adult ADHD exists began in the 1970's, when researchers started to realize that ADHD symptomatology could persist past puberty and into adulthood (Barkley, 1990; DuPaul, Guevermont & Barkley, 1991). Researchers have since explained the clear decrease seen in hyperactive symptoms as a transition from externalized restless to internalized restlessness (Kessler et al., 2006; Weyandt et al., 2003). In 2003, researchers assessed the usefulness of determining internal restlessness as a clinical indicator to diagnose ADHD in adults. After confirming the diagnosis of 20 college students with ADHD and 20 college students without ADHD or another mental health disorder, researchers gave participants the Internal Restless Scale (IRS) (Weyandt et al., 2003). The IRS utilizes a 7-point Likert scale to measure subjective feelings of restlessness. Items include, "I dislike sitting still" and "I feel mentally calm" (Iwaszuk et al., 1997). College students with ADHD endorsed these types of items significantly more than their non-ADHD peers (Weyandt et al., 2003).

When considering the notion that an accurate childhood ADHD diagnosis could be "outgrown", some researchers have taken an etiological and biological approach to demonstrate that ADHD persists (Castellanos et al., 1994; Goodman & Stevenson, 1989; Hynd, Semrud-Clikeman, Lorys, Novey & Eliopulous, 1990; Sheehan et al., 2005). Using MRI technology, the

same abnormalities have been identified in the brains of children and adults diagnosed with ADHD (Hynd, Semrud-Clikeman, Lorys, Novey & Eliopulous, 1990). Moreover, researchers compared MRI scans of the brains of 30 children with either ADHD, dyslexia or no diagnosable mental health disorder. Children with ADHD have abnormalities in their frontal lobe, as compared the other two groups. The frontal lobe is associated with executive functioning and attention (Hynd, Semrud-Clikeman, Lorys, Novey & Eliopulous, 1990). Another study that utilized MRI technology came to similar conclusions, finding that the volume of the right caudate, in the brains of 50 male participants with ADHD, ranging in age from 6 to 19yrs., was smaller than the right caudate in the matched comparisons. The right caudate is associated with executive functioning and the reward system (Castellano et al., 1994).

Furthermore, it is widely accepted that ADHD is a heritable disorder. Heritability indicates that there is likely a genetic component to the presence of ADHD symptomatology within an individual (Levy, Hay, McStephen, Wood & Waldman, 1997; Thapar, Holmes, Poulton & Harrington, 1999). In a study that analyzed the genetic makeup of 179 families with at least one child with ADHD, researchers determined that there is an over transmission of allele T of marker rs1843809. Sheehan et al. (2005) explain that these extra alleles could be one way ADHD is transmitted from one generation to the next. Moreover, the alleles Sheehan et al. isolated slow the process of turning tryptophan into serotonin; and lower levels of serotonin are often associated with ADHD.

Further supporting the research that acknowledges the heritable component of ADHD is a longitudinal study conducted by Biederman et al. in 1992. In this study, 140 families who had children with ADHD and 120 families without were independently assessed for ADHD. Researchers also determined whether or not either of the parents experienced a chronic course of

ADHD symptomatology into adulthood and whether or not their children were correctly diagnosed with ADHD (Biederman et al., 1992). Four years later, another study was conducted on this original sample to determine the persistence of ADHD for the 128 children accurately diagnosed with ADHD in 1992 (Biederman et al., 1996). Follow up information indicated that 85% still experienced impairment and 15% no longer met criteria for ADHD due to a remission of typical ADHD symptomatology (Biederman et al., 1996). Children who were diagnosed with persistent ADHD were significantly more likely to have a parent also diagnosed with chronic ADHD (Biederman et al., 1996).

These findings are consistent with the discussion Hallowell and Ratey began in their book, *Driven to Distraction* (Hallowell & Ratey, 1994). They suggest that the symptoms experienced by adults who have ADHD should be seen as a logical outgrowth of the difficulties a child with ADHD would have experienced. Meaning, the adult with ADHD may still exhibit the typical triad of symptoms: inattention or distractibility, impulsivity, and hyperactivity or restlessness (Hallowell & Ratey, 1994). Resnick explains that the shift in symptomatology could be because of the increased demand on self-sufficiency, decorum, and responsibility in adulthood that does not exist in childhood. Furthermore, the change in symptom presentation could also be due to an increase of coping mechanisms over time and the tendency for individuals to mature cognitively and improve skills such as impulse control (Resnick, 2005).

ADHD in adulthood is often loosely described and divisive among the psychological assessment community (Barkley, 2006). One reason is that the field lacks an extensively validated test for assessment of ADHD at any developmental level and there is a lack of evidence-based methods for identifying ADHD in adulthood (Sibley et al., 2012). Further complicating the issue of diagnosing adults with ADHD is that one-third of children diagnosed

with ADHD experience remission and another third experience a steep decline in symptomatology, no longer meeting clinical criteria in young adulthood (Cherkasova, Ponde & Hechtman, 2012). These findings have lead some psychologists to believe that ADHD is a disorder of childhood. Other psychologists argue that the group of individuals who do experience a remission of ADHD symptoms are just a portion of the sample that have better mental health outcomes or stronger coping skills (Barkley, Murphy & Fischer, 2008).

Difficulty in Diagnosing ADHD

ADHD was originally thought to be a childhood disorder that affected individuals would "outgrow" (Adler & Cohen, 2004). Per the current research, however, many individuals continue to struggle with ADHD symptomatology well into adulthood (Barkley, Fischer, Smallish & Fletcher, 2002; Guzelow, Loya & Hinshaw, 2017; Sibley et al., 2016). Once proper assessment techniques are implemented and observer reports are included, ADHD impairment rates in adults can be around 60% in already diagnosed individuals (Sibley et al., 2016). Many general practitioners and psychiatrists acknowledge that they have difficulty in diagnosing this complicated disorder, missing key symptoms of ADHD in adults (Montano, 2004).

It is difficult, therefore, to find accurate prevalence rates of ADHD in the adult population. In a 2012 study, young adults without ADHD over reported their ADHD symptoms. The same study found that young adults with ADHD under reported their ADHD symptoms (Sibley, et al., 2016). Such findings explain why informant reports (e.g., romantic partners, roommates, parents), in combination with self-reports and other standardized assessment tools (e.g., CAARS-Self, ADSA, BADDS), are essential for accurate diagnosis of ADHD (Sibley, et al., 2012).

ADHD is also a complicated diagnosis to give to an adult because inattentiveness can be seen in various other disorders, including major depression, generalized anxiety, post-traumatic stress disorder, and a hypomanic episode (Milberger, Biederman, Faraone, Murphy, Tsuang, 1995). Differential diagnosis, therefore, is essential to an accurate assessment of ADHD in adulthood. Medical conditions that effect an individual's sleep or cognitions, such as sleep apnea, hypo- or hyperthyroidism, chronic headaches or seizure disorders, can also look like ADHD symptoms in adults. Typically, these symptoms have more overlap with inattentiveness (Lavenstern, 1995; Ball, Wooten & Crowell, 1999).

Additionally, inattentive symptoms seem to be more common than hyperactivity in the adult population. In a 2010 study that looked at the stability of ADHD from childhood through adulthood, per a physician-administered ADHD scale given to patients, 94.9% of the participants experienced inattentive symptoms into adulthood, while only 34.6% of the participants were still reporting hyperactive symptoms as an adult (Kessler et al., 2010).

Moreover, adults with ADHD do not seem to report some of their own impairments accurately. Researchers analyzed data from college students who were placed in three diagnostic groups: individuals who reported a childhood diagnosis of ADHD, individuals who reported a learning disability (LD) without an ADHD diagnosis, and the comparison group who reported neither an ADHD or LD diagnosis. Data received from self-reports was compared to the data researchers obtained from the full-battery assessment done on each participant at initial intake to the study. The results indicated that the awareness adults with ADHD have of their own impairments are significantly lower than the information that can be gleaned from a clinical evaluation (Manor, Vurembrandt, Rozen, Gevah, Weizman & Zalsman, 2012).

When using self-report measures alone, there is a high likelihood that the resulting diagnosis will have poor validity over time (Loney, Ledolter, Kramer & Volpe, 2007). In a longitudinal study of 295 boys seeking outpatient care for behavior and learning disorders, researchers assessed participants based on DSM-II diagnostic criteria and self-report measures. Participants' ratings of their own behavior and symptomatology were compared to the ratings by their peers at school and their brothers, who were not referred to treatment for learning or behavior disorders (Loney, Ledolter, Kramer & Volpe, 2007). Participants were evaluated at three different time periods: 8 to 10 years (Time 1), 13 to 15 years (Time 2), and 18 to 20 years (Time 3). At the two later time periods, participants were asked to retrospectively evaluate their behavior and symptomatology. Over the years, ADHD boys reported that their symptoms had improved drastically by early adulthood and that their behavior and symptomatology was no different than their peers. When the participant self-report measures were compared to the informant reports, however, little agreement was found. Siblings and peers consistently rated the participants' behavior to be more, "impulsive, fidgety, aggressive and … inattentive" than participants rated themselves to be (Loney, Ledolter, Kramer & Volpe, 2007).

Complicating ADHD diagnosis further is the finding that ADHD symptomatology is now commonly known and easily accessible on the internet (Jachimowicz & Geiselman, 2004). Additionally, many individuals could be motivated to feign ADHD within higher education because many accommodations exist for students who are diagnosed with learning disabilities or ADHD (Harrison, 2006). Academic supports can include extended time on tests, preferential seating in classrooms, course notes not offered to other students, and access to tutors. These supports and a growing awareness of disabilities in the United States has lead to an increase in

the request for evaluation and treatment of learning disorders and ADHD (Jachimowicz & Geiselman, 2004).

A limited amount of information was given to participants about ADHD symptomatology in a 2010 study, non-ADHD controls were easily able to produce clinically significant ADHD profiles on a self-report measure when incentivized to try to fool the researchers into believing that they truly had ADHD. When diagnosis was simply based off symptom checklists and ADHD rating scales alone, researchers gave the wrong diagnosis more often than when the Conners' Continuous Performance Task (C-CPT-II) was used (Sollman, Ranseen &Berry, 2010).

Despite support in the literature finding that continuous performance tests (CPTs) are less susceptible to bias than self-report measures and structured interviews, there is debate as to the validity and reliability of CPTs (Abikoff, Courtney, Pelham & Koplewicz, 1993; Christensen, Margolin & Sullaway, 1992; See, Howe, Warm & Dember, 1995). In a 2004 review of this computerized cognitive task used for diagnosing ADHD, authors attempted to define the convergent validity, discriminant validity and predictive validity of several popular CPTs (Nichols & Waschbusch, 2004). The authors found that despite the popularity of CPTs, there are extremely mixed findings when determining the validity of the tasks for eventual diagnosis of ADHD. CPTs discriminated ADHD and typical control groups, but were unable to differentiate ADHD groups from controls diagnosed with other disorders, such as Oppositional Defiant Disorder and Conduct Disorder (Nichols & Waschbusch, 2004). Additionally, participants with ADHD who were on stimulant medication were even less differentiable from clinical and non-clinical control groups (Nichols & Waschbusch, 2004).

There is also evidence to suggest that CPTs do not specifically test for executive functioning, inhibitory abilities or attention skills (Demurie, Roeyers, Wiersema & Songua-

Barke, 2016). This could be because CPTs are often boring, long and do not require much cognitive processing (Lufi & Pan, 2015). In a 2015 study that compared the clinical utility of two different CPTs, 41 adults with ADHD and 54 comparison adults completed the CPT-II, MATH-CPT and the Brown Attention Deficit Disorder Scale (BADDS). The researchers determined that the MATH-CPT was better able to recognize impulsivity and sustained attention. Using a multiple regression, the MATH-CPT as the dependent variable and the five clusters of the BADDS as the independent variable, the MATH CPT accounted for 24% of the variance, while the CPT-II did not account for a significant amount of variance. This could be because the MATH-CPT requires a greater amount of working memory and is able to better assess for a slower cognitive tempo (Lufi & Pan, 2015).

When assessing the adult population, there are several challenges that arise, apart from determining whether or not an individual meets current ADHD criteria (Adler & Cohen, 2004). Retrospective accounts of behavior are necessary for ADHD diagnosis because ADHD symptomatology must be present before the age of twelve (American Psychiatric Association, 2013). Unfortunately, these retrospective reports from the participant themselves, tend to be less specific to ADHD symptomatology and have poor predictive power (Suhr, Zimak, Buelow & Fox, 2009). In a 2009 study, participants were given numerous self-report measures to determine their mental health diagnoses. After the assessment data was analyzed, participants were divided into four groups: individuals who reported a previous diagnosis of ADHD, individuals who reported a previous diagnosis of ADHD and a comorbid psychological condition, individuals who reported a current psychological condition and no history of ADHD, and a psychological comparison group had neither a current psychological diagnosis nor a previous ADHD diagnosis. Based off the retrospective reports that participants gave researchers,

the high false positive percentage of 16% was determined for the group who reported that they had a mental health diagnosis other than ADHD (Suhr, Zimak, Buelow & Fox, 2009).

Academic Functioning of College Students with ADHD

Despite the fact that individuals with ADHD who attend college are more likely to have stronger behavioral techniques to compensate for their ADHD symptomatology and allow them to succeed academically beyond their peers who do not attend college, college students with ADHD are still more likely to struggle in college than their non-ADHD undergraduate peers (Pelham & Fabiano, 2008). There is much support in the literature that states that college students with ADHD experience more academic difficulty than their peers (Blasé, Gilbert, Anastopoulos, Costello, Hoyle & Swartzwelder; Heiligenstein, Guenther, Levy, Savino & Fulwiler, 1999; Lewandowski, Lovett, Codding & Gordon, 2008; Rabiner, Anastopoulos, Costello, Hoyle & Swartzwelder, 2008). The transition to college is difficult for many students. However, this is especially the case for college students with ADHD. Leaving their existing friends and family who are often a form of support and coping can be even more challenging when there is a loss of structure provided to them at home and in their high school classes (Buchanan, 2011).

In a meta-analysis completed in 2007, researchers analyzed 72 studies on children, adolescents, college students and adults and their academic abilities. Across the studies evaluated, individuals with ADHD exhibited significant differences, in the less successful direction, from controls in: achievement tests, reading measures, GPA, repeating a grade and dropping out of school (Frazier, Youngstrom & Glutting, 2007). This could be due to their difficulty with managing time and tendency to be more pleasure seeking. College students with ADHD may be more likely to not decline an invitation to a party, participate in athletics, and join

fraternities at the cost of their academic responsibilities (Buchanan, 2011; Wolf, Simkowitz & Carlson, 2009).

Researchers surveyed 50 college students with (n = 24) and without (n = 26) ADHD in a study looking at: academic performance, organization skills and executive functioning. College students with ADHD significantly differed from their peers by having lower test scores and poorer grades on assignments, poorer study skills and less organization overall (found through various self-report measures) (Weyandt et al., 2013). Weyandt et al. also noted that the largest discrepancy between ADHD and non-ADHD students, over 2 standard deviations apart, was in study and organizational skills (Weyandt et al., 2013). These findings were supported by an earlier study, completed in 2009, by Norwalk, Norvilitis and MacLean. They found that among psychology undergraduates, students with ADHD endorsed poorer study habits than their peers. Specifically, they completed assigned readings less often, and listened to music or watched television while studying more often (Norwalk, Norvilitis & MacLean, 2009). Unfortunately, college students are more likely to withdraw from classes (Rabiner, Anastopoulos, Costello, Hoyle & Swarzwelder, 2008).

Executive functioning particularly facilitates overall academic functioning (Wender, 1995) and college students with ADHD are known for struggling with executive functioning deficits (Antshel et al., 2010). Even having a higher IQ does not compensate for the difficulty college students with ADHD have with executive functioning, as compared to controls (Antshel, et al., 2010). In a 2010 study that assessed adults for IQ, using the Wechsler Adult Intelligence Scale – III, and other psychological differences, utilizing the Structured Clinicial Interview for DSM-IV, the Wisconsin Card Sorting Test and various self-reports, researchers analyzed data to better understand the executive functioning differences between adults with and without ADHD.

According to their findings, adults with high IQ and ADHD had less positive functional outcomes and performed less well on executive functioning tasks than those individuals tested who were not diagnosed with ADHD and also had high IQ scores (Antshel, Faraone, Maglione, Doyle, Fried, Seidman & Biederman, 2010). Yet, high IQ has also been shown to be a protective factor for students with ADHD (Turnock, Rosen & Kaminski, 1998). Students with ADHD and have higher IQ scores are more likely to complete high school and pursue some form of higher education. In the same study, the researchers determined that individuals with ADHD who are currently in college utilize less coping mechanisms than their peers who do not have ADHD (Turnock, Rosen & Kaminski, 1998).

Some of the executive functioning difficulties that adults with ADHD experience could be due to neurological differences in the way they encode during working memory tasks (Kim, Liu, Gilzer, Tannock & Woltering, 2014). Using various neuropsychological tasks measuring working memory performance, a delayed match-to-sample task and an electroencephalogram (EEG), researchers were able to accurately differentiate individuals who ineffectively allocated their attentional resources (unmedicated young adults with ADHD) form those who did not (controls) (Kim, Liu, Gilzer, Tannock & Woltering, 2014). These working memory deficits seen in individuals with ADHD could contribute to poorer academic performance and lower GPA (Gropper & Tannock, 2009).

Sluggish cognitive tempo and daytime sleepiness are also common in college students with ADHD (Langberg, Becker, Dvorsky, & Luebbe, 2014). Moreover, sleep disturbances are often found among individuals with ADHD (Sung, Hiscock, Sciberras & Efron, 2008). Among ADHD children, between 25% and 50% experience insomnia and 50% of adults with ADHD experience insomnia (Sung, Hiscock, Sciberras & Efron, 2008). A lack of sleep in the nighttime

contributes to sluggish cognitive tempo and sleepiness in the daytime. The combination of these two symptoms often result in significant impairment and difficulty with executive functioning tasks, such as missing or being late for school, and forgetting to do or turn in homework (Sung, Hiscock, Sciberras & Efron, 2008).

These difficulties can also be seen in the work force (Shifrin, Proctor & Prevatt, 2010). Just as executive functioning tasks are needed to be successful in school settings, so too, they are needed for a job in the professional world. Inattentive, hyperactive and impulsive symptoms have been shown to negatively affect work functioning and contribute to lower job performance ratings from the supervisors of individuals with ADHD (Barkley, Fischer, Smallish & Fletcher, 2006; Shifrin, Proctor & Prevatt, 2010).

Social Functioning of College Students with ADHD

Few clear findings appear within the literature on the social functioning of college students with ADHD (Green & Rabiner, 2012). One consistent finding, however, is that there is much literature that has indicated that individuals with ADHD experience more negative social relationships than their non-ADHD peers (Chew, Jensen & Rosen, 2009; Shaw-Zirt, Popali-Lehane, Chaplin & Bergman, 2005, Theriault & Holmberg, 2001).

In a study conducted in 2010, researchers sampled 397 college students in Ireland to assess ADHD symptomatology, emotional control, antisocial behaviors, social functioning and personality traits. Their findings suggested that ADHD college students, across gender and age, have an impaired ability to set and achieve realistic goals. Moreover, multiple regressions indicated that the presence of higher ADHD symptomatology negatively predicted responsibility over and above an individual with ADHD's ability to exert self-control (Gudjonsson, Sigurdsson, Gudmundsdottir, Sigurjonsdottir & Smari, 2010). Furthermore, in another college sample (N =

41), the non-ADHD peers of college students with ADHD had higher positive social behavior scores; and, more negative social behavior scores exist among female college students with ADHD than their male peers (Shaw-Zirt, Popali-Lehane, Chaplin & Bergman, 2005).

Additionally, across settings, individuals with ADHD experience increased negative bias that can lead to social rejection (Hoza et al., 2005). Researchers surveyed 257 undergraduates without ADHD on their perceptions of their peers. Results indicated that college students without ADHD were hesitant to work with their peers who have ADHD. Furthermore, male students with ADHD were given even less favorable social ratings than female students with ADHD (Canu, Newman, Morrow & Pope, 2015). In a similar study, females without ADHD gave more positive ratings and had more favorable attitudes towards their peers with ADHD than did males (Chew, Jensen & Rosen, 2009).

Despite the social stigma that college students with ADHD experience related to their diagnosis, many are still able to achieve social and academic success in college (Fuermaier, Tucha, Koerts, Mueller, Lange & Tucha, 2012). Greater parental support could be a determining factor of the success college students with ADHD exhibit (Grenwald-Mayes, 2002). In a small study conducted in 2010, 17 students with a previous diagnosis with ADHD and 19 controls were given self-report measures, and a CPT-II to confirm diagnosis and non-diagnosis of ADHD. ADHD and comparison groups were asked to report on their self-concept and well-being (Wilmhurst, Peele & Wilmhurst, 2011). College students with ADHD reported that they received the most emotional and academic support from their fathers, as opposed to their non-ADHD peers who reported that they receive the most support from their friends. The researchers argued that the parents of college students with ADHD may serve as a protective factor for their children

(Wilmhurst, Peele & Wilmhurst, 2011). A stronger mother-child relationship is another possible protective factor for college students with ADHD (Huggins, Rooney & Chronis-Tuscano, 2012).

Despite the fact that strong parent-child relationships serve as protective factor for individuals with ADHD, only 47% of a community sample of adults with self-reported ADHD endorsed having a strong relationship with their parents. This is significantly lower than what the comparison group reported for this study (Biederman, Faraone, Mick, Monuteaux & Aleardi, 2006). Participants with ADHD were evaluated by researchers to determine the risky sexual behaviors they participated in. Female college students with ADHD were more likely to participate in unprotected sex than their male and female peers without ADHD and their male peers with ADHD (Huggins, Rooney & Chronis-Tuscano, 2012). According to this same study on 92 undergraduate students, males with ADHD were also more likely to have more unfamiliar sexual partners than their non-ADHD counterparts (Huggins, Rooney & Chronis-Tuscano, 2012). Furthermore, adults with ADHD are more likely to divorce or never marry and experience more loneliness throughout the lifetime (Michielsen et al., 2015).

Furthermore, core symptoms of ADHD, such as inattention and impulsivity, can lead to more conflict in interpersonal relationships. Men who have more severe ADHD symptomatology are also more likely to use aggressive tactics, such as shoving or throwing objects at their partner (Theriault & Holmberg, 2001). In the same study, researchers determined that verbal impulsivity (i.e., vocal outbursts, talking over someone else and not waiting for the other person to finish speaking before responding) was another predictor of negative relationship outcomes for individuals with ADHD (Theriault & Holmberg, 2001). These impulsivity issues can compound when drugs and/or alcohol is involved. Indeed, adults with ADHD are significantly more likely to abuse drugs and/or alcohol than their non-ADHD peers (Murphy & Barkley, 1996).

Despite these findings, there is other research that indicates that the social functioning of college students with ADHD does not significantly differ from their non-ADHD peers (Blasé, Anastopoulos, Costello, Hoyle & Swartzwelder, 2009; Buchanan, 2011; Heiligenstein, Guenther, Levy, Savino & Fulwiler, 1999; Rabiner, Anastopoulos, Costello, Hoyle & Swartzwelder, 2008). In a study conducted in 2008 on the transition that freshman face into the college environment, 1,648 college freshman completed self-report measures that assessed their academic and social functioning. College students with ADHD reported that they were equally satisfied with their social lives as their non-ADHD peers, despite their report of depressive symptomatology and academic concerns (Rabiner, Anastopoulos, Costello, Hoyle & Swarzwelder, 2008). College students with ADHD believe that they are not more likely to feel lonely than their non-ADHD peers (Rabiner, Anastopoulos, Costello, Hoyle & Swarzwelder, 2008). Additionally, in a study of 64 undergraduate students, individuals with combined type ADHD, experienced increased ability to initiate a conversation with their peers, and increased ease with handing social situations than their peers without an ADHD diagnosis and individuals with inattentive type ADHD (Canu & Carlson, 2003).

Emotional Functioning of College Students with ADHD

Empirical findings about emotional functioning of college students with ADHD is also mixed (Green & Rabiner, 2012). Overall, much of the literature has determined that adults and college students diagnosed with ADHD have lower self-esteem and a greater likelihood of being diagnosed with an internalizing disorder (e.g., Blasé, Gilbert, Anastopoulos, Costello, Hoyle & Swarzwelder, 2009; Norwalk, Norvilitis & MacLean, 2009; Rabiner, Anastopoulos, Costello, Hoyle & Swartzwelder, 2008). These internalizing disorders have been noted across subtypes of ADHD. In a study assessing the emotional states of college students with ADHD, levels of

depression and anxiety did not significantly differ across subtypes of the disorder (Nelson & Gregg, 2012). In fact, individuals diagnosed with ADHD, across subtypes, are more likely to be diagnosed with mood and/or anxiety disorders (Kessler et al., 2006).

Moreover, college students with ADHD have more anxiety than their non-ADHD peers regarding their schooling and thoughts on future life plans (Prevatt, Dehili, Taylor & Marshall, 2015). In this 2015 study, researchers surveyed 473 college students, 204 of whom were diagnosed with ADHD. They determined that inattentive and hyperactive/impulsive symptomatology were equally predictive of anxiety. Furthermore, this population's anxiety can be characterized by concerns on grades, studying and taking tests (Prevatt, Dehili, Taylor & Marshall, 2015). Another notable finding from this same study is that freshman reported the lowest levels of anxiety, when compared to other students with ADHD in their sophomore, junior or senior years. Researchers postulated that this could be because as students age in college, they come closer and closer to needing to find a full-time job and be more self-sufficient (Prevatt, Dehili, Taylor & Marshall, 2015). This finding is not surprising in light of other research that indicates the significant difficulty adults with ADHD have with planning and organizing tasks (Buchanan, 2011).

Adults with ADHD also report that they experience higher levels of emotional dysregulation and emotional impulsivity than their non-ADHD peers (Mitchell, Robertson, Anastopolous, Nelson-Gray & Kollins, 2012). Depression, anxiety, and other internalizing disorders are seen more often in women with ADHD than men with ADHD (Quinn, 2005; Waite, 2007). On the other hand, men with ADHD are more likely to have conduct or oppositional defiant disorder, and other more externalizing disorders than women with ADHD (Quinn, 2005; Waite, 2007). The ADHD population may have an ineffective way of regulating

their negative emotions or dealing with stress. Moreover, adults with ADHD may be negatively reinforced more than non-ADHD individuals are for avoidant or escape behaviors (Mitchell, Robertson, Anastopolous, Nelson-Gray & Kollins, 2012).

Emotional lability is described by irascible moods with volatile and unstable emotions (American Psychiatric Association, 2013). Individuals with ADHD experience higher levels of emotional lability compared to their non-ADHD peers, which can impair their activities of daily living (i.e., managing money and hygiene or participating in sexually risky behaviors). Conversely, emotional lability is a strong predictor of an adult ADHD diagnosis (Skirrow & Asherson, 2013). Additionally, these emotion regulation deficits were confirmed in a 2015 study on 627 college students from a Southeastern university. Participants who reported less ability to emotionally regulate were also more likely to experience suicidal ideation. In addition, college students with ADHD who experience depressive symptomatology and decreased ability to set goals are at a greater risk of suicidal ideation (Van Eck, Ballard, Hart, Newcomer, Musci & Flory, 2015). In a 2005 study, researchers administered the Rosenberg Self-Esteem Scale to 21 college students diagnosed with ADHD, and 20 college students without an ADHD diagnosis. When groups were compared, students with ADHD reported lower levels of self-esteem and upon further analysis, researchers determined that self-esteem partially mediated the relationship between ADHD and difficulty adjusting to college (Shaw-Zirt, Popali-Lehane, Chaplin & Bergman, 2005).

Other studies have found few, if any, mental health differences between college students with and without ADHD (Heiligenstein, Guenther, Levy, Savino & Fulwiler, 1999; Nelson, 2011; Wilmhurst, Peele & Wilmhurst, 2011). In a study conducted in 2011 also focusing on self-esteem, researchers surveyed 95 undergraduate students with and without ADHD, as determined

by a comprehensive psychological assessment. Researchers determined that there are no significant differences between those with and without the disorder. Furthermore, researchers did not find a mental health difference between ADHD subtypes either (Nelson, 2011). Additionally, among students who self-referred to a university counseling center and subsequently agreed to be a part of a research study, adults with ADHD did not significantly differ on scales measuring depression and anxiety symptomatology from their non-ADHD peers (Heiligenstein, Guenther, Levy, Savino & Fulwiler, 1999).

Limitations of the Current Literature

Despite the growing interest in the ADHD population since the increase of diagnosis starting the late 1980's and increase in research since the 1990's, there is still limited information about college students with a current diagnosis or history of ADHD (Heiligenstein, Guenther, Levy, Savino & Fulwiler, 1999). Green & Rabiner, 2012; Olfson, Gameroff, Marcus & Jensen, 2003). So much of the ADHD research is mixed, that few decisive conclusions can be made (Green & Rabiner, 2012). For counseling psychologists and other mental health professionals at college counseling centers to maximize their effectiveness with college students with ADHD, more research needs to be done.

Furthermore, the current literature includes few studies that use the general college population (individuals without ADHD nor another mental health diagnosis) as a comparison. Instead, studies include comparison groups that have other clinical or subclinical diagnoses. This is in large part because researchers often recruit from college counseling centers (Green & Rabiner, 2012). Only comparing college students with ADHD to their peers who have other mental health concerns or diagnoses can mask the specific concerns of the former. This may be particularly important when assessing emotional, social and academic functioning. Finally, a

significant limitation of the current literature is that researchers do not account for common comorbid diagnoses among the college population diagnosed with ADHD (Green & Rabiner, 2012). When researchers fail to account for comorbid diagnoses, their findings may be falsely attributing poor outcomes to the individuals' ADHD diagnosis. Rigorous diagnostic methods to assess for ADHD or other mental health diagnoses are also essential for minimizing false negative attributions to individuals diagnosed with ADHD.

More research is still needed to support practitioners and psychiatrists attempting to diagnose ADHD in adulthood (Montano, 2004). The symptoms of ADHD that are readily observed in childhood (e.g., distractibility, impatience, and impulsivity) still distress adults; however, it is widely believed that adults are often able to develop coping mechanisms that mask their true difficulties (Adler, 2004). Outcome comparisons between individuals with and without ADHD, and individuals with and without other mental health disorders, could help expand the understanding of how ADHD symptomatology persists in adulthood.

Statement of Purpose

The purposes of the current study are to address the limitations in the literature by improving the diagnostic validity within an archival data set and use new diagnostic groupings to test for differences in academic, and social functioning across the following groups: 1) individuals with ADHD 2) individuals without a past or present diagnosis of ADHD who currently meet criteria for another mental health diagnosis or diagnoses, and 3) a comparison group of individuals who do not have a history of an ADHD diagnosis and do not currently have any mental health diagnoses. Comparisons will be made across academic, and social functioning.

Hypotheses

Hypothesis 1. College students with ADHD (ADHD group or Group 1) and college students with another mental health disorder (OMH Group or Group 2) have significantly lower grade point averages (registrar-reported and self-reported) than students in the Comparison group (comparison group or Group 3).

Hypothesis 2. College students with ADHD (Group 1) report lower academic self-concept than their non-ADHD peers (Groups 2 and 3), when both depression and anxiety symptomatology are controlled for.

Hypothesis 3. College students with ADHD (Group 1) and those with another mental health diagnosis (Group 2) report significantly less depth and less support, and more conflict, in their chosen significant social relationship than their peers in the comparison group (Group 3), when controlling for anxiety and depressive symptoms.

CHAPTER 2

METHOD

Participants

These data were collected through Dr. Kaminski's lab in 2014 and 2015 as part of an IRB approved study of self-reported academic and social functioning among college students with ADHD, students with other mental health disorders, and those with no diagnoses (McKelvy, 2015). Participants were recruited through flyers distributed around campus, announcements made in classes, and SONA (i.e., an online research pool where undergraduates can participate in psychology studies in exchange for extra credit in their psychology classes).

Of the original 165 students who completed the initial phase of online screening measures, 39 did not respond to requests to attend the second phase of the study that included additional questionnaires, structured diagnostic interviews, and a brief neuropsychological test (McKelvy, 2015). These 39 individuals were placed in the “drop out” group and were not included in the current primary analyses due to insufficient information for assignment to diagnostic groups.

The final sample of 126 students, 36 males (28.8%) and 89 females (71.2%), ranged in age from 18 to 43 years old (M = 21.19; SD = 3.83). The modal age was 18. 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). Over half of the participants identified as straight (81.6%; n = 102) while the remaining participants identified as gay (8.8%; n = 11), bisexual (4.8%; n = 6) or questioning/unsure (4%; n = 5). Class ranks are as follows: freshman (27.2%; n = 34), sophomores (16%; n = 20), juniors (24.8%; n = 31), and seniors (32%; n = 40).

Measures used for ADHD Re-Assessment

Demographic questionnaire. Data on participants' age, ethnicity, GPA, year in school and other identifying information was collected in a questionnaire that was prepared specifically for the 2014 study. The questionnaire prompted participants to report on their past mental health diagnoses, including ADHD, learning disorders, and current and past counseling. Participants also indicated if they were taking psychostimulant medication at the time of the assessment.

Conners' Adult ADHD Rating Scale (CAARS-Self). The CAARS-Self is a self-report measure used to help diagnose ADHD in individuals above the age of 18 (Conners, Erhardt & Sparrow, 1999). The CAARS-Self includes 66 questions that are divided into four factors: inattention/memory problems, hyperactivity/restlessness, impulsivity/emotional lability, and problems with self-concept, as well as subscales corresponding to the two categories of DSM-IV diagnostic criteria: Inattentive Symptoms and, Hyperactive-Impulsive Symptoms (Conners, Erhardt & Sparrow, 1999). The Conners' also includes a Total ADHD Symptoms scale. The self-Concept Scale measures an individual's difficulty with social relationships, self-esteem and, self-confidence (Conners, Erhardt & Sparrow, 1999).

The CAARS-Self has evidenced excellent internal reliability with alphas ranging from .86 to .92 on each of the four factors in previous clinical samples (Erhardt, Epstein, Conners, Parker & Sitarenios, 1999). In the dissertation study conducted by McKelvy (2015) used for current analyses, alphas ranged from .85 to .93 across the four factors (McKelvy, 2015). Test-retest reliabilities for the four factors have previously ranged from .88 to .91 (Erhardt, 1999). Criterion validity for the CAARS-Self was originally established through comparison to the Semistructured Interview for Adult ADHD, according to *t*-tests, the ADHD group scored significantly higher than the non-ADHD group (Erhardt, Epstein, Conners, Parker & Sitarenios,

1999). The CAARS-Self's Total ADHD Symptoms scale has approximately 82% accuracy for true ADHD cases and 87% accuracy for non-ADHD cases (Taylor, Deb & Unwin, 2011). Finally, Adler, Spencer, Stein and Newcorn (2007) concluded that the CAARS is the best available measure for ADHD self-report diagnosis because of its strong construct and criterion validity.

Brown Attention-Deficit Disorder Scales (BADDS). The BADDS is a 40-question self-report measure that assesses severity of the individual's ADHD symptoms and features (Brown, 1996). The inventory is comprised of ranked responses from 0, "never" or least symptomatic, to 3, "almost daily" or most symptomatic for how much a participant believes a certain feeling or behavior has been problematic for them in the past 6 months. Problematic symptoms, feelings and behaviors are categorized into 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. Researchers previously determined that this self-report measure focuses on the attention problems adults with ADHD often report, rather than hyperactive or impulsive symptomatology (Roesler, Retz, Thorne, Scheider, Stieglitz & Falkai, 2006).

Test-retest reliability for the BADDS was previously found to be satisfactory (r = .87) (Brown, 1996). Additionally, researchers have evidenced alpha coefficients to be between .69 and .81 in a comprehensive review of studies that validated the BADDS in previous clinical samples (Taylor, Deb & Unwin, 2011). In this same review, true cases of ADHD were found between 84 – 92% of the time, and true non-cases of ADHD were found 33% of the time (Taylore, Deb & Unwin, 2011). In the McKelvy dissertation study, the internal consistency reliability for the five dimensions of the BADDS was .91 (McKelvy, 2015).

Attention-Deficit Scales for Adults (ADSA). The ADSA is a measure used by adults to assess their own ADHD symptomatology. The scale includes 54 items that ask the frequency of occurrence of common ADHD symptomatology that can be answered on a 5-point Likert scale. Responses range from *never* to *always*. Higher scores indicate greater symptomatology. Of the 54 items, 9 content subscales are delineated: Attention-Focus/Concentration, Interpersonal, Behavior-Disorganized Activity, Coordination, Academic Theme, Emotive, Consistency/Long-term, Childhood, and Negative-Social. Total scores one standard deviation above the mean, scores between 161 and 180, are suggestive of an ADHD diagnosis. Total scores two standard deviations above the mean, scores above 181, are strongly suggestive of an ADHD diagnosis (West, Muslow, Arredondo, 2007. The academic theme (ATS) describes an adult's difficulty with explaining ideas to others and their perceptions of their academic achievement throughout their schooling (Triolo & Murphy, 1996).

The ADSA was found to have good internal reliability with alphas ranging from .70 to .83 in previous clinical samples (Taylor, Deb & Unwin, 2011). The ADSA true ADHD classification accuracy rating ranged from 58% - 81%, with split-half reliability was found to be .92 in the same study (Taylor, Deb & Unwin, 2011). In the McKelvy dissertation study, alpha coefficients were .86 for the Attention Concentration scale, .80 for the Behavior-Disorganized Activity scale and .65 for the Negative Social scale (McKelvy, 2015).

Grade point average (GPA). Students gave permission for the registrar to release their overall GPA to the researcher's supervising faculty member. Participants also self-reported their GPA. Both GPAs were used for ADHD assessment and as an academic outcome variable in the present study.

Quality of Relationships Inventory (QRI). The QRI is a self-report measure used to assess an individual's relationship fulfilment within one specific close relationship. Respondents indicate on a 4-point Likert scale, ranging from "not at all" to "very much" how much a certain item describes the relationship they have in mind (Pierce, Sarason & Sarason, 1991). The 39-items evaluate this relationship across three factors: support, depth and conflict (Pierce, Sarason & Sarason, 1991). The developers of the QRI demonstrated high internal consistency, Cronbach's alphas ranged from .83 to .92 for each of the three factors (Pierce, Sarason & Sarason, 1991). In the McKelvy dissertation, Cronbach's alpha coefficients were .85 for the Relationship Support factor, .82 for the Relationship Depth factor and .86 for the Relationship Conflict factor (McKelvy, 2015).

Personality Assessment Inventory (PAI). The PAI is a self-report measure used to assess an individual's personality traits and psychopathological symptoms. The PAI is comprised of 344 4-point Likert-scale items (ranging from 1-false to 4-always) that are then divided into 22 subscales of four types: validity scales, clinical scales, treatment consideration scales and interpersonal scales (Morey, 1991). The PAI has demonstrated good validity across numerous samples with a median internal consistency coefficient ranging from .81 to .86 (Boyle & Lennon, 1994). PAI scores successfully discriminated between college students with trauma, depression, social phobia, and anxiety disorders (McDevitt-Murphy, Weathers, Flood, Eakin & Benson, 2007).

Structured Clinical Interview for DSM-IV Axis I Disorders, Clinical Version (SCID-CV). In a 2011 study conducted by Lobbestael, Leurgans and Arntz, excellent inter-rater reliability was established (k = .61 to .81) among Axis I diagnoses. Another study completed in 2010, among young adults, determined that kappa levels for inter-rater reliability were at k = .85 for

both generalized anxiety disorder and obsessive compulsive disorder (Griffith, Zinbarg, Craske, Mineka, Rose, Waters & Sutton, 2010).

At the time of collection for the dissertation study, the SCID-CV was not yet available for the DSM-V. The SCID-CV for the DSM-V was not made available until October 2015 (First, Williams, Karg & Spitzer, 2015). Therefore, despite the use of DSM-V criteria for the re-assessment of participants in the current study, the SCID-CV for the DSM-IV was utilized for subjective information on past and current symptomatology.

Diagnostic Interview for Adult ADHD (DIVA 2.0). The DIVA 2.0 is a semi-structured clinical interview for diagnosing ADHD in adults. The DIVA 2.0 follows the diagnostic criteria for ADHD in the DSM-IV-TR and prompts interviewees to recall their adult and childhood symptomatology (Kooij, 2010). Each DSM-IV-TR diagnostic criteria that the interviewer reviews has a list of examples of possible behaviors the interviewee might have exhibited. Interviewers are able to check off the examples that fit and fill in other examples that the interviewee offers on their own. The DIVA 2.0 is used to describe an individual's impairment across settings (i.e., school, work, leisure activities), assess for severity of symptomatology and evaluate social functioning. This assessment is best utilized in conjunction with other diagnostic tools to assess for possible differential or comorbid disorders (Kooij, 2010).

Measures and Subscales used for Data Analysis

Grade point average (GPA). Both the self-reported and registrar-reported GPA were used in data analysis. GPA is widely used in the ADHD literature as an indicator of academic success (Blasé et al., 2009; Langberg, Dvorsky, Kipperman, Molitior & Eddy, 2015; Murphy, Barkley & Bush, 2002; Rabiner et al., 2008). Means and standard deviations for Registrar and Self-

Reported GPA for the total sample can be found in Table 1 and in Tables 2 through 5 for the diagnostic groupings.

Academic Theme Subscale – ADSA (ATS). The Academic Theme Subscale of the ADSA was used in data analysis. The ATS specifically measures an individual's perception of their general academic struggles (Triolo & Murphy, 1996). A Chronbach alpha could not be performed for the ATS because it only contains two items. They are "I have trouble explaining my ideas to others," and "My knowledge of the material I learned in school was greater than what was reflected in my grades," (Triolo & Murphy, 1996). A Pearson correlation, therefore, was utilized instead. The two items of the ATS were sufficiently correlated for research purposes, $r(108) = .26$, $p = .003$. Each item was highly correlated with the Total ADSA ADHD Scale, $r(105) = .73$, $p < .001$ and $r(105) = .70$, $p < .001$. Means and standard deviations for the Academic Theme of the ADSA for the total sample can be found in Table 1 and in Tables 2 through 5 for the diagnostic groupings.

Support Factor, Conflict Factor, and Depth Factor – QRI. All three factors of the QRI were used in the current data analysis. Items tap into, "To what extent could you count on this person for help," and "How often does this person try to control or influence your life," (Pierce, Sarason & Sarason, 1991). Participants responded to 39-questions based on their closest friend. The support factor measures the accessibility of care within the relationship. The conflict factor measures the amount of disagreement and frustration within the relationship. And, the depth factor measures the level of importance and stability within the relationship (Pierce, Sarason & Sarason, 1991). In the current study, Cronbach's alpha coefficients were good for all three factors: $\alpha = .89$ for the Relationship Support factor, $\alpha = .85$ for the Relationship Conflict factor, and $\alpha = .83$ for the Relationship Depth factor. All three alphas are in the good range (George &

Mallery, 2003). Means and standard deviations for the Support, Depth, and Conflict Scales of the QRI for the total sample can be found in Table 1 and in Tables 2 through 5 for the diagnostic groupings.

Depression Scale, and Anxiety Scale – PAI. The Anxiety and Depression Subscales of the PAI were used as covariates in data analysis. In the current study, Cronbach's alpha coefficient for the Depression scale is good, $\alpha = .89$. The Depression Scale measures the depressive symptomatology an individual experiences, including their level apathy, feelings of sadness, and amount of energy they have (Morrey, 1991). In the current study, Cronbach's alpha coefficient for the Anxiety scale is excellent, $\alpha = .92$. The Anxiety Scale measures the amount of negative affectivity and stress an individual is experiencing, while also describing the level of concern the individual has about their current state (Morey, 1991). Means and standard deviations for the Depression and Anxiety Scales of the PAI for the total sample can be found in Table 1 and in Tables 2 through 5 for the diagnostic groupings.

Procedure

Participants were recruited from 2014 to 2015 from a four-year university in the southern part of the United States. Research assistants recruited through a former research study on ADHD and obesity, as well as through flyers, classrooms across campus and the university's research participation pool (SONA), Potential participants read a detailed consent notice before completing any measures. Each packet of self-report measures included the demographic questionnaire, CAARS-Self, BADDS, ADSA, QRI, and PAI along with one other measure not included in the present study. Participants who were not called back into the lab for the second phase of the study were entered into a drawing for a $50 visa gift card or awarded SONA credits commensurate with their time spent.

Once the self-report measures were completed, participants who received T scores of 65 or above on at least two of the inattention and/or hyperactivity scales across the CAARS, BADDS, and/or ADSA, were contacted to return for the second phase of the study (as potential members of Groups 1 or 2). In addition, if a participant indicated a childhood diagnosis of ADHD on their demographic questionnaire, regardless of their current T scores, they were also asked to return. Finally, participants who did not report any diagnoses on the demographics questionnaire and did not have any elevations on any subscale on any of their screening measures were selected into the comparison group.

During the second phase of the study, all participants were given the SCID-CV and DIVA 2.0, and completed a CPT by a graduate student, undergraduate research assistant or a principal investigator of the study. Participants were administered the entire SCID-CV (modules A through F), regardless of previous diagnosis, to evaluate for subclinical or clinical levels of depression, anxiety, inattention or hyperactivity/impulsivity. Undergraduate research assistants were trained by a principal investigator to conduct both of the diagnostic interviews over several weeks before the study began. Research assistants were only allowed to conduct the interviews with participants after they successfully completed a mock interview with either of the principal investigators. Depending on how the participants were recruited, they either received: 1) a summarized assessment report with scores, diagnoses, and recommendations or 2) SONA credit (McKelvy, 2015).

The current study aimed to rectify limitations of the 2015 dissertation. First, each individual's data was reassessed with important considerations in mind. Specifically, in the previous study, students with a history of ADHD and co-morbid diagnoses who no longer met

criteria for the former were assumed to have been misdiagnosed with ADHD in childhood or have "outgrown" their ADHD diagnosis (McKelvy, 2015).

According to the 2015 dissertation protocol, researchers hoped to rely on a free CPT program for ADHD diagnosis (McKelvy, 2015). Unfortunately, this particular CPT had limited diagnostic value because it was too easy for college students, with yielding many false negatives. Those participants were placed in the comparison group, when a clinical group or removal from the study may have been more accurate or prudent. The most current literature however, states that most adults do not “outgrow” their ADHD diagnoses, but meet diagnostic criteria differently than children and still struggle with the core symptoms of ADHD (Guzelow, Loya & Hinshaw, 2017; Ramos-Quiroga et al., 2015; Sibley et al., 2016). The recent call from researchers and mental health professionals alike to expand the diagnostic criteria for adult ADHD has prompted clinicians to focus on a person’s diagnostic history and how s/he functions without ADHD medication (Sibley et al., 2016).

Second, group membership in the dissertation study was determined, in part, by each participant's performance on an alternate pairs continuous performance task (CPT). In hindsight, this dated CPT was inappropriate for college students due to its simplicity and brevity (Demurie, Roeyers, Wiersema & Sonuga-Barke, 2016). Thus, the current study reclassified participants without consideration of success on the CPT (Demurie, Roeyers, Wiersema & Sonuga-Barke, 2016; Kessler et al., 2010; Sibley et al., 2016).

A third limitation of the previous study is that only one researcher reviewed each participant’s data in its entirety to decide on group membership. The current study aimed to minimize as many limitations of the previous study as possible by including two reviewers of each participant’s data for assignment to one of the three groups.

Steps to verifying diagnoses. Regardless of the previous diagnosis given to the participant during the dissertation data analysis, each participant's entire assessment file was reviewed individually by two independent raters. Within each assessment file, the reviewers followed a series of steps. First, participants with a history of ADHD who no longer met criteria in adulthood were removed from the sample. Next, two raters independently evaluated each participant's data. That is, we used a holistic approach by considering individual items in addition to scale and subscale scores on all questionnaires and diagnostic interviews. We erred on the side of believing that a reported childhood diagnosis was inaccurate and did not use this existing diagnosis as a data point for current diagnosis. This allowed us to differentiate students with elevations on ADHD scales that were due to symptoms of anxiety and depression from participants whose ADHD scale elevations were a result of lifelong struggles with ADHD. For example, if a participant had a severe or chronic mental illness or a chaotic family history, we believed this to be evidence against an ADHD diagnosis. The reviewers recorded the participant's self-report of childhood and adult psychological diagnoses (and associated medications), checked the CAARS-Self, BADDS, ADSA and PAI for any clinically significant subscale scores, (T score = 65 or higher for the CAARS, T score = 50 or higher for the BADDS; T score = 60 or higher for the ADSA; and T score = 60 for the PAI) and made note of them. Next, for items that the participant endorsed as highly symptomatic and that contributed to a significant T score, the reviewers indicated whether the symptom was uniquely characteristic of ADHD, unique to another mental health diagnosis, or potentially associated with ADHD and/or another mental health diagnosis (i.e., "I get down on myself" or "Many things set me off easily.) A highly symptomatic item was considered to be endorsed with either of the two highest descriptors ("Pretty much, often" and "Very much, very frequently" for the CAARS-Self;

"Twice a week" or "Almost daily" for the BADDS; and "Often" or "Always" for the ADSA) by the participant. Then, the reviewers inspected the transcripts of the SCID-CV and DIVA 2.0, making note when DSM-IV-TR diagnostic criteria were met (4th ed., text rev.; *DSM–IV–TR*; American Psychiatric Association, 2000). Importantly, the reviewers considered childhood as well as adulthood diagnoses with the intent of removing participants from the ADHD groups who may not have clearly evidenced ADHD in childhood.

Finally, the two raters, the student researcher and her advisor, assigned each participant to one of the three groups for analysis [i.e. 1) ADHD group, 2) OMH group, 3) Comparison] or classified them as "cannot be determined". Group assignments were inspected by a researcher who was blind to the purposes of the current study and meaning of each group assignment. This third party produced a list of 21 participant numbers, from the original 126 participants, who were grouped differently by the reviewers. The first Cohen's Kappa obtained by the third party was unsatisfactory, $k = .589$ (Cohen, 1960). Each reviewer reconsidered their group assignments for those participants. Raters came to consensus on 10 of the 21 cases to minimize data loss. The third researcher checked for inter-rater reliability for the second time and it was satisfactory, $k = .90$ (Cohen, 1960). The 11 assessments from participants that did not reach consensus were classified as "cannot be determined" and were not included in analyses. This is in addition to the original 5 cases that both raters determined to be "undeterminable." The frequencies and percentages of categorical demographic variables and means and standard deviations of continuous variables, for the remaining 110 participants, can be found in Tables 9 and 18 respectively.

Participant Groupings Made After Re-Assessment

ADHD Group (Group 1). After re-assessment, 26 individuals met criteria for ADHD according to the DSM-V. In the ADHD group, there are 9 males (34.6%) and 17 females (65.4%). Their ages range from 18 to 32-years-old (M = 21.08, SD = 3.44). The race/ethnicity of the sample included: 57.7% European-American/White (n = 15), 26.9% Latin-American/Hispanic (n = 7), 11.5% African American/Black (n = 3), and 3.8% Other (n = 1). Well over half of the participants identified as Straight (84.6%; n = 22) while the remaining participants identified as Bisexual (7.7%; n = 2), gay (3.8%; n = 1), or Questioning/Unsure (3.8%; n = 1). Class ranks are as follows: Freshman (19.2%; n = 5), Sophomores (23.1%; n = 6), Juniors (26.9%; n = 7), and Seniors (30.8%; n = 8). Table 10 includes the frequencies and percentages of the demographic variables for this group. Half of the individuals endorsed that they currently take medication for their ADHD symptomatology (38.5%, n = 10), while the other half stated that they did not (38.5%, n = 10), and 6 individuals did not answer the question (23.1%).

Based on the diagnoses given in the re-assessment phase of the current study, 9 individuals currently meet criteria for another mental health diagnosis (34.6%) and 17 do not (65.4%). Table 24 describes these comorbid diagnoses. Of those with another mental health disorder, ten had multiple comorbid diagnoses. We were not able to separate individuals with ADHD and a comorbid diagnosis from those who were not diagnosed with one because this would have made the groups too small for analysis. Indeed, nine individuals (34.6%) currently diagnosed with ADHD by the raters of this study, did not report that they were diagnosed with ADHD in their childhood. And, only five individuals stated that they have received a Learning Disorder diagnosis in their lifetime (19.2%) and 3 of those individuals currently receive

accommodations from the university's Office of Disability Accommodations. Means and standard deviations of continuous variables for the ADHD group can be found in Table 2.

OMH Group (Group 2). Individuals in the OMH group (n = 40) currently meet DSM-V criteria for a mental health disorder *other than* ADHD. Table 24 describes the diagnoses individuals in this group meet criteria for. In the OMH group, there are 11 males (27.5%) and 29 females (72.5%). Their ages range from 18 to 30-years-old (M = 21.38, SD = 3.29). The race/ethnicity of the sample included: 50.0% European-American/White (n = 20), 20.0% Latin-American/Hispanic (n = 8), 15% African American/Black (n = 6), 5.0% Asian American (n = 2) and 10% Other (n = 4). Individuals identified as either Straight (n = 30, 75%), Gay/Lesbian (n = 4, 10.0%), Bisexual (n = 3, 7.5%), or Questioning/Unsure (n = 3, 7.5%). There are 9 Freshman (22.5%), 4 Sophomores (10.0%), 10 Juniors (25.0%), and 17 Seniors (42.5%) in this group. Table 11 includes the frequencies and percentages of the demographic variables for the OMH group. I performed a series of chi-squares and a t-test to ensure that the OMH group did not significantly differ from the ADHD group on key demographic variables. The OMH group does not statistically differ from the ADHD group on sex, age, race/ethnicity, sexual orientation, or class rank. Tables 12 and 19 outline the demographic comparisons between the ADHD and OMH groups.

A quarter of the individuals in the OMH group endorsed that they currently take psychotropic medication for their mental health symptomatology (25.0%, n = 10), 30 individuals stated that they did not (75.0%). The majority of individuals stated that do not have a Learning Disorder (n = 38, 95.0%), while only 2 individuals stated that they do (5.0%). Neither of those individuals currently receive accommodations from the Office of Disability Accommodations.

Means and standard deviations of continuous variables for the OMH group can be found in Table 3.

Comparison Group (Group 3). Individuals in the comparison group (n = 44) do not currently meet criteria for ADHD or another mental health disorder. In the comparison group, there are 10 males (22.7%) and 34 females (77.3%). Their ages range from 18 to 30-years-old (M = 21.38, SD = 3.29). The race/ethnicity of the sample includes: 40.9% European-American/White (n = 18), 20.5% Latin-American/Hispanic (n = 9), 15.9% Other (n = 7), 13.6% African American/Black (n = 6), and 9.1% Asian American (n = 4). The majority of individuals identified as Straight (n = 40, 90.9%), while 2 individuals identified as Gay/Lesbian (4.5%), 1 individual identified as Questioning/Unsure (2.3%), and 1 did not answer the question. There are 11 Freshman (25.0%), 9 Sophomores (20.5%), 9 Juniors (20.5%), and 15 Seniors (34.1%) in this group. Table 13 includes the frequencies and percentages of the demographic variables for the comparison group. Most of the individuals endorsed that they do not currently take psychotropic medication (n = 35, 79.5%), 9 individuals stated that they did (20.5%). One individual stated that they take an ADHD medication (2.3%). The majority of individuals stated that they do not have a Learning Disorder diagnosis (n = 42, 95.5%), while only 2 individuals stated that they did (4.5%). Neither of those individuals currently receive accommodations from the Office of Disability Accommodations. Means and standard deviations of continuous variables for the comparison group can be found in Table 4.

Drop Out Group. Individuals in the drop out group (n = 39) did not respond to requests to attend the second phase of the study that included additional questionnaires, structured diagnostic interviews, and a brief neuropsychological test (McKelvy, 2015). In the drop out group, there are 15 males (38.5%) and 24 females (61.5%). Their ages range from 18 to 40-

years-old (M = 22.23, SD = 5.21). The race/ethnicity of the sample includes: 43.6% European-American/White (n = 17), 20.5% Latin-American/Hispanic (n = 8), 20.5% African American/Black (n = 8), 12.8% Asian American (n = 5) and 2.6% Other (n = 1). The majority of individuals identified as Straight (n = 36, 92.3%), while 2 individuals identified as Bisexual (5.1%), and 1 individual identified as Gay (2.6%). There are 9 Freshman (23.1%), 4 Sophomores (10.3%), 11 Juniors (28.2%), and 15 Seniors (38.5%) in this group. Table 14 includes the frequencies and percentages of the demographic variables for this group. I conducted a series of Chi-Squares and t-Tests to compare the drop out group to the ADHD, OMH, and comparison groups. Tables 15 through 17 and Tables 21 through 23 include these findings. It seems as though a disproportionate number of sexual minorities stayed in the sample instead of dropping out of the study, p = .038. There were no other significant differences between the groups on those demographic variables.

A little more than half of the individuals endorsed that they do not currently take psychotropic medication (n = 20, 51.3%), 19 individuals stated that they did (48.7%). Seven individuals stated that they take an ADHD medication (17.9%), 18 stated that they did not (46.2%), and many did not answer the question (n = 14, 35.9%). The majority of individuals stated that they do not have a Learning Disorder diagnosis (n = 35, 89.7%), while only 4 individuals stated that they did (10.3%). All 4 of those individuals currently receive accommodations from the Office of Disability Accommodations.

Means and standard deviations of key continuous variables for the drop out group can be found in Table 5. A series of t-Tests were conducted to compare the drop out group to the ADHD, OMH, and comparison groups on key continuous variables that were used in assessment and analyses. It seems as though the ADHD group had significantly higher mean scores than the

drop out group on the ADHD Total Scores of the CAARS and BADDS (p = .013 and p = .001 respectively). The OMH group also had significantly higher mean scores than the drop out group on the ADHD Total Scores of the CAARS and BADDS (p = .022 and p = .044 respectively). The drop out group had higher mean scores than the comparison group on the ADSA Academic Theme (ATS), CAARS ADHD Total Score, and the BADDS ADHD Total Score ($p < .001$, $p < .001$, and $p < .001$ respectively). These findings are to be expected as individuals in the drop out group were asked to return for the second half of the dissertation study because of significant scores on key variables, but declined to do so. The comparison group, by definition, did not obtain significant scores on those variables. Tables 6 through 8 include the information gathered from these *t*-Tests.

Data Preparation, Design, and Analysis

Data cleaning and screening procedures were originally conducted in the previous study to check for missing values and outliers (McKelvy, 2015). Frequency tables were examined again to confirm that less than 2% of all data were missing on each subscale used for the current study. Moreover, the data showed to be missing at random (MCAR). I used the "exclude cases pairwise" option to ensure that participants with missing data were only included in analyses that did not require their missing variables for analysis (Pallant, 2007).

I also tested the assumptions of ANOVA (i.e., normality of dependent variables, level of measurement, independence of observations, and homogeneity of variance), and MANOVA and MANCOVA (i.e., normality of dependent variables and covariates, sample size, linearity, homogeneity of regression, multicollinearity and homogeneity of variance-covariance matrices) (Tabachnick & Fidell, 2007). To test the normality of the data, I computed the skewness and kurtosis, total scores, means, standard deviations, histograms, and Kolmogoro-Smirnov tests for

all measured variables. I discovered that the total scores on the CAARS ADHD Scale, BADDS ADHD scale, ADSA Academic theme scale, QRI Depth scale, and PAI Depression and Anxiety scales were normally distributed. The QRI Support scale was negatively skewed, Skewness = -1.40. Square root and logarithmic procedures were used to transform this measure but it remained skewed. Therefore, I decided to keep the non-transformed variable because ANCOVA and MANCOVA are usually strong enough to accept slight violations of normality (Tabachnick & Fidell, 2007). I also performed a check on the internal consistency of measured variables using Chronbach's alpha. Please refer to Table 1 for the internal consistency reliabilities, skewness and kurtosis of all variables used in analyses.

I examined the data for univariate and multivariate outliers with standardized scores and Mahalanobis distances (Tabachnik & Fidell, 2007). I observed several univariate outliers on both Registrar-Reported and Self-Reported GPAs. I manually transformed these outliers to reflect values less than three standard deviations below the mean (Tabachnik & Fidell, 2007). I did not detect any multivariate outliers.

Finally, I tested for linearity and multicollinearity assumptions associated with MANCOVA with correlation analyses and scatter plots. I detected no problem with bivariate multicollinearity because none of the correlations were higher than .8 (Tabachnik & Fidell, 2007). I also examined the scatter plots of the relationships between dependent variables and found no evidence of non-linearity.

CHAPTER 3

RESULTS

The first hypothesis states that college students with ADHD and college students with a different mental health disorder have lower registrar-reported (Reg) and self-reported (SR) GPA, than their peers without any diagnosis. A MANOVA examined differences in GPAs across the three groups. There was a significant multivariate effect across groups, $F(4, 204) = 2.826$, $p = .026$, partial eta squared = .053, with a medium to large effect size. That is, 5.3% of the variance in GPAs was accounted for by group membership.

Post hoc analyses revealed significant group differences for both registrar GPA [$F(2, 103) = 4.55$, $p = .013$] and self-reported GPA [$F(2, 103) = 4.51$, $p = .013$] (See Table 25). Specifically, for the ADHD students, their registrar and self-reported GPAs were $M_{Reg} = 2.93$, $SD_{Reg} = .69$ and $M_{SR} = 2.99$, $SD_{SR} = .70$; whereas the students in the comparison group performed significantly better, $M_{Reg} = 3.40$, $SD_{Reg} = .48$ and $M_{SR} = 3.43$, $SD_{SR} = .48$. As predicted, the OMH and ADHD groups were not significantly different from each other. See Table 26 for planned comparisons. See Tables 2 through 4 for means and standard deviations.

The second hypothesis states that individuals with ADHD will have lower academic self-concept than their peers with or without another mental health disorder (OMH and comparison groups), when both depression and anxiety symptomatology are controlled. I ran a One-way ANCOVA to test for differences between the three groups on their academic self-concept while controlling for anxiety and depression symptoms. After controlling for anxiety and depression, there is a significant effect of group membership on an individual's perception of their academic struggles, $F(2, 107) = 8.52$, $p < .001$, partial eta squared = .14 (See Table 27). Contrary to the hypothesis, however, students OMH diagnoses have as low academic self-concept ($M = 59.67$,

SD = 2.02) as their ADHD peers (*M* = 61.63, *SD* = 2.56) when compared to students without any diagnoses (*M* = 43.93, *SD* = 1.90). See Table 28 for planned contrasts.

The third hypothesis stated that college students with ADHD and college students with another mental health disorder (OMH group) will report significantly less depth and support in their close relationship and significantly more conflict in that relationship, than their peers without a psychiatric diagnosis, when controlling for anxiety and depression symptoms. I performed a MANCOVA to examine differences between diagnostic groups on their perceived relationship qualities. The overall model was not significant. However, tests of Between-Subjects Effects indicated that there was a significant difference among diagnostic groupings for the Conflict Subscale (QRI Conflict), $F(2, 105) = 4.47$, $p = .01$, partial eta squared = .078 (See Table 29). Contrary to the hypothesis, only students in the OMH group (M = 1.78, *SD* = .50) reported significantly higher conflict in their close relationship than the comparison group (M = 1.48, *SD* = .36). See Tables 2 through 4 for means and standard deviations.

CHAPTER 4

DISCUSSION

The purpose of the current study was to address some of the limitations in the literature on the functioning of college students with ADHD. New diagnostic groupings were created to test for differences across academic and social functioning. Results suggest college students with ADHD have lower GPAs and lower academic self-concept than their undiagnosed peers. Results also suggest, however, that college students with ADHD are likely socially faring as well as their undiagnosed peers. Findings also support the value of comprehensive assessment, combined with a thorough evaluation of the material by a trained clinician, for the accurate diagnosis of ADHD for research purposes.

Upon further examination of the groupings, a number of differences between diagnostic groups and drop outs arose. An apparently disproportionate number of sexual minorities remained in the sample, instead of choosing to drop out and not return for further testing. As sexual minorities are at higher risk for depression and a number of other mental health diagnoses, this population may have been especially motivated to receive the assessment report offered to those who finished the second phase of the dissertation study (Gibbs & Ruce, 2016; Johnson et al., 2013; Lehavot & Simpson, 2014; McKelvy, 2015).

The effect of an assessment report incentive may have also been seen in the apparent increased likelihood of those with higher T-Scores on the ADHD measures to remain in the sample. By design, the students in the comparison group however, did not have any elevated scores. It is not surprising that they had several scores that were significantly different from the students who dropped out of the study. As such, students in the comparison group may be higher functioning than the average college student. One hypothesis to explain the relative perseverance

of the comparison group may be their good mental health assisting them in following through with their commitment to the researchers. Additionally, these academically successful students may have been more motivated than the drop outs to receive extra credit in the class from which they were recruited. This may also indicate that the comparison group included in this study may be higher functioning than the average college student, having been motivated to receive extra credit in a psychology class.

Additionally, the ADHD group was not solely comprised of individuals with a previous diagnosis of ADHD. Nine individuals currently met criteria for ADHD, were placed in the ADHD group by the researchers, and reported that they had never received a diagnosis of ADHD before. These individuals could have unique coping skills, higher than average IQ scores, or believe that they have another mental health diagnosis. The differences between the individuals who reported to have ADHD and those who did not were not analyzed within the data. Furthermore, ten of the individuals in the ADHD group met criteria for multiple other mental health diagnoses.

Academic Functioning

The first hypothesis stated that college students with ADHD (ADHD group) or another mental health disorder (OMH group) will have lower GPAs (registrar-reported and self-reported) than their peers without a mental health diagnosis (comparison group). Findings from the current study indicated that college students with ADHD have and report lower GPAs than their peers without a mental health diagnosis. As expected, college students with ADHD and those in the OMH group had and reported similar GPAs to one another. These findings are consistent with much of the previous literature that states college students with ADHD experience more academic difficulty than their non-ADHD peers (Blasé, Gilbert, Anastopoulos, Costello, Hoyle

& Swartzwelder; Heiligenstein, Guenther, Levy, Savino & Fulwiler, 1999; Lewandowski, Lovett, Codding & Gordon, 2008; Rabiner, Anastopoulos, Costello, Hoyle & Swartzwelder, 2008).

As opposed to their peers with ADHD, college students in the OMH group did not have lower GPAs than their peers without a mental health diagnosis. This could indicate that the specific academic difficulties college students with ADHD experience could put them at higher risk of low academic performance. Previous literature has indicated that individuals with ADHD are more likely to receive lower grades on tests; and they are more likely to repeat a grade or drop out of school (Frazier, Youngstorm & Glutting, 2007). Moreover, the tendency of college students with ADHD to participate in extra-curricular activities and not decline an invitation to a party at the expense of their academic responsibilities, could be contributing factors as to why the individuals in the ADHD group had significantly lower GPAs than those in the OMH group (Buchanan, 2011; Wolf, Simkowitz & Carlson, 2009). It is also possible that individuals with another mental health diagnosis may be less likely to participate in these more social aspects of college due to potential difficulties with mood or anxiety (Blanco & Barnett, 2014).

Learning disorders are often found in ADHD populations with comorbidity rates ranging from 8% to 75% (Dietz & Montague, 206). Despite this wide range, the literature widely supports that learning disabilities are common in the ADHD population (DuPaul, Gormley & Laracy, 2013; Green & Rabiner, 2012). In the current sample of individuals with ADHD, 19.2% (n = 5) reported that they were previously diagnosed with a learning disorder. The compounded academic difficulty individuals with ADHD and LD experience often lead to lower GPAs and weaker study skills (Dalley, Bolocofsky, Alcorn & Baker, 1992; Proctor, Hurst, Prevatt &

Adams, 2006). This may have contributed to the significantly lower GPAs seen in the current sample as well.

Another possible explanation for this finding is the increased likelihood for college students with ADHD to have poor study skills (Weyandt et al., 2013). The findings of this study are supported by previous literature that indicates college students with ADHD will struggle with completing assignments on time and finishing timed tests (Lewandowski, Lovett, Codding & Gordon, 2008; Reaser, Prevatt, Petscher & Proctor, 2007). Both of these difficulties, when seen across classes, can contribute to a lower GPA. This is particularly unfortunate to note, as only three individuals in the ADHD group, or 11.5%, reported utilizing the supports of the Office of Disability Accommodations (ODA). And, two of those individuals even reported having a learning disorder. Although this finding is not surprising given previous research that revealed an underutilization of accommodations by individuals with ADHD (Parker, Hoffman, Sawlowsky & Rolands, 2011; Sparks, Jaworsky & Philips, 2005). Furthermore, research has shown that accommodations to sustain attention during traditional teaching or assessment methods can be effective in buffering the difficulty college students with ADHD experience (Jansen et al., 2017).

Academic Self Concept

The second hypothesis stated that individuals with ADHD will have lower academic self-concept than their peers with or without another mental health diagnosis. However, upon closer inspection of the scores, it should be noted that the ADHD group's mean score is only slightly above the clinical cut off. The OMH group mean is equal to the clinical cut off score. To isolate the effect of having ADHD, the effects of anxiety and depression were statistically controlled. This was a limited solution, however, given the other types of psychological symptoms that could not be controlled. Findings from the current study indicated that individuals with ADHD

had lower academic self-concept than their peers without a mental health diagnosis (comparison group), but similarly low academic self-concept to their peers with another mental health diagnosis (OMH group). Again, the literature widely supports the finding that individuals with ADHD report more difficulty transitioning to college and are more likely to withdraw from a class due to perceived academic strain and lack of success (Buchanan, 2011; Rabiner, Anastopoulos, Costello, Hoyle & Swarzwelder, 2008).

One possible explanation for this finding is that both college students with ADHD and college students with another mental health disorder struggle with the executive functioning skills that facilitate academic success (Antshell et al., 2010; Wender, 1995). Indeed, individuals with anxiety and depression can perform similarly to individuals with ADHD on Continuous Performance Tasks (CPTs) (Micco et al., 2009; Wright, Lipszyc, Dupuis, Thayaparajah & Schachar, 2014) The inattention symptoms both of these groups experience could hinder their abilities to organize, manage their time, and focus on academic material. Therefore, they could truly have a harder time grasping classroom concepts. Additionally, findings from this study do indicate that individuals with ADHD have lower GPAs than their peers. If college students with ADHD are aware of the higher scores their peers receive on tests and assignments and/or higher grades in courses, this comparison could contribute to lower academic self-concept.

Previous research has also shown that parents and teachers alike perceive students with ADHD to perform less well in math and reading, and to exhibit more undesirable classroom behaviors than their non-ADHD peers (Eisenberg & Schneider, 2007). Consistent with numerous psychological theories (e.g. object relations, attachment, and self-psychology), college students with ADHD could have internalized the negative perceptions of their parents and teachers as

children and carried this belief with them into higher education (Cashdan, 1989; Bowlby, 1988; Kohut, 1908).

The negative perception parents and teachers have of students with ADHD could mimic the poor self-image college students with other mental health diagnoses so often have of themselves (Atta, 1993; Lakey, Hirsch, Nelson & Nsamenang, 2014). This means a negative impression of academic-self can be seen across mental health diagnoses and derive from various sources.

Finally, college students with ADHD may feel the strain of a transition to college, the lack of structure, and loss of instrumental and readily available familial support more acutely than college students without a mental health diagnosis (Buchanan, 2011). There is empirical evidence to support the notion that in college students with ADHD, the most common method of effective coping is assistance from a person or people that know them well (e.g., a parent calling to wake a student with ADHD who tends to oversleep) (Turnock, Rosen, & Kaminski, 1998). Another possible explanation for repeat findings is that academically successful high school students with ADHD who were accepted to a 4-year-university may compare their high school feelings of success to their current feelings. These comparisons may contribute to their low academic self-concept. These students may also recognize that when they lived at home with their parents they were more regimented and focused on their studies. Indeed, previous literature indicated that more academically successful high school students with ADHD received more social, emotional and academic support from their parents (Wilmhurst, Peele & Wilmhurst, 2011).

As mentioned previously, the comparison group in the current study could be higher achieving than the average college student. If this is the case, this group may also have higher

academic self-concept and the difference may be explained by the reality of their higher GPAs. Again, one of the incentives for participating in the dissertation study was earning extra credit in the class from which they were recruited. These students may have higher achievement motivation or have more help seeking behaviors. All of these qualities could contribute to someone feeling more confident in their academic abilities.

Social Functioning

The third hypothesis stated that college students with ADHD (ADHD group) or another mental health diagnosis (OMH group) will report less depth and support, and more conflict in a close relationship, when depression and anxiety are controlled for, than their peers without a mental health diagnosis (comparison group). Once again, anxiety and depression were statistically controlled in an effort to isolate the contribution of ADHD to social functioning. The hypothesis was not supported. Of the three social functioning variables, only the conflict scale differed across groups. Specifically, the participants in the OMH group reported experiencing significantly more conflict in their relationships when compared to students in the comparison group. Students with a mental health diagnosis other than ADHD may get into more fights, feel more frustration or disagree with their close friends more often. Moreover, students with ADHD could experience less conflict with those they are close with.

Indeed, the research has shown that children with ADHD are often content with the friendships they have made. Yet, it is the parents and teachers who believe that children with ADHD are not faring as well socially to their peers (Jiang & Johnston, 2016; Owens, Goldfine, Evangelista, Hoza, & Kaiser 2007). Researchers argue for a positive illusory bias when a difference between the parents' perception and child's perception of the child's social well-being exists (Owens, Goldfine, Evangelista, Hoza, & Kaiser 2007; Volz-Sidiropoulou, Boecker &

Gauggel, 2016). However, one could also argue that the parents' and teachers' negative social perception of children with ADHD is based on the stigma they have internalized against individuals with ADHD and not the actual quality of friendships they observe for children with ADHD. Meaning, the bias may actually stem from the parents and teachers (Barton, 2007). The expectation for individuals with ADHD to have more negative social outcomes may have roots in a faulty theory.

This finding is in line with previous studies that have found that college students with ADHD experience similar levels of social success and satisfaction as their non-diagnosed peers (Blasé, Anastopoulos, Costello, Hoyle & Swartzwelder, 2009; Buchanan, 2011; Fuermaier, Tucha, Koerts, Mueller, Lange & Tucha, 2012; Heiligenstein, Guenther, Levy, Savino & Fulwiler, 1999; Rabiner, Anastopoulos, Costello, Hoyle & Swartzwelder, 2008). Some college students with ADHD may even be better equipped to socially adjust to college because they are more likely than their undiagnosed peers to initiate conversation with new people and more likely to participate in fraternities and club sports (Buchanan, 2011; Canu & Carlson, 2003; Wolf, Simkowitz & Carlson, 2009).

Furthermore, research has shown that as individuals with ADHD age, they are likely to socially mature, exhibiting less impulsive or hyperactive behaviors that can be off-putting to others (Adler, 2004; Hallowell & Ratey, 1994; Resnick, 2005). The current sample of college students with ADHD may have already found coping skills that allowed them to not only reach higher education, but also to form stronger relational bonds. These bonds may even serve as one of the coping skills that has allowed them to progress academically. Students with ADHD may ask friends for notes or study guides, form study groups, or even ask friends from class for reminders to complete assignments.

Theoretical Implications

This study adds to the current body of literature that looks at the academic and social functioning of college students with ADHD. First and foremost, the current study has shown how essential a comprehensive assessment, combined with a thorough evaluation of the material by a trained clinician, is for the accurate diagnosis of ADHD for research purposes. Even with these practices in place, consensus between raters was not met after the first round of evaluation and was only satisfactory after the second round. This provides further reason to not base diagnoses off of self-report measures alone. Undoubtedly, incorrect classifications are made in studies that only use self-report.

Moreover, inaccurate classifications of individuals with ADHD could be contributing to the abundance of mixed findings in the literature. It stands to reason then that readers of the current ADHD literature should pay close attention to the methods of diagnosing and ruling out other medical diagnoses that can mimic symptoms of ADHD before assessing their confidence in other findings. This should be especially so when outcomes are negative, as elevated T-scores of undesirable constructs may stem from any number of mental health diagnoses.

Indeed, the academic and social functioning of college students with ADHD can look very similar to their peers with a different mental health diagnosis. And, overall, college students with ADHD are performing well despite a lack of accommodations and high rates of comorbid diagnoses. Considering the number of difficulties college students with ADHD must have overcome to reach higher education, findings might indicate that a college student with ADHD is especially resilient.

Clinical Implications

Findings from the current study have multiple clinical implications for those wishing to support college students with ADHD in either academic or social domains. Clinicians should first note that individuals with ADHD who are in college have likely already developed coping skills that enhance their academic and social abilities. A strength-based approach for this population may be especially helpful as the coping skills they already developed likely contributed to their pursuit of higher education.

However, findings from the current study indicated that college students with ADHD will have lower GPAs on average compared to their peers without a mental health diagnosis. College counselors should recommend the Office of Disability Accommodations and potentially support their clients in receiving accommodations because the client may feel stigmatized or intimidated, think they should have outgrown their ADHD, have an opinion that accommodations are unfair or "cheating" or think that the services provided at ODA will not be helpful to them. College students with ADHD could also feel that they are not entitled to accommodations and think that they do not deserve the extra support. Some students may not even know that ODA is an option for them. Or, students could believe that the administrative hurdles, organization, and paperwork needed to receive accommodations from ODA may not be worth the benefit they could receive. College counselors should not rely on the parents of college students with ADHD to ensure that the student is receiving accommodations. Indeed, the parents may also struggle with organization or be unfamiliar with the process. Tutors, review sessions, study groups, and online tutorials are other resources to suggest.

Furthermore, inattentive symptoms or a sense of "internal restlessness" are likely sources of frustration for college students with ADHD who may be struggling academically. It could be

helpful for college counselors to teach organization and time management skills, scheduling and good study habits. There are also a number of apps and calendars that can be utilized to help keep students on track. Referral for medication management and adherence may also be important components of academic success in college. College counselors can normalize and empathizing the frustrations of medication side effects. Psychologists who work in university counseling centers or on-campus Psychology Clinics can assist their clients with ADHD by forging and maintaining good working relationships with the university's psychiatrists (or physicians in that role). Due to psychologists' training in diagnostic assessment, they may have to educate their medical colleagues about the importance of referring patients for a comprehensive assessment when the presenting complaint may be ADHD. Not only do some adults misdiagnose themselves based on misunderstanding ADHD, but college students may also feign or exaggerate symptoms in an effort to get stimulant medication (Harrison, 2006; Jachimowicz & Geiselman, 2004). Finally, in some cases, it may be helpful or necessary to provide physicians with high-quality research articles about symptoms of and effective medication management for ADHD in adults.

The negative academic self-concepts college students with ADHD might have should also be normalized, explored, and potentially put in the context of a lifetime of academic obstacles. Furthermore, the academic failures that the student may recognize should also be reframed in the context of the hurdles he or she already overcame to come to college. Again, a strength-based approach could help a college student with ADHD change his or her negative academic self-perception and raise academic self-concept through a mindset of resilience.

Finally, the findings of the current study indicate that college students with ADHD are likely faring as well socially as their undiagnosed peers. For those that have close friendships or

familial relationships, clinicians should encourage the importance of those connections for resilience. Clinicians could even suggest that college students with ADHD request that their parents or friends call them to remind them of important deadlines, or assist them in making study schedules. Overall, college counselors should encourage and assure their clients with ADHD that it is okay to ask for help. Clinicians should also take note if their clients feel they do not have the social support they once had, because this could be a reason for academic and emotional concerns.

Limitations

There were a number of limitations to the current study despite efforts to improve the diagnostic validity of the archival data set. First, the sample lacked diversity and was mostly comprised of individuals who identified as female, white, and straight. Males, ethnic/racial minorities and sexual minorities were underrepresented. Therefore, the findings were less generalizable to the greater college population. The lack of men in the sample is particularly problematic since the prevalence of ADHD in males is twice as high as it is in females (APA, 2013)

The sample size also created a limitation for the current study. Initially, we intended to include two ADHD groups: one for students with ADHD only and another for students with ADHD and comorbid mental health diagnosis. The former were particularly difficult to recruit. Having two ADHD groups would have allowed us to better understand the unique effects of ADHD symptomatology on a college student. Moreover, ten of the individuals in the ADHD group had multiple comorbid diagnoses. Although the majority of the comorbid diagnoses include depression and anxiety symptoms, the combination of diagnoses for these individuals may create unique difficulties.

Furthermore, the sample of college students with ADHD who would participate in a research study that required persevering through a long self-report battery (i.e., high total number of items) and keeping an appointment for up to four hours of diagnostic assessment may be unique. The incentive to complete the second phase of the dissertation study was an assessment report. This means that the ADHD and OMH groupings in this study may exhibit more help-seeking behaviors than their similarly diagnosed peers. Help-seeking behaviors in the ADHD community can be linked to increased help from teachers and greater social support (Bussing, Koro-Liurgber, Gary, Mason & Garvan, 2005). Additionally, individuals who are interested in receiving an assessment report may be more trusting of others and more open to sharing their experiences. Diagnostic interviews sometimes require participants to share intimate details of their past and current mental health status with an unknown researcher. The ability those participants have to openly share in a research setting may lend itself well to the relationships these participants create.

The assessments completed in 2015 also lacked a number of elements that could have enhanced the current study. Participants were not given intellectual or achievement tests. The absence of these data limited the raters' ability to confirm or rule out a learning disorder or identify the role of intellectual ability on academic self-concept and GPA across groups. Unfortunately, this was the only diagnosis we were not able to verify. Additionally, a medical history was not taken. This left the current researchers unable to rule out physical diagnoses that can have similar symptoms to ADHD. Another weakness in our comprehensive assessment was reliance on the participants for information about their childhood symptomatology. Finally, the structured clinical interviews administered during the second phase of the dissertation study, had evidence of interviewer "drift". That is, as their time from intensive training and practice

increased, research assistants made more mistakes and omissions during the structured clinical interviews. It seems for structured clinical interviews to be properly completed in the future, periodic training reviews need to be added to the protocol.

Other limitations existed within the measures available for analysis. The only measurement of academic functioning was GPA. GPA is not always an accurate measure of academic achievement because it can be highly susceptible to class rank and major. Some majors are easier than others, and it is possible that individuals with ADHD are more drawn to some majors over others.

Furthermore, the data set did not include any measures other than the PAI, which assessed personality or mental health symptomatology. The PAI was utilized as a covariate and an assessment tool. Therefore, another measure was needed to compare emotional functioning across diagnostic groups. Additionally, the PAI, although useful when individual questions were analyzed, is not normed on the ADHD population.

Directions for Future Research

Future studies could continue to improve upon the diagnostic validity of ADHD assessment by rectifying the limitations of the current study. Intellectual and achievement tests should be included to enable researchers to confirm a Learning Disorder diagnosis and have an additional measure of academic achievement. Additional measures that examine mental health symptomatology should also be included to learn more about the emotional functioning of college students with ADHD. Including separate measures on emotional functioning or personality, other than measures used for assessment, could also increase the current understanding of the emotional well-being of college students with ADHD. This could even allow future researchers to validate personality measures on the ADHD population.

Larger sample sizes are needed to ensure that there are enough participants for a diverse sample with multiple diagnostic groupings. Sampling from classes outside of the psychology department could potentially help with this if other majors have different gender or racial/ethnic ratios. A student's major should also be noted to see if college students with ADHD gravitate towards less rigorous course schedules.

Researchers should explore the coping mechanisms that college students with ADHD already put in place. Peer and familial relationships could be better assessed to determine if college students with ADHD are in fact utilizing their social support networks to better their academic outcomes. Including a questionnaire that examines self-care, study habits or specific usage of academic accommodations could also further the understanding of individuals who have clear resilience, as shown through their acceptance to college. Analyzing the different coping mechanisms of college students who report they have ADHD, and those who do not report a previous diagnosis yet still meet criteria for ADHD after assessment, could reveal some of these skills.

Comparing a parent or friend report of a participant's current functioning could also be a fruitful line of research. It is fairly well established that people with ADHD are better reporters of anxiety and depression (internalizing), but less aware of ADHD symptomatology that impacts others (e.g., interrupting, fidgeting) (Factor, Rosen & Reyes, 2016; Kloo & Kain, 2016). In addition to mental health concerns, physical health problems such as hyperthyroid, hypothyroid, chronic stress, and sleep deficits may also be considered in future research. Obtaining a parent-report of the participant's ADHD symptomatology in childhood or any records (i.e., school or medical) would add to the current literature because very few studies of adults with ADHD mitigate the limitation of a participant's memory of childhood.

Conclusion

The current study extended the literature on college students with ADHD. Through the use of psychometrically sound instruments, valid diagnostic assessment techniques, and conservative decision-making, we attempted to create accurate diagnostic and comparison groups. We compared college students with ADHD to their peers with and without other mental health diagnoses on academic and social functioning. Our findings suggest that college students with ADHD have lower grade point averages and academic self-concept than students without mental health diagnoses, but are similar in these areas to their non-ADHD peers with other mental health diagnoses. Moreover, college students with ADHD report sufficient social functioning; that is, their scores were not different from students without a mental health diagnosis or students with other mental health diagnoses.

Table 1

Means and Standard Deviations of Continuous Variables for the Total Sample (N = 110)

Measures	*M*	*SD*	Items	Possible Range	Actual Range	α	Skewness	Kurtosis
1. CAARS ADHD	59.13	16.40	11	25-90	34-90	.85	.15	-1.11
2. BADDS ADHD	66.19	14.56	9	≤50-100+	50-100	.90	.45	-1.03
3. ADSA - ATS	55.09	14.44	2	30-85	2-10	.26*	-.23	-.55
4. Registrar GPA	3.20	.60	N/A	0-4	1.0-4.0	N/A	-.96	1.02
5. Reported GPA	3.23	.63	N/A	0-5+	1.0-5.6	N/A	-.62	1.22
6. QRI Support	3.37	.60	7	1-4	1.0-4.0	.89	-1.40	2.01
7. QRI Depth	2.98	.63	6	1-4	1.0-4.0	.83	-.54	-.09
8. QRI Conflict	1.63	.48	12	1-4	1.0-3.3	.85	.99	.64
9. PAI Depression	23.51	12.18	24	≤20-110+	.00-60.0	.89	.44	-.07
10. PAI Anxiety	28.96	14.49	24	≤20-110+	3.0-64.0	.92	.26	-.68

Note. *Indicates inter-item correlation reported due to low scale item number, $p = .003$. 1 = Conners' Adult ADHD Rating Scales Total ADHD symptoms T-Score; 2 = Brown Attention-Deficit Disorder Scales; 3 = Attention-Deficit Scales for Adults - Academic Theme Scale; 4 = Registrar-Reported Grade Point Average; 5 = Participant Self-Reported Grade Point Average; 6 = Quality of Relationship Inventory Support Scale; 7 = Quality of Relationship Inventory Depth Scale; 8 = Quality of Relationship Inventory Conflict Scale; 9 = Personality Assessment Inventory Depression Scale; 10 = Personality Assessment Inventory Anxiety Scale

Table 2

Means and Standard Deviations of Continuous Variables for the ADHD Group (n = 26)

Measures	*M*	*SD*	Items	Possible Range	Actual Range	α	Skewness	Kurtosis
1. CAARS ADHD	61.0	8.02	11	25-90	44-83	.61	.57	1.83
2. BADDS ADHD	76.96	12.04	9	≤50-100+	53-94	.69	-.45	-.67
3. ADSA - ATS	61.50	11.41	2	30-85	31-77	-.12*	-.79	.97
4. Registrar GPA	3.15	.53	N/A	0-4	1.80-3.88	N/A	-.63	.25
5. Reported GPA	3.00	.71	N/A	0-5+	1.25-4.25	N/A	-.77	.70
6. QRI Support	3.49	.36	7	1-4	2.71-4.0	.63	.88	-.27
7. QRI Depth	3.00	.52	6	1-4	1.67-4.0	.70	-.33	.31
8. QRI Conflict	1.52	.46	12	1-4	1.08-2.75	.86	1.09	.54
9. PAI Depression	25.85	11.40	24	≤20-110+	3.0-59.0	.87	.71	1.63
10. PAI Anxiety	29.35	12.00	24	≤20-110+	7.0-47.0	.88	-.50	-.89

Note. * Indicates inter-item correlation reported due to low scale item number, $p > .05$. 1 = Conners' Adult ADHD Rating Scales Total ADHD symptoms T-Score; 2 = Brown Attention-Deficit Disorder Scales; 3 = Attention-Deficit Scales for Adults - Academic Theme Scale; 4 = Registrar-Reported Grade Point Average; 5 = Participant Self-Reported Grade Point Average; 6 = Quality of Relationship Inventory Support Scale; 7 = Quality of Relationship Inventory Depth Scale; 8 = Quality of Relationship Inventory Conflict Scale; 9 = Personality Assessment Inventory Depression Scale; 10 = Personality Assessment Inventory Anxiety Scale

Table 3

Means and Standard Deviations of Continuous Variables for the OMH Group (n = 40)

Measures	*M*	*SD*	Items	Possible Range	Actual Range	α	Skewness	Kurtosis
1. CAARS ADHD	60.68	11.21	11	25-90	40.0-85.0	.82	.13	-.73
2. BADDS ADHD	72.45	13.07	9	≤50-100+	50.0-100.0	.86	.05	.54
3. ADSA - ATS	59.80	13.00	2	30-85	31-84	.09*	-.10	-.001
4. Registrar GPA	3.17	.69	N/A	0-4	1.0-4.0	N/A	-.95	.89
5. Reported GPA	3.22	.68	N/A	0-5+	1-5.10	N/A	-.54	2.53
6. QRI Support	3.28	.64	7	1-4	1.57-4.00	.89	-1.80	2.51
7. QRI Depth	2.98	.67	6	1-4	1.33-4.00	.86	-.55	-.34
8. QRI Conflict	1.78	.50	12	1-4	1.08-3.08	.84	.15	-.90
9. PAI Depression	29.28	11.44	24	≤20-110+	6.0-60.0	.86	.28	.16
10. PAI Anxiety	38.25	1.89	24	≤20-110+	15.0-64.0	.87	.03	-.73

Note. * Indicates inter-item correlation reported due to low scale item number, $p > .05$. 1 = Conners' Adult ADHD Rating Scales Total ADHD symptoms T-Score; 2 = Brown Attention-Deficit Disorder Scales; 3 = Attention-Deficit Scales for Adults - Academic Theme Scale; 4 = Registrar-Reported Grade Point Average; 5 = Participant Self-Reported Grade Point Average; 6 = Quality of Relationship Inventory Support Scale; 7 = Quality of Relationship Inventory Depth Scale; 8 = Quality of Relationship Inventory Conflict Scale; 9 = Personality Assessment Inventory Depression Scale; 10 = Personality Assessment Inventory Anxiety Scale

Table 4

Means and Standard Deviations of Continuous Variables for the Comparison Group (n = 44)

Measures	*M*	*SD*	Items	Possible Range	Actual Range	α	Skewness	Kurtosis
1. CAARS ADHD	43.57	8.45	11	25-90	32-70	.77	1.18	1.74
2. BADDS ADHD	54.14	6.52	9	≤50-100+	50-75	.86	1.85	3.0
3. ADSA - ATS	43.89	12.46	2	30-85	20-69	.22*	.41	-.44
4. Registrar GPA	3.19	.64	N/A	0-4	1.25-4.0	N/A	-1.07	1.45
5. Reported GPA	3.43	.48	N/A	0-5+	1.8-4.0	N/A	-1.05	1.46
6. QRI Support	3.40	.57	7	1-4	1.57-4.0	.86	-1.11	1.18
7. QRI Depth	2.95	.64	6	1-4	1.33-3.83	.83	-.66	-.35
8. QRI Conflict	1.48	.36	12	1-4	1.0-2.33	.81	.68	-.33
9. PAI Depression	15.02	8.31	24	≤20-110+	4-37.0	.83	.73	-.03
10. PAI Anxiety	17.45	10.50	24	≤20-110+	3-45	.90	.85	.02

Note. * Indicates inter-item correlation reported due to low scale item number, $p > .05$. 1 = Conners' Adult ADHD Rating Scales Total ADHD symptoms T-Score; 2 = Brown Attention-Deficit Disorder Scales; 3 = Attention-Deficit Scales for Adults - Academic Theme Scale; 4 = Registrar-Reported Grade Point Average; 5 = Participant Self-Reported Grade Point Average; 6 = Quality of Relationship Inventory Support Scale; 7 = Quality of Relationship Inventory Depth Scale; 8 = Quality of Relationship Inventory Conflict Scale; 9 = Personality Assessment Inventory Depression Scale; 10 = Personality Assessment Inventory Anxiety Scale

Table 5

Means and Standard Deviations of Continuous Variables for the Drop Out Group (n = 39)

Measures	M	*SD*	Items	Possible Range	Actual Range	α	Skewness	Kurtosis
1. CAARS ADHD	54.97	9.89	11	25-90	36-72	.74	-.08	-1.00
2. BADDS ADHD	66.59	12.38	9	≤50-100+	50-88	.89	.05	-1.31
3. ADSA - ATS	57.82	13.75	2	30-85	31-84	.18*	-.25	-.66
4. Registrar GPA	3.30	.51	N/A	0-4	1.8-4.0	N/A	-1.11	1.46
5. Reported GPA	3.20	.63	N/A	0-5+	1.8-4.8	N/A	.08	.17
6. QRI Support	3.29	.72	7	1-4	1.0-4.0	.90	-1.21	1.46
7. QRI Depth	2.95	.68	6	1-4	1.0-4.0	.85	-.44	.33
8. QRI Conflict	1.71	.55	12	1-4	1.0-3.3	.86	1.13	.78
9. PAI Depression	24.66	11.60	24	≤20-110+	4.0-5.2	.87	.27	-.30
10. PAI Anxiety	31.95	14.17	24	≤20-110+	9.0-63.0	.92	.58	-.31

Note. * Indicates inter-item correlation reported due to low scale item number, $p > .05$. 1 = Conners' Adult ADHD Rating Scales Total ADHD symptoms T-Score; 2 = Brown Attention-Deficit Disorder Scales; 3 = Attention-Deficit Scales for Adults - Academic Theme Scale; 4 = Registrar-Reported Grade Point Average; 5 = Participant Self-Reported Grade Point Average; 6 = Quality of Relationship Inventory Support Scale; 7 = Quality of Relationship Inventory Depth Scale; 8 = Quality of Relationship Inventory Conflict Scale; 9 = Personality Assessment Inventory Depression Scale; 10 = Personality Assessment Inventory Anxiety Scale

Table 6

Independent Group t-Tests Between ADHD and Drop Out Groups on Continuous Variables

Measures	*t*	*p*
1. CAARS ADHD	2.57	.01
2. BADDS ADHD	3.35	.001
3. ADSA - ATS	1.13	.26
4. Registrar GPA	-1.62	.11
5. Self-Reported GPA	-1.27	.21
6. QRI Support	1.54	.13
7. QRI Depth	.33	.75
8. QRI Conflict	-1.42	.16
9. PAI Depression	.41	.69
10. PAI Anxiety	-.77	.44

Note. 1 = Conners' Adult ADHD Rating Scales Total ADHD symptoms; 2 = Brown Attention-Deficit Disorder Scales; 3 = Attention-Deficit Scales for Adults - Academic Theme Scale; 4 = Registrar-Reported Grade Point Average; 5 = Participant Self-Reported Grade Point Average; 6 = Quality of Relationship Inventory Support Scale; 7 = Quality of Relationship Inventory Depth Scale; 8 = Quality of Relationship Inventory Conflict Scale; 9 = Personality Assessment Inventory Depression Scale; 10 = Personality Assessment Inventory Anxiety Scale

Table 7

Differences Between OMH and Drop Out Groups on Continuous Variables

Measures	*t*	*p*
1. CAARS ADHD	2.34	.02
2. BADDS ADHD	2.05	.04
3. ADSA - ATS	.66	.51
4. Registrar GPA	-.19	.85
5. Self-Reported GPA	-.06	.96
6. QRI Support	-.05	.96
7. QRI Depth	.23	.82
8. QRI Conflict	.64	.52
9. PAI Depression	2.04	.05
10. PAI Anxiety	2.14	.04

Note. 1 = Conners' Adult ADHD Rating Scales Total ADHD symptoms; 2 = Brown Attention-Deficit Disorder Scales; 3 = Attention-Deficit Scales for Adults - Academic Theme Scale; 4 = Registrar-Reported Grade Point Average; 5 = Participant Self-Reported Grade Point Average; 6 = Quality of Relationship Inventory Support Scale; 7 = Quality of Relationship Inventory Depth Scale; 8 = Quality of Relationship Inventory Conflict Scale; 9 = Personality Assessment Inventory Depression Scale; 10 = Personality Assessment Inventory Anxiety Scale

Table 8

Differences Between Comparison and Drop Out Groups on Continuous Variables

Measures	*t*	*p*
1. CAARS ADHD	-5.60	<.001
2. BADDS ADHD	-4.97	<.001
3. ADSA - ATS	-4.84	<.001
4. Registrar GPA	1.76	.08
5. Self-Reported GPA	1.81	.07
6. QRI Support	.80	.43
7. QRI Depth	.04	.97
8. QRI Conflict	-2.13	.04
9. PAI Depression	-4.37	<.001
10. PAI Anxiety	-5.33	<.001

Note. 1 = Conners' Adult ADHD Rating Scales Total ADHD symptoms; 2 = Brown Attention-Deficit Disorder Scales; 3 = Attention-Deficit Scales for Adults - Academic Theme Scale; 4 = Registrar-Reported Grade Point Average; 5 = Participant Self-Reported Grade Point Average; 6 = Quality of Relationship Inventory Support Scale; 7 = Quality of Relationship Inventory Depth Scale; 8 = Quality of Relationship Inventory Conflict Scale; 9 = Personality Assessment Inventory Depression Scale; 10 = Personality Assessment Inventory Anxiety Scale

Table 9

Frequencies and Percentages of Demographic Variables for Total Sample (N = 110)

Demographics	*N*	%
Sex		
Male	30	27.3
Female	80	72.7
Ethnicity		
Asian-American (Asian)	6	5.5
African-American (Black)	15	13.6
European-American (White)	53	48.2
Latin-American (Hispanic)	24	21.8
Other	12	10.9
Sexual Orientation		
Straight	92	83.6
Gay	7	6.4
Bisexual	5	4.5
Questioning/unsure	5	4.5
Class Rank		
Freshman	25	22.7
Sophomore	19	17.3
Junior	26	23.6
Senior	40	36.4

Table 10

Frequencies and Percentages of Demographic Variables for ADHD Group (n = 26)

Demographics	*n*	%
Sex		
Male	9	34.6
Female	17	65.4
Ethnicity		
Asian-American (Asian)	0	0
African-American (Black)	3	11.5
European-American (White)	15	57.7
Latin-American (Hispanic)	7	26.9
Other	1	3.8
Sexual Orientation		
Straight	22	84.6
Gay	1	3.8
Bisexual	2	7.7
Questioning/unsure	1	3.8
Class Rank		
Freshman	5	19.2
Sophomore	6	23.1
Junior	7	26.9
Senior	8	30.8

Table 11

Frequencies and Percentages of Demographic Variables for OMH Group (n = 40)

Demographics	*n*	%
Sex		
Male	11	27.5
Female	29	72.5
Ethnicity		
Asian-American (Asian)	2	5.0
African-American (Black)	6	15.0
European-American (White)	20	50.0
Latin-American (Hispanic)	8	20.0
Other	4	10
Sexual Orientation		
Straight	30	75.0
Gay	4	10.0
Bisexual	3	7.5
Questioning/unsure	3	7.5
Class Rank		
Freshman	9	22.5
Sophomore	4	10.0
Junior	10	25.0
Senior	17	42.5

Table 12

Differences Between Demographic Variables by ADHD and OMH Groups

Demographics	ADHD (n = 26)		OMH (n = 40)			
	n	%	*n*	%	χ^2	*p*
Sex					.38	.54
Male	9	34.6	11	27.5		
Female	17	65.4	29	72.5		
Ethnicity					.42*	.81
African-American (Black)	3	12.0	6	17.6		
European-American (White)	15	60.0	20	58.8		
Latin-American (Hispanic)	7	28.0	8	23.5		
Sexual Orientation					.87*	.35
Straight	22	84.6	30	75.0		
Gay/Bisexual/Questioning	4	15.4	10	25.0		
Class Rank					2.45	.48
Freshman	5	19.2	9	22.5		
Sophomore	6	23.1	4	10.0		
Junior	7	26.9	10	25.0		
Senior	8	30.8	17	42.5		

Note. * Indicates Chi-square was performed despite cell values <5, results should be read as tentative.

Table 13

Frequencies and Percentages of Demographic Variables for Comparison Group (n = 44)

Demographics	*n*	%
Sex		
Male	10	22.7
Female	34	77.3
Ethnicity		
Asian-American (Asian)	4	9.1
African-American (Black)	6	13.6
European-American (White)	18	40.9
Latin-American (Hispanic)	9	20.5
Other	7	15.9
Sexual Orientation		
Straight	40	90.9
Gay	2	4.5
Bisexual	0	0
Questioning/unsure	1	2.3
Class Rank		
Freshman	11	25.0
Sophomore	9	20.5
Junior	9	20.5
Senior	15	34.1

Table 14

Frequencies and Percentages of Demographic Variables for Drop Out Group (n = 39)

Demographics	*n*	%
Sex		
Male	15	38.5
Female	24	61.5
Ethnicity		
Asian-American (Asian)	5	12.8
African-American (Black)	8	20.5
European-American (White)	17	43.6
Latin-American (Hispanic)	8	20.5
Other	1	2.6
Sexual Orientation		
Straight	36	92.3
Gay	1	2.6
Bisexual	2	5.1
Questioning/unsure	0	0
Class Rank		
Freshman	9	23.1
Sophomore	4	10.3
Junior	11	28.2
Senior	15	38.5

Table 15

Differences Between Demographic Variables by ADHD and Drop Out (DO) Groups

	ADHD (n = 26)		DO (n = 39)			
Demographicss	n	%	n	%	χ^2	p
Sex					.10	.75
Male	9	34.6	15	38.5		
Female	17	65.4	24	61.5		
Ethnicity					1.39*	.50
African-American (Black)	3	12.0	8	24.2		
European-American (White)	15	60.0	17	51.5		
Latin-American (Hispanic)	7	28.0	8	24.2		
Sexual Orientation					.96*	.33
Straight	22	84.6	36	92.3		
Gay/Bisexual/Questioning	4	15.4	3	7.7		
Class Rank					2.04*	.56
Freshman	5	19.2	9	23.1		
Sophomore	6	23.1	4	10.3		
Junior	7	26.9	11	28.2		
Senior	8	30.8	15	38.5		

Note. * Indicates Chi-square was performed despite cell values <5, results should be read as tentative.

Table 16

Differences Across Demographic Variables by OMH and Drop Out (DO) Groups

Demographics	OMH (n = 40)		DO (n = 39)		χ^2	p
	n	%	n	%		
Sex					1.08	.30
Male	11	27.5	15	38.5		
Female	29	72.5	24	61.5		
Ethnicity					.52	.92
Asian-American (Asian) and Other	6	15.0	6	15.4		
African-American (Black)	6	15.0	8	20.5		
European-American (White)	20	50.0	17	43.6		
Latin-American (Hispanic)	8	20.0	8	20.5		
Sexual Orientation					4.30*	.04
Straight	30	75.0	36	92.3		
Gay/Bisexual/Questioning	10	25.0	3	7.7		
Class Rank					.16*	.98
Freshman	9	22.5	9	23.1		
Sophomore	4	10.0	4	10.3		
Junior	10	25.0	11	28.2		
Senior	17	42.5	15	38.5		

Note. * Indicates Chi-square was performed despite cell values <5, results should be read as tentative.

Table 17

Differences Across Demographic Variables by Comparison (C) and Drop Out (DO) Groups

	C (n = 44)		DO (n = 39)			
Demographics	*n*	%	*n*	%	χ^2	*p*
Sex					2.43	.12
Male	10	22.7	15	38.5		
Female	34	77.3	24	61.5		
Ethnicity					.47*	.93
Asian-American (Asian) and Other	4	10.8	5	13.2		
African-American (Black)	6	16.2	8	21.1		
European-American (White)	18	48.6	17	44.7		
Latin-American (Hispanic)	9	24.3	8	21.1		
Sexual Orientation					.02*	.90
Straight	40	93.0	36	92.3		
Gay/Bisexual/Questioning	3	7.0	3	7.7		
Class Rank					2.03*	.57
Freshman	11	25	9	23.1		
Sophomore	9	20.5	4	10.3		
Junior	9	20.5	11	28.2		
Senior	15	34.1	15	38.5		

Note. * Indicates Chi-square was performed despite cell values <5, results should be read as tentative.

Table 18

Means and Standard Deviations of Age for Diagnostic Groups

Groups	*M*	*SD*
ADHD	21.08	3.44
OMH	21.38	.52
Comparison	21.59	4.62
Drop Out	22.23	5.21
Total	21.39	3.88

Table 19

Independent Group t-Test Between ADHD and OMH Groups on Age

	N	*M*	*SD*	*t*	*p*
ADHD	26	21.08	3.44	-.35	.72
OMH	40	21.38	3.29		

Table 20

Independent Group t-Test Between ADHD and Comparison Groups on Age

	N	*M*	*SD*	*t*	*p*
ADHD	26	21.08	3.44	-.49	.37
Comparison	44	21.59	4.62		

Table 21

Independent Group t-Test Between ADHD and Drop Out Groups on Age

	N	*M*	*SD*	*t*	*p*
ADHD	26	21.08	3.44	-.99	.33
Drop Out	39	22.23	5.21		

Table 22

Independent Group t-Test Between OMH and Drop Out Groups on Age

	N	*M*	*SD*	*t*	*p*
OMH	40	21.38	3.29	-.87	.39
Drop Out	39	22.23	5.21		

Table 23

Independent Group t-Test Between Comparison and Drop Out Groups on Age

	N	*M*	*SD*	*t*	*p*
Comparison	44	21.59	4.62	-.59	.56
Drop Out	39	22.23	5.21		

Table 24

Frequencies and Percentages of Diagnoses for the ADHD and OMH Groups

	ADHD (*n* = 26)		OMH (*n* = 40)	
Diagnoses	*n*	%	*n*	%
Major Depressive Disorder	9	34.6	22	55
Dysthymia	5	19.2	5	12.5
Bipolar Disorder	0	0	4	10
Social Anxiety Disorder	1	3.8	10	25
Generalized Anxiety Disorder	6	23.1	17	42.5
Post-Traumatic Stress Disorder	0	0	4	10
Obsessive Compulsive Disorder	2	7.7	4	10
Anorexia Nervosa	1	3.8	0	0
Bulimia Nervosa	1	3.8	3	7.5
Schizophrenia Disorder	2	7.7	0	0
Substance Abuse Disorder	5	19.2	9	22.5
Learning Disorder	5	19.2	1	2.5

Table 25

MANOVA Comparing Registrar-Reported and Self-Reported GPAs Across Diagnostic Groups

	df	SS	MS	*F*	Sig.	Partial Eta Squared
Registrar-Reported	2, 103	3.158	1.579	4.55	.013	.081
Self-Reported	2, 103	3.124	1.562	4.511	.013	.081

Note. Registrar GPA = Registrar-Reported Grade Point Average; Self-Reported GPA = Participant Self-Reported Grade Point Average

Table 26

Least Significant Difference (LSD) Comparisons of Registrar-Reported and Self-Reported GPAs Across Diagnostic Groups

Variable	Comparisons	Mean Difference	SE	Sig.
Registrar GPA	ADHD to OMH	-.203	.152	.184
	ADHD to Comparison	-.437	.148	.004
	OMH to Comparison	-.235	.131	.077
Self-Reported GPA	ADHD to OMH	-.168	.152	.269
	ADHD to Comparison	-.426	.148	.005
	OMH to Comparison	-.258	.131	.052

Note. Registrar GPA = Registrar-Reported Grade Point Average; Self-Reported GPA = Participant Self-Reported Grade Point Average

Table 27

ANCOVA Comparing Academic Self-Concept Across Diagnostic Groupings Controlling for Depression and Anxiety Symptoms

SS	*df*	MS	*F*	Sig.	Partial Eta Squared
45.20	2	22.60	8.52	<.001	.14

Table 28

Planned Contrasts for Academic Self-Concept Across Diagnostic Groupings

Comparisons	Mean Difference	SE	Sig.
ADHD to OMH	1.962	3.267	.550
ADHD to Comparison	17.696	3.118	<.001

Table 29

MANCOVA Comparing Perceived Relationship Quality Across Diagnostic Groupings Controlling for Depression and Anxiety Symptoms

	df	SS	MS	*F*	Sig.	Partial Eta Squared
QRI Support	2,105	.82	.41	1.40	.25	.026
QRI Depth	2, 105	.08	.04	.11	.90	.002
QRI Conflict	2, 105	1.64	.82	4.47	.01	.078

Note. QRI Support = Quality of Relationship Inventory Support Scale; QRI Depth = Quality of Relationship Inventory Depth Scale; QRI Conflict = Quality of Relationship Inventory Conflict Scale

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